Online Specificity:
Live Event Artworks and the Inner Continuity of the Network

Mohammad Hossein Namazi

Thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy

University of the Arts London
Chelsea College of Arts

31 October 2018

00.01. Abstract

This practice-based research analyses the encounter of Net/Web artworks, their materiality and their space-time condition. I analyse a selection of *online-specific* artworks to examine their materiality and experiential features in an investigation into how they can offer a varied encounter atypical to offline artworks. The research suggests that these encounters have the potential to disturb a familiar linear or chronological sense of space-time.

In line with this enquiry, the research explores qualities found in *online-specific* artworks that are analogous with the encounter of *durée* (i.e. *duration*). This concept was first theorised by Henri Bergson in 1886 as an experience of *time* with a heterogeneous nature that takes place in the *inner self* of human experience. I examine this theory to consider whether *online-specific* artworks are more capable of precipitating experiences associated with *durée* and its understanding of *memory*. In order to do so, I examine the materiality of these artworks (e.g. HTML/CSS) and their temporal existence in the *network duration* when online users establish a net connection to retrieve them (e.g. URL, HTTP). This research analyses the state of the network as a *heterogeneous* reality, as described by network theorist Tiziana Terranova (2004), in order to explore how such qualities impact the encounter of *online-specific* artworks as inherent assets of the network duration. The thesis proposes that the transitory reality of these time-based artworks are *only* operative in the *live* stream of the information flux that resides in the *virtual* state of the network. As a result, such encounters are analysed through a new notion of *event* described in the research as *live events.* From this perspective, the research explores similar experiential aspects that are shared between *online-specific* artworks and offline time-based artworks (e.g. *Standing Wave* (1920) by Naum Gabo) due to a *live* encounter during their *temporal* activation.

Subsequently, this research analyses the materiality of telecommunication technology, especially within the protocol system (e.g. TCP/IP) operative in the architecture of the Net/Web to illustrate the transitory reality of *online-specific* artworks. Furthermore, through a genealogy of historical references the research selects a number of offline and online artworks to analyse their experiential aspect in relation to their time experience, materiality and method of realisation. The nature of web-based artworks and their encounter is recognised in the research through the iterative possibility of their 'assets' in the network and their potential capability to introduce new memory experiences specific to an online encounter.

TABLE OF CONTENTS

00.02. Introduction

Research overview — In the 1990s when the World Wide Web (www)[1] was first introduced to the public, a new form of artistic practice emerged that utilised the network and its applications for the production of artworks. Internet-based art practice celebrated this new means of telecommunication, championing its use for open accessibility, freedom of (art) distribution and as a way to directly engage with an audience, or those participating with the work.

Early experimentation with the Internet as an art medium, known as the net.art movement, established new forms of engagement that offered varied and unfamiliar encounters; often where previous 'spectators' became active 'participants' or users, operating in contrary to the ways in which Gallery-based art used to be encountered (Greene, 2004). The Internet introduced technical protocols, applications and devices to establish communication and distribute data across the network. Internet-based artists engage with this condition of the network to circulate and share their artworks with members of the public who use this technology increasingly for their day-to-day activities.

This practice-based research provides an articulation of the materiality and experiential aspects of Internet Art in a global digital network. The practice and accompanying analysis attends specifically to the temporal experience of networks, derived from outlining analogies between an account of durée derived from the philosophy of Henri Bergson, and the experience of duration in the network when activated. As a result, the research looks into the virtual state of the web and its associated production of durée as time-experience, with the potential of artworks to induce a live-event. For this, the research provides a new reading of Bergson's philosophy of time when encountering artworks that utilise net/web materiality. During various stages, my research engages with a number of characteristics associated with internet artworks, including: participatory,

[1] The term World Wide Web was invented by Tim Berners-Lee, which is one of the many applications of internet technology. The Web is an application that is divergent from and carried by the Internet. In chapter one, I will explain in more detail the structure of the Web and its significance in the way that information is distributed, but for now it should be understood that the Web is not the same at the Internet.

digitalised, technological, political, temporal and socially-engaged experiences.

I focused on the Internet as a tool for the production of artworks, in line with the goals of my investigation; specifically the production of artworks and their particular encounter in a network understood as temporal and heterogeneous. In this context, the network theories that support this approach were taken into consideration to achieve a conceptual linkage between the Bergsonian account of durée and the duration of the network. Although within this research, there are references to net.art when engaging with political, technological, or historical aspects, they are not the centre of attention in this research. Consequently, instead of a broad historical context into net/web artworks, a conceptual reading of their time-experience in specific relation to Henri Bergson's account of durée has focussed this investigation.

During the procedure of the research, I have been engaged with a number of artworks in relation to their materiality, medium, participation, and time-experience. Through this engagement I have also gained an understanding of the artists and their approach to art-making. However, as the research has developed, I have excluded many sections as they did not cover the core features of my research.

Nevertheless, I have included three appendices for this practice-based research. The first explores *One Day in the Street,* organised by the artist research group GRAV in 1968, which provides information on their first public participatory art event and my analysis of their equivalent representation within the Internet environment as a public realm. The second section is titled *Codes-Trouvés*, which aims to describe an online manifestation of found-object and readymade, as understood through codes and their virtual presence in the network. In this section, I utilised an artwork by Jean Tinguely that was produced with readymade objects to introduce a manifestation into their equivalency within the online condition, through a digital/virtual presence (e.g. readymade codes).

The third section in the Appendices relates to the artwork *Five Minute Conversations,* which I made in 2015. Through the trajectory of the research, I concluded that there is no need to include an in-depth analysis of this artwork within the main body of the text.

Nevertheless, I realised its presence as an appendix could provide additional information to the curious reader in terms of exploring more information in relation to the practice aspect of the research and ideas around participation, collaboration and the iterative process.

To succeed in this research trajectory, it became crucial to familiarise the reader with the complex data transaction in the network and the operation of the World Wide Web.

Research Methodology —

This practice-based research utilises a combination of analyses in practice and theory to explore the specific act of encounter in Internet Art in addition to their alternative time-experience. Throughout various chapters of this research, I will aim to achieve a number of goals by responding to the following questions:

- What are the constituent *materialities* of internet-based artworks?
- How is an encounter of telematic time and space experienced?
- How could a Bergsonian account of durée and its heterogeneous quality be applicable in network duration?
- How do we understand the concept of *lived duration* in artworks represented as a *live event*?
- How could the online encounter of internet-based artworks contribute to alternative forms of time experience, in addition to new types of memory experiences?

In fulfilling these enquiries, I will utilise the following methods:

Methods

(1) Making online-specific artworks (html/css)
(2) Exploration of the materiality and the encounter of online-specific artworks
(3) Analyses of relevant net.art literature and appropriate historical examples
(4) Analyses of Henri Bergson's account of time as in durée (1889, 1896)

(5) Analyses of conceptual readings of the network in a heterogeneous context
(6) Exploring commonalities between durée and network duration

Methodology

This practice-based research takes into account the concept of the 'reflective practitioner' and 'reflective practice' derived from Donald Schön in 1983. Through a reflection into practice, I aim to combine research and practical work, concepts and results into a context for an examination. This research prioritises the particular apprehension and understanding that lies in the realm of the practitioner (Malins and Gray, 2004).

Through a reflection on experimentation with internet programming and making online-specific artworks, I will explore their experiential aspects as well as selected works by other practitioners. In parallel, I will examine the writings of artists, art critics, and theorists on net/web art, comparing their thinking to my own discoveries. The 'Net Art Anthology', provided by Rhizome, will serve as one of my active, coherent and accessible resources for online historical research in net/web discourse.[2] The reflective practice approach employed in this investigation provides the capacity for me to evaluate the procedure of the research in its various stages both in the production of artworks and the theoretical development in relation to practice. Through a critical approach and evaluation into my exploration, seeking suggestions, views and the observations of other practitioners, academics and peers, I make sure to create an inter-subjective approach and to fulfil my goals in this inquiry (Malins and Gray, 2004).

In order to manage the complexity and multi-dimensional aspects of the research, the six methods mentioned earlier will generate six investigational domains that provide resources for one another. However, the initiation of this research begins with the production of net/web-based artworks to provide practice-based knowledge, including materiality and related time-experience.

[2] At the time of this research, the Rhizome website is hosting a two-year long online exhibition that will gradually exhibit one hundred historical and contemporary net/web artworks. For more information see: https://anthology.rhizome.org/

Within this phase, I use a combination of self-written lines of code and found codes discovered in the digital archives, as well as code available widely and freely on the www (e.g. W3C, Stack Overflow, etc.).

Each method in this investigation has the potential to provide resources and analyses in various points in time. Plus, their permutations. For instance, the analysis of Bergsonian account of durée, provides resources to explore their conceptual and experiential relevance when applied in the environment of the network. Equally, the exploration into the materiality of the Internet offers a framework to demonstrate how data traverses the network within a temporal duration established in a connection.

The production of web-based artworks including *Technography*, *Internet Fantasy* and *Entropic Iteration*, in addition to the solo exhibition *Around Hospitality*, provided insights in exploration, analyses and understanding in various dimensions of internet-based artworks – when presented in online or offline settings. For instance, the series of html/css animated objects: *Technography*, provided an insight into the online-specificity and time-experience when their presence do not extend beyond the realm of the browsers. However, the internet-based sound artwork, *Internet Fantasy*, informed the research of situations where participation and engagement of the audience is key to the realisation of the artwork in the physical space. On the other hand, the series of internet gif animations, *Entropic Iteration*, provided practical resources in the capacity of the Internet to materialise physical experiences (or their manifestations) into the virtual space of the net.

The methodology of reflective practitioner enabled me to deploy things that I learned and developed from one artwork, to explore other dimensions in another. On reflection, these methods enabled me to produce a coherent trajectory and development through my practice, and equally importantly, it enabled me to explore various aspects of Bergson's theory of time within the diverse encounters of these online-specific artworks.

The model of the reflective practitioner provided the appropriate framework to develop a trajectory both in theory and practice. This development began through my early engagement with programming, relevant literature, network theories and Henri Bergson's philosophy of time. The early coding practice enabled me to utilise the things that I learned from html/css code-

experimentation and led to the production of the *Technography* series as a manifestation of an online event.

I embodied the encounter, engagement and digital materiality of *Technography* in practical analysis and theoretical reflections. These online-specific artworks (e.g. *location.405, location.580,* etc.) had provided the basis for my research to juxtapose and compare them with other internet-based artworks (e.g. *Form Art, Kings Cross Phone-In,* etc.) and to conceptualise Bergsonian theory within their time-experience. Additionally, utilising the experience of making *Technography* enabled me to manifest their location within the network and their inclusion in a heterogenous environment. This is to say, their making procedure helped to build insight into the theoretical aspects of Internet Art and their relation to the network.

In the next phase of the research, I elaborated on these experiences to produce a more participatory demanding work, *Internet Fantasy,* which provided a discourse to reflect on the participatory aspect of the work within a temporary live-event. In addition, the realisation of this artwork enabled me to reflect on the Bergsonian account of duration within both physical and virtual aspects, as in the offline and online realms of the live-event. Reflective practice was particularly beneficial within this work as it enabled a context where analysis on the time-experience of the artwork were possible both within online and offline conditions.

Moving to the production of the internet-based gif animation, *Entropic Iteration,* I reflected on the experience of the previous two artworks to manifest an offline/physical encounter within the online-specific realm. Therefore, I deployed the research experience of the previously made artworks to contextualise *Entropic Iteration* and to articulate the differences it can offer. Thus, its production enabled my research to bring into context manifestations of an offline encounter (associated to its physical sense of time), within the network and online-specific conditions.

While these three artworks each informed the research of alternative aspects of internet-based artworks, the exhibition, *Around Hospitality*, provided an appropriate frame to juxtapose internet-based artworks in a gallery context next to offline artworks. The act of encounter in each of these artworks provided insights into the various attributes of the online-specific artworks and their

associations with a Bergsonian account of durée.

Through a Bergsonian account, the research concentrates on relevant aspects in relation to Bergson's concept of durée when applied in the context of a heterogeneous network. On the other hand, the artworks I selected for analyses, serve as a genealogy into previous experiments and achievements by other practitioners.

The analyses of a selection of artworks provide resources to explore the materiality and, equally importantly, their act of encounter. Therefore, the combination of a Bergsonian account of durée and the investigation into the materiality of the network proffer a context to investigate the time-based element of such artworks and their temporal state.

From the outset, I will provide an account of the *materiality* of the Internet/Web, to identify the nature of telematics (or telecommunication and informatics) as a medium. This aims to clarify for the reader the operational mechanisms of web-based artworks and the potential effect on the user during the act of encountering.

In order to gain an in-depth theoretical understanding of the notion of the time experience of the net/web, I will analyse the theory of *durée* (i.e. duration) as defined by Henri Bergson. To do so, I will mainly refer to his two texts *Time and Free Will* (1889) and *Matter and Memory* (1896). Furthermore, I will examine the work of other theorists who have written about Bergson's concept of duration and I will draw on this thinking to define a network space-time condition. Following this enquiry, I will evaluate the nature of *live-ness* that resides in Bergson's durée in order to unfold a discussion on the *live* experience of the way in which web art takes place.

Research approach — To achieve my primary goals and to reflect on the aforementioned questions, this practice-based research is demonstrated in three chapters that focus on online specificity, network duration and art as live event.

The making procedure in my practice evidenced in this research is interwoven closely with theory through analysis provided on the notion of durée and its potential to open up my understanding of the encounter of web-based artworks. It is from this background that this thesis explores the Bergsonian theory of durée as seen in the context of network duration. The research will investigate the potential of forming an analogy between durée and network duration through materiality, time-experience and the specific act of encounter found in online space.

The reader will soon notice that this thesis is integrated with *hyperlinks* to guide you either towards my web-based artworks or to examples of net/web artworks made by other artists. On some occasions I have used hyperlinks to refer to the video documentation of my practice, or the visualisation of technical features of the research. Therefore, this thesis *is an offline document that takes the shape of an interlinked online document*. While the thesis may well exist on a website eventually, the physical paper version necessitates an interaction between the off and online, so that the reader is requested to engage with the network mechanisms that the chapters describe as well as practically enabling the reader to fully comprehend the context and to experience the practice described.

This practice-based research examines three web-based artworks that I made throughout the doctoral research. Each of these artworks are introduced to address specific features of web-based artworks and the varied forms of encounter that they produce. I describe *Technography* (2014–18)*, Internet Fantasy* (2016)*,* and *Entropic Iteration* (2016). While the *Technography* series and *Internet Fantasy* are the main focus of the analysis in this research, *Entropic Iteration* acts as a particular case to describe experiential aspects that the aforementioned artworks do not directly address. Therefore, it has not been necessary to analyse details of the making procedure in *Entropic Iteration* that has already been covered by the other two examples. However, in addition to its integration into the research context, *Entropic Iteration* also functions as an external booklet attached to this thesis representing the art project as an annex.

Research structure — The conceptual framework found in this research is ordered around ideas of *materiality, acts of encounter, time experience* and the *making procedure* of web-based artworks. The three chapters making up this thesis can be outlined in the following way:

Chapter One: Online Specificity – The Materiality of the Net/Web Encounter

This practice-based research first analyses the materiality of internet/web architecture and the technology found in the electronic environment of the network. The chapter opens with a description and detailed examination of the *Technography* series, the first artwork selected from my practice.

In this chapter I use the term *online specific* to address artworks that rely entirely on net/web materiality for their realisation (e.g. HTML tags). This is a term I have introduced to make a particular distinction with other types of art-related encounters on the Web, generally referred to as post-internet artworks. The former uses the World Wide Web as a medium to inhabit, whereas the latter uses it only to disseminate and document artworks that often exist elsewhere.

As a result, chapter one serves to explore online specificity through the virtual materiality of telematic technology. Web-based artworks are realised only in a temporal state when a user establishes a connection with the network. I analyse technical and conceptual features of *Technography* in relation to the particular conditions of the online environment, including a reading of some historical web-based artworks.

Through exploring a selection of historical net.art experimentations in the 1990s, chapter one opens a discussion around their materiality and specific act of encounter, whether through their engagement with users or their temporal realisations within the network. These artworks include, *King's Cross Phone-In* (1994) by Heath Bunting, *'http://oss.jodi.org/ss.html* (1995) by the collective JODI, *My Boyfriend Came Back from the War* (1996) by Olia Lialina (also known as a *Net_Film*) and *Form Art* (1997) by Alexei Shulgin.

Chapter Two: Network Duration – The Inner-Continuity of the Self and the Duration of the Network

Having determined the materiality and specificity of the network, this research proceeds by exploring Henri Bergson's theory of *time* as *durée*, a form that is heterogeneous. I will examine how Bergson depicts *durée* as residing in the inner-self of the human encounter and how this space is a non-spatial realm.

I will investigate this theory of time to determine whether it could extend into the space of network architecture and whether, in turn, this space has the potential to introduce new notions of *durée.* In parallel, I will explore the time experience of online users while engaging with attributes of online-specific artworks. These include the nature of telematic space-time, network architecture and simultaneity in the act of encounter and participation.

While Bergson is prominent in my research, I will also explore his theory through other analyses provided by Gilles Deleuze (1988), Tiziana Terranova (2004), Christian Kerslake (2007) and Jay Lampert (2012). This is to understand other readings to see how they relate to the practice-based research found in this thesis. As I will explain, Bergson stresses that durée resides in live-ness, allowing encounters to be temporal. In this chapter, my main interest is to explore the *live* aspect of durée in the inner self, which I use to give a reading of the *live* nature of time-based artworks, especially in internet/www artworks. To achieve this, I consider historical artworks that involve *live experience* (i.e. an event occurring in real time), which I relate to the real time experience of the Internet ecosystem.

In chapter two I will elaborate on the *Technography* series and other web-based artworks to analyse their time experience in relation to a Bergsonian account of duration. As a result, I will elaborate my analyses of Olia Lialina's *Net_Film,* as well as introducing Thomson-Craighead's *A Live Portrait of Tim Berners-Lee* (2014). Furthermore, I lay the ground for exploring other types of offline time-based artworks and their commonalities in the act of encounter with web-based artwork. This is initiated by introducing *Standing Wave* made by Naum Gabo in 1920.

Chapter two continues with an in-depth analysis and exploration into the nature of telematic space-time and provides theory and analyses around *network memory* as established by Tiziana Terranova (2004). This chapter ends by relating back to the materiality of the Internet/Web as depicted in chapter one in order to understand the nature of duration in the inner state of the network. I will describe the status of information flux in a temporal, nonlinear and virtual setting.

Chapter Three: Art as Live-Event — The Felt Duration in the Act of Encounter

Chapter three approaches the Web as a framework capable of producing new notions of event. I begin this chapter by introducing and analysing *Internet Fantasy,* another example of my web-based art practice, orchestrated in 2016. I analyse how internet/web materiality allows for web-art strategies to situate a *live event* that is interlinked with the network. I introduce the term *live event* to identify the act of encounter that occurs in the *live experience* of an event in real time. This term applies to both *spatial* and *non-spatial* encounters; encompassing the nature of events in durée, as well as in the *felt durational* encounter in the *live event* of web/event-based artworks.

In chapter three I continue my analysis of the commonalities that web-based art has with the early time/event-based artwork *Standing Wave* (1920) by Naum Gabo and I also introduce *Light-Space Modulator* by László Moholy-Nagy (1922), *18 Happenings in 6 Parts* (1959) by Allan Kaprow and *Lampada Annuale* (1966) by Alighiero Boetti. Such early time-based artworks expanded and extended the framework of art–this was achieved, 'by breaking with two forms of stasis: spatial and temporal' (Shanken, 2009: 17). This is mainly achieved through the *live* nature of the encounter that is understood to be mutual when these artworks are realised. Here I re-introduce an analysis of Bergson's durée to explore the condition of *lived duration* encountered within these artworks. Furthermore, I analyse the critical writing of Guy Brett (1968), Frank Popper (1968) and Edward A. Shanken (2009), in order to further understand my encounter with the time-based *Standing Wave.* In addition to analysing the notion of *event* in selected historical artworks, I re-visit my research from previous chapters to identify the application of event within the temporal duration of the network.

Research context — Examining the nature of time and space in internet/web architecture provides temporal situations that engage with participation, live events and online specificity. The temporal and virtual manifestation of web-based artworks within the network duration, triggers specific experiential aspects that cannot take place in the physical encounter of works of art.

The temporal settings established between a web browser and a web server, provide an individual form of encounter within the frame of a screen for online users. However, equally, these web-based artworks are publicly accessible through the informational flow in the network of nodes, which can be seen as a shared repository in which all is available everywhere at the same time. Therefore, in such settings the simultaneous act of encounter has the potential to be shared among many users.

The framework provided in the encounter of web-based artworks, including its materiality and space-time condition, provides new notions of time experience in works of art, as well as giving rise to new types of memory images constructed from online encounters. By investigating the links between the notion of durée and the nature of memory I will analyse the impact of these concepts in the production, application and realisation of web-based artworks. In this practice-based research, the realisation of web-based artworks is considered in the virtual space of the World Wide Web, where information is constantly under transformation in temporal iterations. In other words, the Internet is the virtual web as well as the physical infrastructure such as data centres and computational hardware.

Given that the Internet is a relatively available and accessible platform around the world, I will seek to summaries this research by considering the capacity of this hybrid and simultaneous space for art in contemporary culture. In an era where telematic technology offers new dynamics between physical and logical existence (Rheingold, 1995), network duration plays an important role in arts production and reception. In this context, I will investigate how the web reflects and elaborates on artistic expression in conceptual, social and experimental Fine Art practice.

00.03. Contextual Review

To come to an understanding of the relevant discourse on durationally situated Internet Art, and to be able to determine my own definition for such a practice, I have tried to develop specific terminology. However, this research has also engaged with some ideas attributed to artworks associated with Constructivism, which explored notions of time, and event within other related art practices. As a result, the contextual review of this research includes a combination of writers who explored early time-based artworks as well as contemporary writers who have analysed theories and practices in relation to Internet Art.

I was initially engaged with writers such as Guy Brett (*Kinetic Art*, 1968; *Force Fields*, 1999) who explored the notion of event within early time-based artworks and the kinetic art movement. Similarly, the writings of Frank Popper (*Art: Action and Participation*, 1975), Jack Burnham (*Beyond Modern Sculpture*, 1968), and Edward Shanken (*Art and Electronic Media*, 2009), were very informative to position a pre- or early internet understanding of time-based artworks. This also overlaps with participatory features in the experience of artworks that were extensively analysed by writers such as Claire Bishop (*Participation*, 2006; *Artificial Hells: Participatory Art and the Politics of Spectatorship*, 2012), Lucy Lippard (*Six years: the dematerialization of the art object from 1966 to 1972*, 1973), and Pamela Lee (*Chronophobia: On Time in the Art of the 1960s*, 2006). These writers offered great insights into positioning the nature of event, participation, and socially engaged art practice in a pre-internet art era. Exploration into their writings enabled me to imagine similar concepts and concerns in art practice within the realm of the Internet. I visited the archive of Getty Museum where I closely observed some of the actual materials (e.g. artworks, objects, publications) discussed by the aforementioned writers in relation to constructivism, kinetic art and early computer art. The list of these observations is provided after the bibliography section (see page: 202–204).

The relations between technology and a move towards participation/usership enabled me to highlight the equivalent features in pre-internet art practice and, therefore, to think of similar concepts within the virtual space of the Internet.

This comparison was important, as it supported relevant insights in the capacity of encountering the notion of time and event in internet/web architecture. One important break-through consisted of providing a working definition of temporal internet-based art practices and then developing my own position: online-specificity.

Brett Stalbaum, an information theorist at University of California San Diego, focuses on the formal aspects of Internet Art to explain the practice of the net.art of the 1990s as a media that enables 'authorial choice between the poles of fast and slow, and as such the choice constitutes a general aesthetic position taken by the artist' (Stalbaum, online: 1998). What is particular to Stalbaum's approach lies in his attempt to define net.art within its aesthetic quality. By highlighting that speed is a 'fundamental descriptive quality' in the net.art medium, Stalbaum explains that the time-experience in the encounter of net.art should be through 'the breadth of the hypertext relative to the conceptual depth of the work' (ibid).

Stalbaum relates the concept of time in hypermedia as a matter of 'implementation and not representation' (ibid), suggesting that net.art also follows the same approach. My research context relates closely to Stalbaum's approach, also asserting that hypertext maintains the main property of Internet related artworks and is, therefore, a gateway to manifesting the time-experience of online-specific artworks. This aspect has been represented in my research through analysing the nonlinear movement, provided by hypertext and its effect on users' sense of time within the Internet environment. However, I would reflect that Stalbaum gives too much emphasis to the formal aspects of Internet Art to arrive at a definition for net.art. On the contrary, my research explores the formal and conceptual aspects of online-specific artworks through their participatory, online/offline social activities, in addition to specific types of Internet materiality (e.g. protocols, html/css programming, digital materiality) as properties that can comprise formal and conceptual aspects of online-specific artworks.

The move from a pre-internet era to online art practices has been the focus of Peter Weibel, the director of ZKM, in his curated exhibition *Net_Condition,* which was exhibited in Barcelona, Graz, Karlsruhe and Tokyo from 1998 to 2000 (Weibel, 2001). Weibel attempts to highlight how the media alter and shape

reality (Weibel, 2001). As a result, it is not surprising that he limited his definition of Internet Art to the general and broad *new media*. In the introduction for *Net_Condition*, which was the first major show to exhibit Internet Art in a gallery context, Weibel observes net art as a radical form of art with the potential to connect the isolated systems of modern art to the open system of computer and network art in a post-modern era. Following this observation, he states, in the case of this new media art exhibition, 'the traditional material places and cultural institutions served as a basis for extending artistic activities from local physical spaces into the information space' (Weibel and Druckrey, 1999: 8). This aspect of Internet Art is reflected in my research by connecting the time-experience of an artwork in a Bergsonian account of durée, to the time-experience within the duration of the network (see: 02.02).

The publication *Net_Condition* (2001), includes many essays and artworks all linked to the term *new media* and its position within fine art practice. The exhibition serves as a useful reference and an attempt to exhibit net art utilising a combination of online (ZKM's website) and onsite models (Verschooren, 2007).

Despite a broad and general approach to the field, Rachel Greene's writings in her book *Internet Art* (2004), provided a chronological context for related activities from the pre-internet to the net.art era. What I found important in Green's book resides in her attempt to link 60s conceptualism and 70s early computer art activities to internet-art practice. Her exploration enabled this research to gain an understanding of artistic activities at a time that early telecommunication technologies were exposing their significant cultural and socio-political impact. These include writings about E.A.T. (Experiments in Art and Technology) and Roy Ascott's early telematic projects such as *The Pleasure of the Text* (1984).

In contrast to Greene's broad definition, Julian Stallabrass in his book *Internet Art: The Online Clash of Culture and Commerce* (2003) takes a specific approach, which highlights the Internet Art relationship to activism and the anti-corporate spirit that overarches such works of art. Stallabrass defines that 'the Internet is not a medium, like painting, print, or video, but rather a transmission system for data that potentially simulates all reproductive media' (Stallabrass, 2003: 12). Stallabrass' reading of the Internet as a vehicle for transferring data, limits the

possibility to define any medium specific features for Internet Art, but equally opens an alternative window to observe such art practice within the overall context of the network, and hence the specificities of the network.

Stallabrass' description of the notion of 'nettime' contributed to this research, however, I outline my views on the network as a medium/tool for art production, to which in Chapter 1, I have extensively laid out the materiality of the Internet and its specific protocolar condition for navigation of the information.

In this context, I found Alexander Galloway's writings in *Protocol: How Control Exists after Decentralization* (2004) to be significant due to his analysis of internet-based methods of communication within its restricted 'protocological technology' (Galloway, 2004, 2012). From the viewpoint of Galloway, an internet-based artwork is a practice that takes place within the universal network, making a tactical link with the protocol suite as its main feature. Through this prism, this condition enables such artworks to challenge the centralisation of power in the network (Galloway, 2004). I find Galloway's approach relevant to the context of this research as it highlights the protocological condition of the network and positions internet-based artworks as inherent component in this environment.

In the book series of *Media Art Net* (2004 – 05), Vol. 1 and 2, Rudolf Frieling and Dieter Daniels outlined a cohesive research and analysis as to the role of media and its utilisation in contemporary culture. The book follows a general and common route in utilising a *historical* approach, dating back to the early 20th century. By introducing artists such as Lazlo Moholy-Nagy and theorists such as Bertolt Brecht, the narration of the book aims to apply similar approaches to most of the major industrial, conceptual and technological movements in the arts during the 20th century. Therefore, the survey covers a very wide range of subjects in relation to telematic art and computer art, including some observations on Internet Art and its contribution to the sphere of New Media. This proved useful as it established a connection between the physical materiality of the book and its online presence. The authors make it clear that the link: *www.mediaartnet.org* maintains the principle location of the publication, where various forms of representations including audiovisual and theoretical structures are available. The editors believe this online-offline connection will provide 'profound and comprehensively documented information

and contextualization' for readers (Frieling and Daniels, 2004: 14). In particular, I significantly learnt from section 8 of *Media Art Net 1*, titled *Interaction, Participation, Networking* written by Inke Arns. In this section, Arns connects the live and participatory features in artworks made by conceptual artists such as John Cage, Dan Graham, Allan Kaprow, to then juxtapose them with telematics and network-based artworks made by artists including Roy Ascott, Peter Weibel and Nam June Paik. Although the book serves very well as a reference to be informed about various telematics art projects, however, the authors intention is not to provide any specific definition of Internet Art or Telematics Art.

Mark Tribe and Reena Jana also include internet-based artworks within the broad field of New Media Art. In their book, *New Media Art* (2006), a selection of internet-based artworks are described as the result of the impact of media technologies that maintain the capacity to offer a particular mode of engagement.

Although the collection of art projects presented in the book as well as on the Rhizome website (https://rhizome.org/art/artbase/), have contributed greatly to my research (*Net Art Anthology*, 2019), nevertheless, it is not possible to fully agree with Tribe's generalisation of internet-based artworks under the term New Media – as it represents a broad term that can refer to a number of media types dating back to a pre-Internet era such as digital moving image. Instead, the work of Karen Verschooren, a researcher and scholar in the field of Internet Art, gives a more accurate reading by not considering new media art as a movement, which is something that Tribe and Jana insist on in their definition (Verschooren, 2007). However, I take into account the general understanding of New Media Art that can be relevant in the historical context of art.

Following the above, I have to state that my research was influenced by Tribe and Jana's description of artworks, when they refer to open source principles, found material, and the nature of collaboration and sharing that are inherent in artworks associated with the Internet. For instance, their writings that describe a Duchampian basis in Internet art practices, align with my approach in this research – this is reflected by introducing examples such as *Life Sharing* by Eva and Franco Mattes and *MBCBFTW* by Olia Lialina. One particular term that they borrowed from pop-culture is *re-mixing,* which refers to various version of

MBCBFTW made by other users in the network. This is equivalent to the term *Iterative Process,* which I have chosen to echo a similar concept in my research.

I found the writings of Tilman Baumgartel in his book *[net.art 2.0]* (2005), a valuable guide. This is not only due to his views on Internet specificities (e.g. codes, protocols, virtual realisation, etc.) as the main characteristics and material for internet-based artworks, but equally importantly, to his views in positioning net.art practice with the capacity to go beyond artistic projects on the Internet.

Baumgartel aims to contextualise Internet Art through a comparison of divergent art constructed inside the Internet with art made outside the network. I found a useful analogy in Baumgartel's writings when some artworks are brought into the context that are not generally associated with Internet Art and therefore project a conceptual understanding and manifest perspective into the field. For instance, Malevich's notion of *'suprematic space'*, Vladimir Tatlin's *Tower,* Lucio Fontana's *Movimento Spaziale* and the *'Art by Telephone'* exhibition at the SFMoma in 1969. (Baumgartel, 2005: 31). As a result, Tilman Baumgartel introduces a deeper articulation and analysis into a discourse that does not fixate on the clichés such as browser, computer, and programming. Instead it provides a trajectory of thoughts and activities in which net art can also be seen to be included.

The analysis and writings of Professor Tom Corby in his book *Network Art: Practices and Positions* (2006), suggest a specific and clear definition for Internet associated artworks in relation to the notion of *network*. Corby highlights the network reality of such artworks, but equally states that their presence can apply to offline art projects. He writes that '…network art […] is inclusive of practices that are formally complex but also works in which technology is not a necessary and present condition for the realisation and dissemination of the work – such as books and performance' (Corby, 2006: 2). Corby's definition is important to the context of my research as it highlights the potential of the network not only as an online reality but also in offline conditions. This definition describes the multi-dimensional aspect of internet-based art projects that can utilise various strategies to extend their manifestations into physical and offline settings. This aspect is also reflected in my proposed term *online-specific*. I aimed to identify such capacity within the network through giving an

account of artworks such as *Phone in Kings X* (see page: 39) and *Internet Fantasy* (see page: 103), to bring into focus the presence of the network as a social space and an offline setting. Corby's definition can also encompass a wide range of Internet Art practices, therefore his description has the potential of including social and cultural projects utilising network technologies.

With a journalistic background and method of writing, Josephine Bosma lays out a detailed analysis of Internet Art discourse aiming for a definition of what she calls a complicated and complex form of art. Bosma's approach is more pragmatic in terms of resolving a so-called well-known problem: *what is net.art, and how to define it?*

The goal in her book *Nettitude's Let's Talk Net Art* (2011), is to come up with a specific definition for Net Art. I found Bosma's journalistic style notably helpful for my research as her review and analysis of writers mentioned earlier (e.g. Burnham, Stallabrass, Greene, Baumgartel, Tribe and Jana, and Shanken amongst others) provided an appropriate context for comparisons of various approaches in Internet Art practice. Her definition of Internet Art, as she states herself, comprises a flexible approach similar to the Internet's condition. She states, 'net art is art based in or on Internet culture. These are in constant flux' (Bosma, 2011: 24). By highlighting the cultural aspect that the Internet has brought to contemporary society, Bosma makes it clear that net art does not necessarily need a 'physical (hard-wired or wireless) connection to the Internet' (ibid), and thus can exist independent to the network. In this respect, the definition she provides of Internet Art has a commonality with Corby's definition in voicing that internet-based artworks can exist offline as well as online. However, Bosma grounds her definition on theories of the French philosopher, Gilbert Simondon, intending to bring to attention that culture and technology are inseparable and thus culture is actively reflected within technological developments (Bosma, 2011). Net art for Bosma is 'art that is created from an awareness of, or deep involvement, in a world transferred and affected by elaborate technical ensembles' (Bosma, 2011: 25). Thus, net art is established and developed through the Network.

Another point within the context of complexity and instability of the technological and cultural aspect of the Internet, relates to Bosma's approach to

Internet Art. This aligns with my view that Internet Art is heterogenous and therefore 'it contains and even connects numerous disciplines' (Bosma, 2011: 26).

This also applies when Bosma explains the importance of 'flow' in its direct and 'close contact' to the network, which Marshall McLuhan has referred to as the extension of our nervous system (Bosma, 63: 2011). This leads to an active 'live' network linking various physical and/or virtual locations. This includes both formal and conceptual aspects of the Internet, to which Bosma depicted an outline of five features: *code*, *flow*, *screen*, *matter* and *context*. Although these issues relate to the context of my research, one particular feature is the notion of *flow* within the network; Bosma aims to highlight the vital and explicit utilisation of *active* network connections. As she states: 'for me, an explicit form of flow exists in the installation and performance context, where it connects flows of the body and the machine, of the social and the technological networks' (ibid).

Lauren Cornell and Ed Halter, in their recently published book, *Mass Effect* (2015), explored the influence of the Internet and its various products (e.g. social media, digital archives, data-transferring, etc.) on contemporary life-style, to then position art in today's society.

In their essay, *Hard Reboot,* that acts as an introduction to the book, Cornell and Halter highlight key topics that they believe have been affected by the Internet including: history, togetherness, memory, place, etc. By inviting contributions from writers and artists, the book covers an interesting collection of themes that discuss the Internet and the position of artwork in a contemporary networked society.

For instance, one particular example relates to Domenico Quaranta's essay *Internet State of Mind,* published as part of *Mass Effect*. Quaranta looks into the sociological and psychological influence of the Internet by stating: 'If everybody has joined "an internet state of mind" and art can flow freely between the networked space and the white cube, does internet art still make any sense?' (Quaranta in Cornell and Halter, 2015: 431). In depicting an anti-market and activist characteristics for Internet artists, Quaranta praises such forms of art practice. He suggests that since the Internet remains a domain that enables artists to engage with a broader audience, it can offer a more effective art

practice stimulating dialogues and criticism on global issues. This notion of connectivity is reflected in my research within the heterogenous quality of the Internet, to which a nonlinear time-experience is offered by means of network duration and temporal connections.

Although Cornell and Halter do not provide any specific definition of internet-based artworks, the book has influenced my research in positioning and proposing alternative forms of encountering art in the environment of a web 2.0 telecommunication system. This is due to the close proximity and easy access to the Internet that web 2.0 offers to users.

This situation was reflected in more detail in Eva Respini's recent book, *Art in the Age of the Internet, 1989 to Today,* published in 2018. Respini curates a useful collection of essays from various writers and artists aiming to cover all the contemporary creative practices (art & design) that have emerged during the past few years. The book serves very well as a chronological reference into the history of Internet Art practice. Nevertheless, Respini does not attempt to define Internet Art, rather providing a collection of practices that inter-connect and/or utilise the Internet in order to be realised.

Respini makes this clear by stating that the book originated to 'respond to our shifting, infinite present by exhibiting and examining artworks that represent multivalent artistic strategies' (Respini, 41: 2018). In other words, through the new technological development of the Internet, especially after the web 2.0 era, which made the network more interactive and user-friendly, the number of Internet associated creative practices has grown. For instance, 3-D printing, digital video animations, virtual reality, online gaming and hacking are only some of the new practices made possible by the network (Respini, 2018). These practices can use the Internet as part of the production process, but might not themselves be considered Internet-based artworks. The term *online-specificity,* introduced for this research, has the capacity to fill this gap and make it more specific to the necessity of the *online* condition of Internet Art projects.

Christian Paul in her book *Digital Art* (2015), offers a general review of digital art in a socio-political context including its accessibility, dynamism and participatory features. The book consists of many examples of artworks with brief attention given to their analysis, making it more like a book designed to list

artworks associated with digital art than critical review. Her approach to digital art included some examples of internet-based artworks capable of contextualising ideas such as ownership, copyright, participation, activism and hacking (e.g. Documenta X cloned website by Vuk Cosic, 1997; *Toywar* by etoy, 1999; *Life Sharing* by Eva and Franco Mattes, 2001) (Paul: 2015). Nevertheless, these net-based artworks remain only as examples for Paul to demonstrate the digital characteristics and their operation within digital conditions, which therefore offered minimal influence on my research. This was due to Paul's generalisation of internet-based artworks within their digital features, in contrary to their specificities within the network and their internet-related materiality.

The book *Information,* edited by Sarah Cook, provided incredible access to a curated collection of texts in relation to information, telematics, network, net.art and post-internet art, spanning from 1970 to 2016. Through these critical analyses, I had valuable access to various explorations by artists in relation to the subject of information, not just as a material for their artworks but also 'as process [and] as methods' (Cook, 2016: 13). The five chapters[3] of the book follow a thematic exploration of the circulation of information in our environment and its utilisation to produce, receive, distribute and encounter art. For instance, the Live Web artwork *Beacon* (2005 – 2016) by Thomson and Craighead that creates 'concrete poetry' by witnessing the network constantly to create snapshots of online activities (Cook, 2016: 107). To give another example, the conversation between Cook and Bunting provided insights into Bunting's practice and his approach to working as an internet artist. I also became very engaged with Charu Maithani's essay *Error/Glitch/Noise: Observation on Aesthetic Forms of Failure,* addressing various aesthetic forms of failure when information transfers in the network – referring to the temporal states of connections (Cook, 102: 2016). Nevertheless, the book is not aiming to provide a clear definition of Internet Art, rather its goal is to reflect practitioners' or theorists' insights on the effect of the mass global circulation of information through the Internet.

Peter Lunenfeld in his book *Snap to Grid* (2000), outlines a wide range of subjects in the context of digital media, art and culture. There are a few parts in the book that links briefly with examples in relation to Internet Art. For

[3] The chapters are: Information as Matter, The Informational Milieu, Information's Modalities, Too Much Information and What Information Wants.

instance, in Part II: Media's, sections 4 and 6, internet-based artworks such as *Grammotron* (1999) by Mike Amerika and JODI's <*Jodi.org*> (1997), are discussed respectively (Lunenfeld, 2000: 48, 83). Nevertheless, the book mainly investigates a sociological study of the presence and the effect of Digital Media on the human living condition. Lunenfeld is not concerned with a definition of Internet Art, but rather is interested in a wide framework of techno-cultural society, which spans from Cyborg Economics to Digital Photography, or from the World Wide Web to Virtual Reality and Hybrid Architecture. I enjoyed exploring *Snap to Grid,* as it opens up the possibility for the reader to become familiar with a fast-developing techno-cultural society that has been influenced/changed by various aspects of Digital technology.

In contrary to Lunenfeld, Jon Ippolito focusses more on Internet Art. In his article *Ten Myths of Internet Art,* published in *Leonardo* journal (2002)*,* he aims to clarify ten general common misunderstandings in Internet Art. For instance, as part of 'Myth Number 5: Internet art = Web art', Ippolito, describes the differences of www and the Internet, which explains other online protocols such as e-mail, peer-to-peer instant messaging, videoconference, etc. Although the short article aims to approach some general misconceptions about Internet Art from a wide scope, it is not intending to specifically identify any clear definition of Internet Art (Leonardo, 2002).

Jon Ippolito aims to locate Internet Art in the wider context of Fine Art history. This is derived from a conscious decision not to define the specificity of Internet Art, but rather as Richard Rinehart, a collaborator of Ippolito, states: 'When Jon and I reference new media art here, we are not indicating a separate "genre" of art. […] So we will not limit our discussion to narrowly defined terms. We will use the inclusive term "new media art," which has digital art at its centre and other non-traditional art forms at its blurry edge' (Ippolito and Rinehart, 2014: 21). As a result, although their co-authored book *Re-collection, Art, New Media, and Social Memory* (2014) has interesting material to offer, especially in relation to the growing influence of various digital technologies in the social context of contemporary culture, it lacks specific definitions and descriptions of Internet Art per se.

Andreas Broeckmann includes examples of Internet Art in his book *Machine Art in the Twentieth Century* (2016), referring to them as 'browser software projects'

(Broeckmann, 2016: 145). By highlighting the role of software, Broeckmann aims to reform and link the historical term of machine and computer art to internet-based artworks. For example, by referring to *Wrong Browser* (2000) by JODI, he states that such 'artistic browser software projects […] indicate the typical relation between a critical articulation of information infrastructure and the visualisation of machine operations' (Broeckmann, 2016: 145). Thus, Broeckmann highlights the role of machines as a primary aspect of such artworks in contrast to the interaction, exchange and or participation of the users. However, Broeckmann eventually re-establishes his argument around the notion of network. He clearly states that, 'the dynamic network environments in which projects like these [e.g. *Wrong Browser*] operate make them akin to an aesthetics of systems rather than one of machines' (Broeckmann, 2016: 145). In chapter 6 of this book, Broeckmann discusses in greater detail the network-based nature of such artworks and utilises Felix Guattari's writings to describe a narrative for machines as a 'continuous state of transformation and becoming' (Broeckmann, 2016: 242). Nevertheless, even in this chapter, there is not much sign of Internet Art projects and hence much of the writing relies on a traditional understanding of computer art and its roots in constructivism by re-examining the work of artists such as Nicolas Schöffer, Roy Ascott, Hans Haacke and Joseph Beuys. As a result, Broeckmann does not provide any clear definition of, or concentration on, Internet Art, except by indicating the importance of the network within the nature of internet-based artworks.

To define the terminology of my research, I was inspired and influenced by the approaches of authors including Baumgartel, Galloway, Corby and Bosma, in their thinking, analyses and definition of Internet Art practices. I devised the term *online-specific* to call attention to art projects that utilise the Internet, either as their main tool or in relation to the network.

Online-specific refers to artworks that were either entirely made using the Internet or have utilised the Internet as one stage in their realisation. This definition is not in contrary to Corby or Bosma's understanding of the *network* reality of Internet Art, but rather, it focuses on the necessity of an on-line connection somewhere in the making process.

Therefore, the term *online-specific* is inclusive of both online and offline projects, however, it aims to clarify and highlight the online condition that was used in

the process of production. As a result, the term live-event used in this research refers to the live-ness or temporality of the network, capable of manifesting in both online and offline settings.

To support my terminology, alongside examples from my own practice, I carefully selected some historical artworks from the realm of Internet Art. For instance, I utilised Heath Bunting's artwork *_readme.html* (1998), to refer to the connectivity as well as commodification of online-specific artworks. In another example, by showcasing Olia Lialina's *My Boyfriend Came Back from the War* (1996), I aimed to represent the nonlinearity of an online encounter. These artworks precisely demonstrate the multiple possibilities of encountering the work and represent a manifestation of the notion of online and its (potential) connectivity and nonlinearity in the network. In addition, through examples such as JODI's *http://oss.jodi.org/ss.html* (1995) and Alexei Shulgin's *Form Art* (1997), the multiple possibilities of interaction and engagement with users are demonstrated in the research as specific characteristics of online and virtual encounters, which introduces alternative descriptions of participation and socially engaged practice. This is also depicted briefly in *Life Sharing* (2000 – 2003), an artwork by Eva and Franco Mattes. Moreover, by analysing Heath Bunting's *King's X Phone In* (1994), the research provided an example of an actual event in a physical space, which was sourced from online communications and connectivity. This latter example provided grounds to investigate strategies in online-specific artworks that can lead to an event being staged in a physical space – through the participation of users and in collaboration with them.

In addition, the notion of *'online'* itself is evolving in the rapidly growing Internet era of my generation. Today, we are almost online by default and therefore the ontology of being online has increasingly merged with offline experiences. To highlight this aspect of the Internet in a time that web 3.0 is imminent, online-specificity can bring into context this new state of connectivity, distribution and the location of online-specific artworks within its realm.

Chapter 1.

Online Specificity – The Materiality of the Net/Web Encounter

---

01.00. Chapter Overview – This investigation begins by outlining the materiality and the architecture of the Internet as well as the communication protocols of the World Wide Web. I will analyse the technical and conceptual features of my web-based art practice in relation to the particular conditions of the online environment, including an analysis of some historical and contemporary web-based artworks.

Online specific is a term I will deploy throughout this thesis in order to describe works of art that use the materiality of the web and that exist in the online environment. *Online specific* represents both the site and time specificity of these web-based artworks. I will propose that online specific artworks manifest certain attributes such as *live-ness* and taking on the characteristics of an event that has a very particular temporal quality. I will study these attributes throughout the thesis however in this chapter I will concentrate on the materiality and temporal presence of such artworks in the network. Online specific is particularly suitable for describing the creation of artworks that are products of programming languages on the World Wide Web (WWW). By utilising this term, I intend to distinguish web-based artworks from works of art in the physical (offline) environment. This term also applies to artworks that are represented in the physical environment but whose existence is dependent, sourced and linked to the WWW.

In this chapter, I also explore the specific condition of the web environment with reference to my artistic practice and critical reflection. Within my online studio—a place between my computer and the WWW (e.g. my website)—I will introduce new approaches in the production process, studio practice and the experiential encounter with web-based artworks. The *Technography* artworks (made between 2014 – 2017) will provide the main source of reflection and experimentation for this chapter. I will explain:

(1) How these artworks were made
(2) How they explore temporal and participatory conditions as events

(3) How their presence relates to a specific sense of time
To develop the above, it is necessary to explore the structure and constituents of the medium of the Internet/WWW. The network and its applications have provided novel strategies for my practice, impacting on the way I make and think about art as temporal experiences. Thus, I initiate this account of my research by exploring the concept of the WWW, its origins and the technical properties that drive it. In doing so, I will focus only on elements that concern the materiality and the experience of my artworks so as to understand and explain how the reality of the WWW and its network architecture can manifest new notions for my practice and artworks more generally.

The exploration of the materiality and the experience of my web-based artworks (e.g. *Technography*) will provide an account of this research to explore non-linear temporal experience in my web-based practice. In order to develop a more in-depth understanding of time and temporality in relation to the Internet/WWW, I will consider historical artworks that involve what I will describe as 'live experience'. I will develop this concept of 'live-ness' in relation to *network duration.*

01.01. ***Technography***

I am sitting on a fast train! The train is busy. My friend is sitting on the other side of the aisle away from me. We use the WhatsApp application to communicate and exchange messages between us during a two-hour journey back to London. While we are exchanging messages, I think of this surreal transition of text between our devices. I imagine the entrance of texts/images/icons into my device as virtual objects that come out of my friend's phone, travelling through the fast moving train and into the cloud network of the internet ecosystem, only to then reappear on the screen of my own device.

This encounter alters my perception of space-time on the train and frees my sense of the physical, spatial confines by immersing me into the expanse of *web time* and *web space*. The experience produces a sense of betwixt and between in which the online users' *body* is physically located somewhere, but is being impacted by sensorial information as the *mind* is simultaneously engaged on and offline in a web space that is concurrently *everywhere* and *nowhere* (Ascott, 1995). These back and forth message exchanges between our devices happen almost instantly—in the blink of an eye—disrupting not only a spatial sense, but also an offline sense of linear time, by expanding into the digital and communicating in quick time across spatial boundaries. This sense of spatiotemporal disorientation occurs due to our immersion in the space-time of the network that is different to the space-time of the train environment. This leads to the mixing of two realities: *our presence on the train with our presence in the network*. Could artworks also be shared in a manner similar to text messages in this web environment? Would it be possible to think of artworks traveling to us or of us travelling to them?

Following this encounter, I became more conscious of the agency of the network, including its materiality and aesthetics, the way it inhabits space and time, as well as the way that users engage in interactivity and participatory features. These conditions are now part of everyday life in the majority of contemporary societies, including my own. A recent study by IBM Big Data and Analytics Hub estimated that 2.5 quintillion bytes (2.3 trillion gigabytes) of data was created each day in 2015 (Geng, 2017). The same report estimates that by 2020 the volume scale of data production will reach 40 zettabytes (43 trillion gigabytes), which is an increase of 300 times since 2005 (ibid).

This study indicates a great volume of online users and their engagement with the network (e.g. video sharing, music broadcasting, stock market data, social media, etc.). These interactions and encounters produce an immense flux of information that moves across the inner space of the network, the workings of which I will outline further in this chapter.

In order to get to grips with the specificities of the encounter with the Internet/WWW, and the processes that occur to maintain and transfer information, I began to utilise webpages to experiment with their potential for art production. Later, I collectively called these experiments *Technography*.

Technography is a hypermedia series of web-based encounters. The series contains dynamic animated shapes with a specific timespan. However, these animated forms are not pre-recorded, they are *live* entities that can *only* transpire in the *specific time* of a user *requesting* access to them. Thus, resonating aspects of an event—or, *web event*. These encounters are found and located through their URL address. Each succession of *Technography* inhabits a specific location in the network, listed via its Domain Name System (DNS) protocol.

Technography was developed over a number of years through experimentation with coding practice. The initial idea began by thinking through the possibility of considering a webpage as a space where an *event* could occur. In this context, I am interested in web-based *assets*[4] (i.e. data) as something that can only materialise at the user's *request*. This condition emphasises the idea that the Web only exists in motion, in a 'live' space in which assets operate as web-based events that automatically set off a series of actions. Thus, when communicating on the train via WhatsApp with another user, with each sent or received text, my device connects to a server (see: 01.04) and then uses a custom Hypertext Transfer Protocol (HTTP) (specific to the WhatsApp application) to communicate my messages to this server. The server then in return, reports the information to the other user's device. When multiple users are connected to the web at the same time, there is a set of *live connections* to the server and *live streams of data*

[4] Document assets, or merely *assets,* is a term I use to refer to artefacts, units and information found on the WWW.

from the server (Sebesta, 2009). Temporally bound connections transfer data in the network and deliver assets to the screen of my device with immediacy that, if I am well connected, appear 'live' at my request as text messages, photos, audio tracks, gif files, video clips, icons, emojis.

Technography works in a similar way. The data of *Technography* (hypermedia documents) materialises in the course of the network duration *when* protocols (e.g. URL, TCP/IP, HTTP, HTML) are exchanged between an online user and a server. These processes are inherent in *Technography* and its specific condition of being existent online. The assets (i.e. data) of the series are stored on a web server that might be located anywhere in the world as long as it can be reached by my host provider company Crazy Domains. This is where the specific information of *Technography* concerning its protocols (e.g. URLs, HTTP, HTML, DNS, etc.) and the data concerning its contents (e.g. codes) are stored. Online users can encounter the *Technography* series by requesting them via their URL.

These assets also enable me to send or share *Technography* to friends, institutions, galleries, supervisors (and potentially to all members of the network) as embedded links in emails, WhatsApp or Skype messages, social media platforms, blogs, etc. This increases the possibility of sharing *Technography* across various platforms and enables encounters on users' desktop computers while at home, in the office or on their portable pocket devices wherever they are located globally where it is possible to get online.

The webpages of *Technography* are based on two different coding languages: Hypertext Markup Language (HTML) and Cascading Style Sheets (CSS).[5] HTML is a language[6] constructed by using 'text with embedded tags'[7] (Sheldon, 2001: 593). The purpose of an HTML file is to, 'describe the general form and layout of documents to be displayed by browsers' (Sebesta, 2009: 39). CSS determines how HTML elements should be rendered on screen, on paper, in sound or in other media (W3C, 2018).[8] CSS coding language defines the style and

---

6 A *markup language* refers to 'a system (e.g. HTML) for marking or tagging a document that indicates its logical structure (such as paragraphs) and gives instructions for its layout on the page especially for electronic transmission and display' (Merriam-Webster Dictionary, 2018).

7 A tag is 'an element of code in a computer document used especially to control format and layout or to establish a hyperlink' (Merriam-Webster Dictionary, 2018).

7 The World Wide Web Consortium (W3C) is 'an international community where member organisations, a full-time staff and the public work together to develop Web standards' (W3C, 2018).

controlling factors of every element such as shape, speed, colour, size, the angle of shapes and the timeframe for this dynamic document, which is then applied harmoniously across various devices and software browsers.

HTML files are stored in web servers where they wait for user requests. Once a request is made a *default* webpage with an HTML arrangement is sent to users allowing the web browser to read and execute the HTML tags. This results in content being prepared for display. Although HTML documents enable the display of data objects such as images, sounds and other multimedia objects, these 'objects are not actually stored in the text of the HTML document' (Sheldon, 2001: 593). In the request moment, 'the external reference pulls the *referenced object* [i.e. *asset*] in to the document' (ibid), to be structured and displayed in the web browser.

When writing HTML, *tags* must be added to the text to define the execution of a particular event and its arrangements. This includes the opening tag and the closing tag: e.g. *<title>Technography</title>*, which is the *tag* that executes the *title* of the webpage. An HTML webpage typically contains three parts:

(1) A line containing the HTML version:
e.g. `<!doctype html>`.

(2) A declarative header section, which includes the metadata that defines the document title, character set, styles, links, scripts and other meta-information:

e.g. `<meta name="description" content="Mohammad Namazi web-based Technography artworks">.`

(3) The body, which includes the actual content such as text, image, sound, video or more codes:

e.g. `<body> <div id="location-405" title= "location-405" div align="center"> </body>.`

In the body, the tags are used to specify, 'a division or a section in an HTML document' (W3S School, 2018). In the above example, a tag is

named as ‘location-405’ and is used to indicate a container in the HTML document of *location.405*. The container is used to control the exact orientation of each element of *Technography* on the page and is a reference to enable CSS to style further features such as, *height, width, position, font-family, font-size, colour, transformation, animation, speed, duration, iteration, opacity* etc. The text below includes all the CSS behavioural attributes coded for *location.405.*

```
#location.405  {

        position: fixed;
        outline: #666 dotted;
        width: 200px;
        height: 133px;
        left: 600px;
        top: 300px;
        z-index: 1;
        transform: rotate(0deg);
        -webkit-animation: outlinemove2 15s infinite;
        -webkit-animation-direction: alternate;
        -webkit-animation-play-state: running;
        -webkit-animation-timing-function: linear; /* Chrome, Safari, Opera */
        animation: outlinemove2 40s infinite;
        animation-iteration-count: 2;
        animation-delay: 15s;

}
```

```
<!doctype html>

<html lang="en">
<meta charset="UTF-8">
<link href="../css/404animatiecsc.css" rel="stylesheet" type="text/css">

<head>
<title>work.no.405 - Technography</title>
<link rel="shortcut icon" href="../favicon.ico.BMP">
<meta name="description" content="Mohammad Namazi Artworks">
<meta name="keywords" content="Mohammad Namazi, Website">
<meta name="author" content="Mohammad Namazi">
<meta name="viewport" content="width=device-width; initial-scale=0.4;
maximum-scale=0.6">

<style type="text/css">

body, td, th {
      color: #000;
      font-size: 11px;
      font-family: Arial, Helvetica, sans-serif;
}
</style>

</head>

<body>

<div id="workanimate405" title= "Work No. 405" div align="center">

</div>

</body>
</html>
```

1. 1. HTML document, location.405, *Technography* series, 2016

```css
@charset "UTF-8";
/* CSS Document */

#workanimate405 {
	position: fixed;
	outline: #666 dotted;
	width: 200px;
	height: 133px;
	z-index: 1;
	margin-left: 600px;
	top: 300px;
	transform: rotate(0deg);

	-webkit-animation: outlinemove2 15s infinite;
	-webkit-animation-direction: alternate;
	-webkit-animation-play-state: running;
	-webkit-animation-timing-function: linear;

	animation: outlinemove2 15s infinite;
	animation-iteration-count: 2;
	animation-delay: 4s;

}

@-webkit-keyframes outlinemove2 {

    50% {outline-width: 0px;}
}

@keyframes outlinemove2 {

    50% {outline-width: 250px;}
}
```

Figure 1.2. CSS document, location.405, *Technography* series, 2016

I define each part of the *Technography* series by their location in the network. For instance, *Location.405, Location.580,* etc. are the sequences I introduced both to identify them and to create a separation between each artwork. I used Adobe Dreamweaver software to assemble code, edit and craft *Technography*. The making is purely an offline practice in which the coding process occurs in local software while offline. Although, this being said, there might be occasions that I use the Web for problem solving or for utilising readymade pieces of code during the making procedure.

As a result, once this part of the process has been completed, I will incorporate the assets (i.e. data) of *Technography* within the *network*. Once the assets are uploaded, their location is specified and located by the URL address. Users of the network can reach *Technography* via their URL at anytime and anywhere. Figure. 1.1. and 1.2. present the HTML tags and the CSS codes of *location.405* respectively. Once, the HTML and CSS are attached together the artwork is ready for realisation.

The following series of images are three screenshots taken from various stages of *Technography location.405.* In the making procedure, I established specific mutual features for all the different forms of *Technography*. These features are:

(1) *They all automatically begin to perform fifteen seconds after reaching the URL*
(2) Once the movement begins, the entire course of action must be executed and end uninterruptedly, or in other words, the user cannot pause *Technography* yet they can reload or close the browser
(3) The moving elements must return to their pixel location where they were initially found
(4) Other pages on the web can be connected to *Technography,* yet themselves must not be connected to any other web assets

Aside from these rules, each series of *Technography* has its own specific characteristics such as its composition, shape, colour, speed, iteration, timing, etc. I programmed a delay of fifteen seconds in order to introduce an anticipatory moment for the encounter of the 'live event', as opposed to an immediate start. In addition, I realised dynamic objects should return to their original point/pixel on the webpage in order to demonstrate a circular form of completing a course of actions. The construction of shapes in *Technography* first begins with code experimentation on basic forms such as a rectangle, circle or text. But this stage leads to exploration with new possibilities in coding to deform, transform, or move the shapes to produce alternative timings and motion. The primary location of *Technography* is on my website. When I share *Technography* with other locations or members of the WWW, they are still sourced through the location of my website in the network.

Furthermore, I decided to isolate each *Technography* experiment so that when encountered by users they function as a cul-de-sac in the network. However, users are able to either reload their browser (Command/Ctrl + R) to re-activate *Technography* or they can reverse and go back to the previous route that they were taking. In the network other webpages (e.g. my website) are connected to *Technography,* enabling its assets to be part of the duration of the network.

An encounter with the *Technography* series is fully completed once the user has experienced the entire timespan programmed—this is when *Technography* stops further actions automatically. Prior to further reading, please now visit *location.405* by browsing the following URL.[9]

http://mohammadnamazi.com/technography/location.405.html

In *location.405,* there are two iterations of a single action that each last forty seconds. Therefore, the full timespan of the artwork ends after eighty seconds. The *live event* in *location.405,* consists of a transformation in the scale of multiple miniature dots lined up into the shape of a rectangle which, over time, significantly enlarge into circular dots. In this action, while the dots are gradually enlarging, their quantity is reducing due to the limited available space in the rectangle of the screen. However, they regain their original arrangement when returning to their initial *pixel position* on the webpage (i.e. width: 200px, height: 133px, margin-left: 600px, top: 300px), thus completing their course of action.

[9] As I indicated in the introduction, this practice-based research *takes the shape of an offline document that is inter-linked with online documents*, resulting in the *necessity* of encountering the suggested Uniform Resource Locators (URLs) to enable the reader to proceed from one phase to another and to fully comprehend the context.

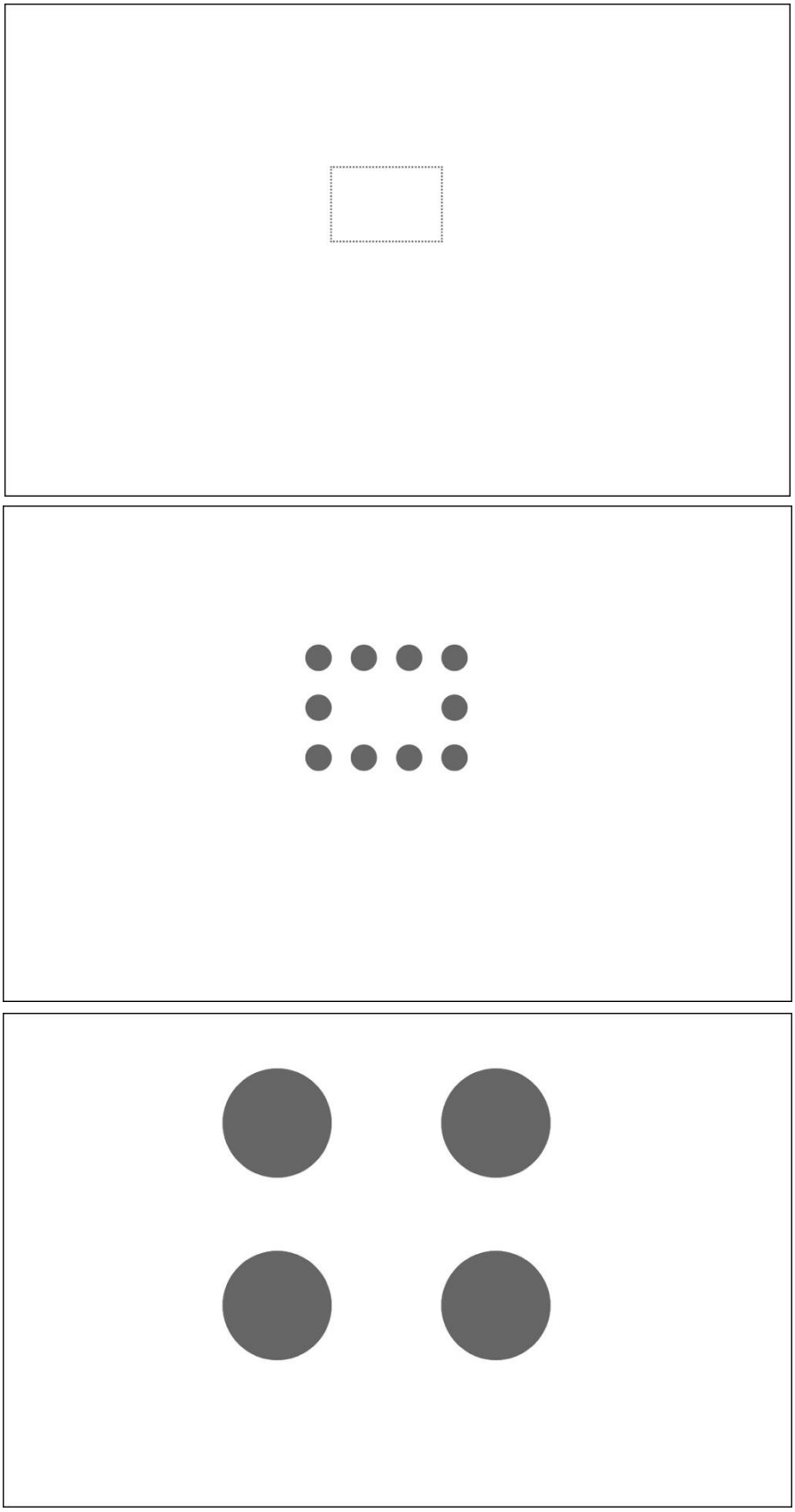

Figure 1.3. Screenshots from location.405, *Technography*, Mohammad Namazi, 2016

In the procedure of the *live event* in *location.405,* the gradual transformation of the rectangular shape into four enlarged circles increases the size of the forms on the screen. This transformation allows for the emergence of the grey colour to gradually become the strongest visual element present. When encountering *location.405* for the first time, you are unaware of the timespan of the animation (eighty seconds) as you are instead engaged with the various transformations that are taking place in the different phases of the live event. The combination of these transformations (e.g. shift in size, shape, arrangement and the screen colour change) situates an experience that is online and yet has the potential to alter the users' physical sensations. These characteristics are portrayed and experienced differently in *location.406*. Prior to progressing to the next paragraph, please now visit *location.406* by browsing the following URL:

http://mohammadnamazi.com/technography/location.406.html

In *location.406,* the live event comprises of the *rotation* of a rectangle, as well as the *transformation* of its outlining borders into an enlarged rectangular surface, spilling over the entire space of a fifteen-inch monitor. While this encounter might be different in another user device due to variation in screen size, the timespan of the work will nevertheless remain concrete.

In *location.406,* two iterations of the same action construct the full timeline. Each iteration lasts sixty seconds and therefore the course of the complete encounter will take 120 seconds. In this work, the outline of the rectangle consists of a double line border. In the event of the transformation, the content of each of these two thin lines is stretched and enlarged, as well as rotated. Thus, in contrary to the previous work, in *location.406,* two actions are executed simultaneously in the *live event*: the *rotation* and the *enlargement*. In *406,* I introduced a slower pace in contrast to *405,* so that the encounter with these two actions becomes more perceptible. Equally, a slower pace emphasises the transition of colour on the screen, enhancing the users' experience. This occurs when the small gradient green-yellow rectangle that is (initially) surrounded by a large amount of white space, gradually increases in size to occupy the entire webpage, effecting the act of encounter through various differentiations of visual elements.

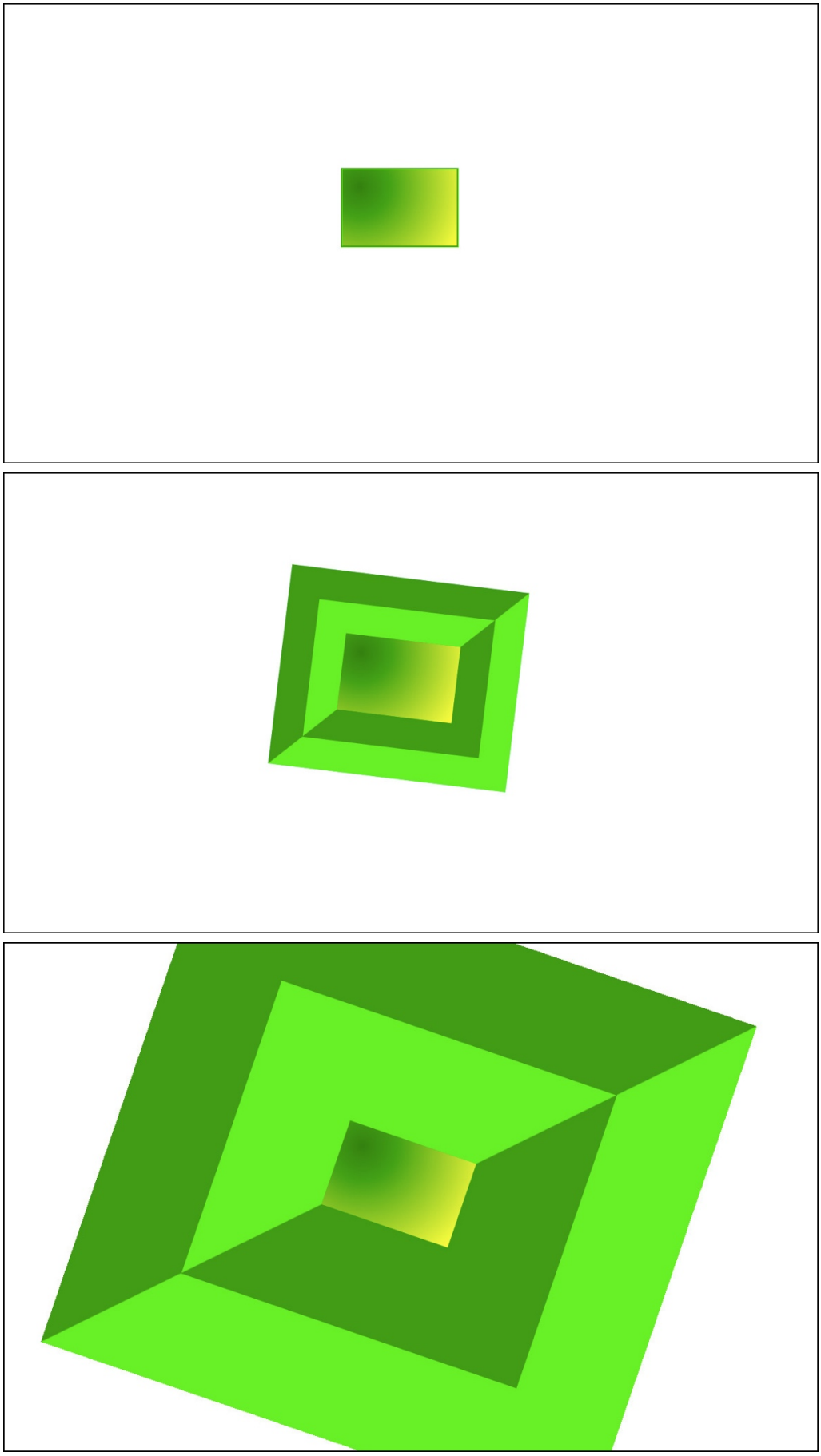

Figure 1.4. Screenshots from location.406, *Technography*, Mohammad Namazi, 2016

The variations within each element of the *Technography* series produces a different encounter for users. For instance, *location.580,* uses two words, *Right* and *Left,* accompanied with a dot. Each of these elements on the hypermedia page of *Technography* varies in size, colour, the direction of movement, speed and various transitions in which the forms shrink or expand.

In comparison, the experiential impact of *Technography*: *location.641* is different as it has no textual information but is instead comprised of two lines with different widths, colour and differing speeds. Thus *location.641* mainly introduces a sensorial encounter with the user, influenced by the rhythm between the two forms during the course of their movements.

Prior to progressing to the next paragraph, please now visit *location.580* and *location.641* by browsing the two following URLs:

http://mohammadnamazi.com/technography/location.580.html

http://mohammadnamazi.com/technography/location.641.html

The practice of creating live events through different visual attributes in the *Technography* series, has the potential to impact online users during their encounter. In addition, users are not only experiencing a temporal visual event, but are at the same time witnessing the specific time of their connection to the server—interacting with the nature of time within the web. As a result, the *time experience* suggested by *Technography* varies, engaging with the telematic time[10] of the Web (see: 02.06) and the course of various live events in the encounter. In chapters two and three I will explore whether this *time experience* could be analogical to the notion of *durée* as described by Henri Bergson in *Time and Free Will* (1886).

[10] I will discuss telematic time in more detail in chapters two and three, but for now it is important to understand that telematic time and space in this research refers to the engagement with telecommunication devices such as computers or various types of smart devices enabled to connect to the Internet. Forms of engagement include sending, receiving and storing information on the Web or a device using telecommunication devices.

Figure 1.5. Screenshots from Location.580, *Technography*, Mohammad Namazi 2016

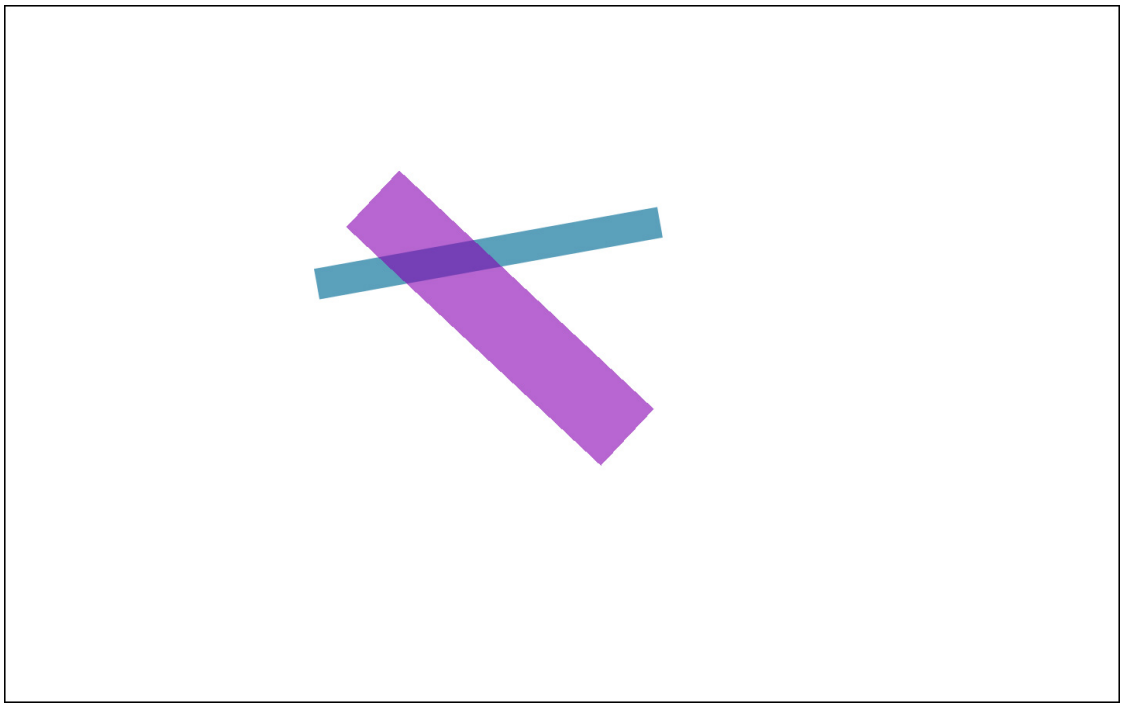

Figure 1.6. Screenshots from Location.641, *Technography*, Mohammad Namazi, 2016

The more I experimented with assembling code as a base material for my practice, the more I became engaged with art production methods *limited* to the condition of being online. This includes an understanding of web assets, or digital objects, and how they can be constructed, reused, or upcycled in the virtual space of the Web. I learnt how codebase scripts (e.g. HTML, CSS) are shared and exchanged on various online platforms with a DIY approach to solving coding problems (e.g. Stack Overflow, W3Schools). Equally, such forms of practice introduce familiarisation with the iterative quality[11] of the Web and how readymade digital objects are subject to be contextualised and re-contextualised in this environment.

Throughout the research I will discuss various sequences of *Technography*. Within the experimentation of *Technography,* one significant enquiry related to the materiality of the network, specifically in relation to the transportation of assets. Or, in other words, how do these assets travel the network to reach my device as a *live event* via HTML tags and CSS operations?

[11] I will unpack the *iterative* condition of the web in chapter three. At this point, it is necessary to understand that any data on the web has potential to be reproduced in endless successive repetition (see: 03.07).

01.02. The Network of Networks

The *Technography* series resides and is realised within the Internet network. Their multiple iterations are inherent to the conditions found in the environment that forms the Internet. The Internet is a global system of information transfer that utilises many predecessor telecommunication and network technologies going back to 1950s.[12] In practical terms, 'the Internet is a global web of interconnected computer networks—a network of networks' (Sheldon, 2001: 630).

Computers range from all sizes, designs and forms of production and are not all directly connected to each other. Instead, typically, all computers within an organisation are linked together and only 'one node on this local network is physically connected to the Internet' (Sebesta, 2009: 21). This is why the Internet is understood as, 'a network of networks rather than a network of computers' (ibid).

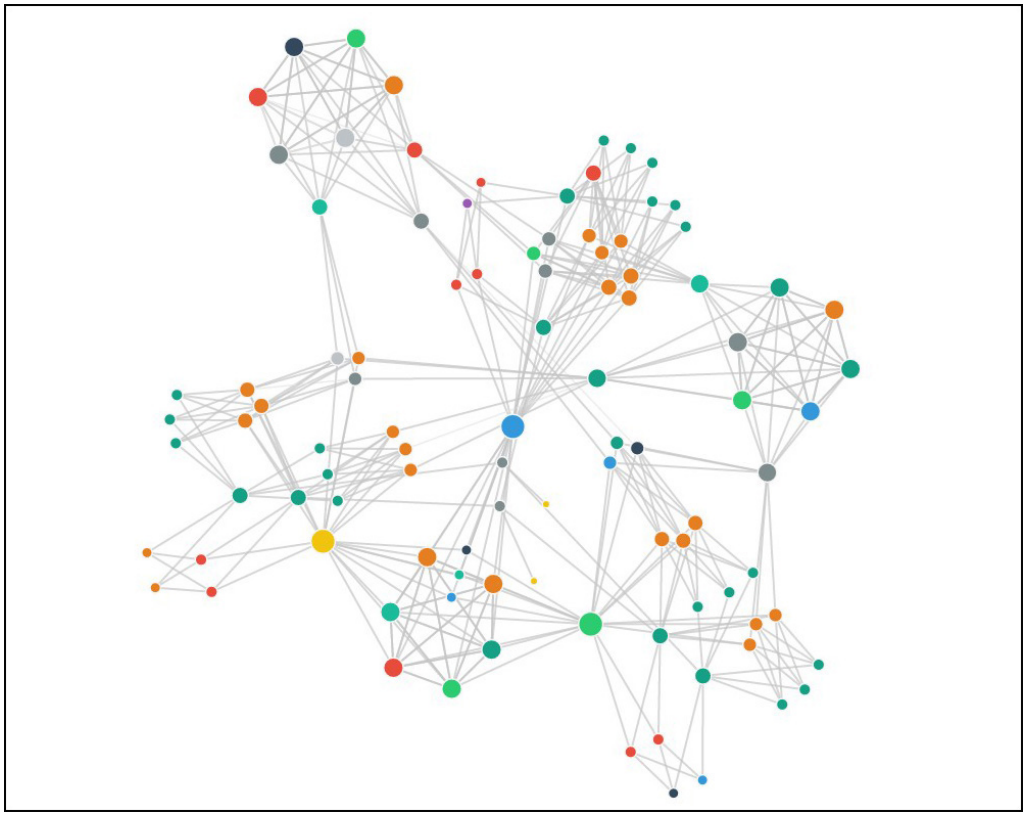

Figure 1.7. Visualisation of the network of networks and their connectivity.

12 The foundation of the Internet is also indebted to scholar and researcher Leonard Kleinrock who introduced queuing theory and digital message switching in 1959. Paul Baran and Donald Davies independently continued to work on Kleinrock's ideas and enhanced the concept of forwarding blocks of data in a network setting.

The original concept of the Internet as an, 'interconnected mesh topology network with redundant links' was conceived by Paul Baran in the early 1960s, through modelling 'the brain's neural network of redundant pathways' (Sheldon, 2001: 630).[13] Baran named his model *Distributed Adaptive Message Block Switching*. He also introduced a model for *multiplexing—a means by which data can travel from numerous sources and across the network simultaneously*. In parallel, Donald Davies at the National Physical Laboratory (UK) also developed a similar message-forwarding concept in 1965. He named his concept *packet switching*, which was in fact, a better term for describing Paul Baran's terminology (Sheldon, 2001).

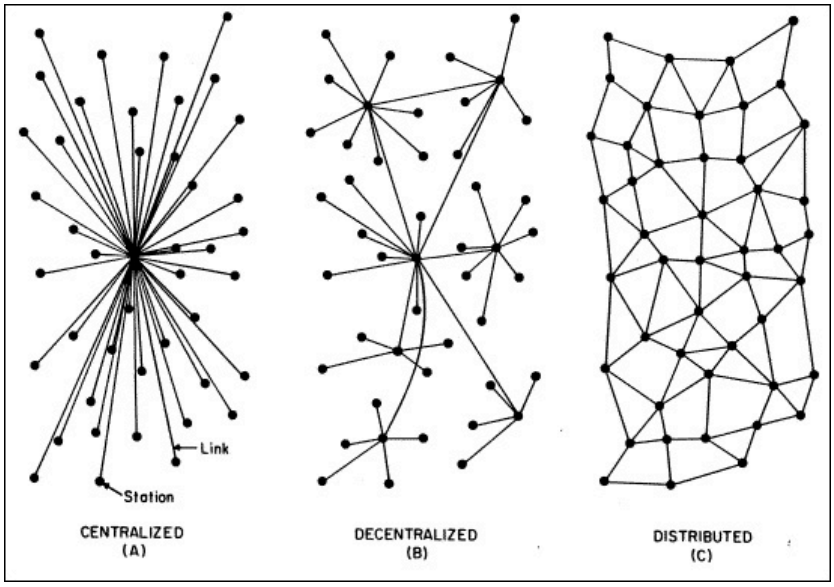

Figure 1.8. Centralised, decentralised and distributed network models by Paul Baran (1964), part of a RAND Institute study to create a robust and nonlinear military communication network.

Packet switching and multiplexing are two main features of Internet technology utilised in the realisation process of the *Technography* series. These features enable the encounter of *Technography* to simultaneously occur for multiple users located at different terminals in the network. This mechanism influences the realisation of the *Technography* series as well as its encounter when the protocols are exchanged in the inner space of the Internet.

In principle, the Internet is 'a set of standardised protocols' that enable computers to speak to one another and therefore to exchange data. The

[13] While working for the U.S. Department of Defence, Baran's project was to build a network communication topology capable of surviving disruption, disturbance and suspension in situations such as nuclear war (Sheldon, 2001: 630).

information (e.g. an email message, a photo, a piece of code, a web-based artwork, etc.) is transferred over various carriers such as telephone cables, TV wires and satellite channels. When I share the encounter of *Technography* through the WhatsApp application, the material exchanged travels through the immaterial digital network as well as the physical network of cables, wires and devices. The image below is a screenshot representing the moment I sent the URL of *location.406, 580, 629* and *630* to another Skype user. By clicking on these links the other user encounters the artworks.

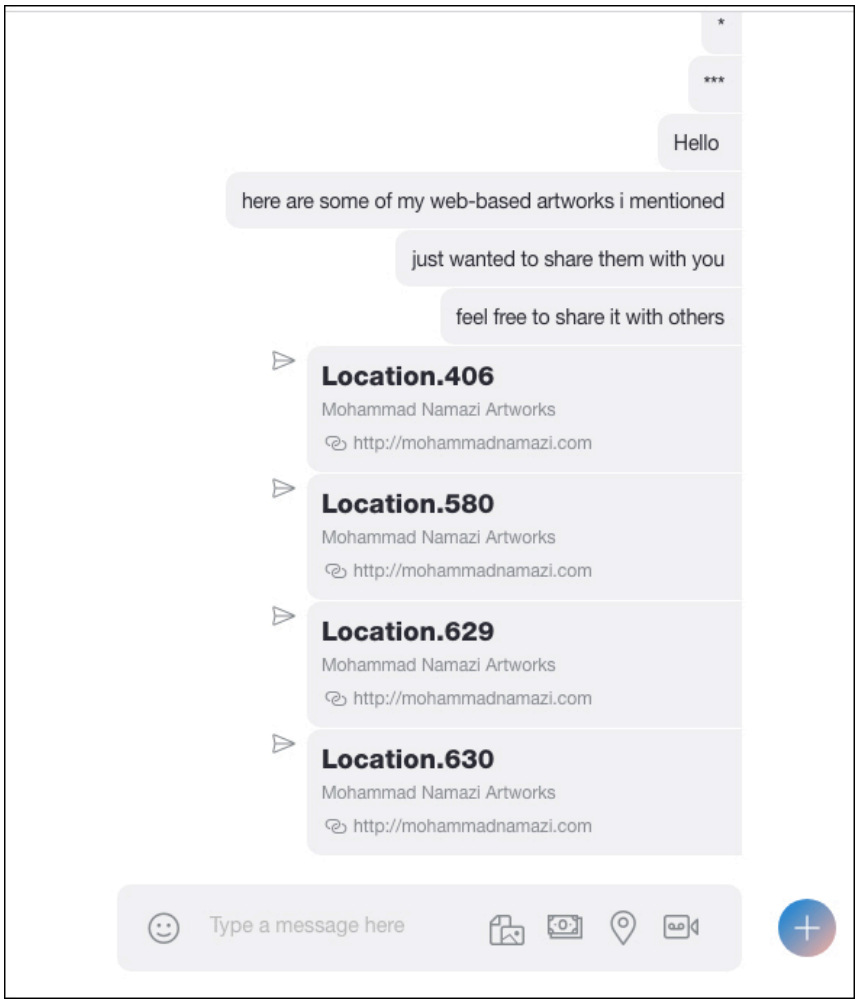

Figure 1.9. screenshot of Skype application page for text/data exchange. Here I am sharing some of the *Technography* series with another user.

In packet switching, packets (or units of data) comprised of bytes are transported via *routers* in the network fairly independently (Fall and Stevens, 2011). The most commonly known packet switching technology is Transmission Control Protocol (TCP)/Internet Protocol (IP).[14] The architecture of a packet consists of a header and a data region. The header contains the address and the information for routing. In the network, routers recognise the address and send packets through the most suitable route to their destination(s). Packets are metaphorically similar to an envelope, where the delivery address is printed on the outer body of the envelope and the information sits inside it. However, different packets of data take different routes to complete their journey. Please browse the following URL to view a dynamic illustration of a packet switching transportation model.

http://mohammadnamazi.com/packet_switching.html

When a request takes place, the information of the hypertext documents of any given *Technography* will be:

(1) Divided in the server programme and placed into packets
(2) Sent through the network by packet switching
(3) Re-materialised, repacked and re-constructed at the user's web browser

Having information delivered in packets instead of a single transmission line (e.g. telephone network) means that if there is any malfunction or a glitch in the process of communication, only the affected packets need to be rendered to complete the transmission. Baran's model of communication supported 'any-to-any connectivity' where any node—usually a router or server—is capable of linking directly with any other node (Sheldon, 2001: 632). This model of communication necessitates an appropriate global addressing system to enable

[14] At the beginning of the 1970s the development of Transmission Control Protocol (TCP) began at Stanford University by the electric engineers Robert Kahn and Vinton Cerf from the Defence Advanced Research Projects Agency (DARPA) (Sheldon, 2001). After early experimentations, designers recognised that TCP's consistency features disrupted its capability to transfer live voice through the network. As a consequence, in 1978, TCP was reshaped into TCP and Internet Protocol (IP), in which TCP provides reliable services such as, 'flow control, acknowledgement, retransmissions' and IP controls primary networking purposes which include, 'addressing, routing, and packet forwarding' (Sheldon, 2001: 632). All the linked networks were obliged to apply the new TCP/IP protocol suite as part of their program systems (Sheldon, 2001) and the Internet, the network of networks was enabled.

packets to travel from their source to their destination.[15] The Domain Name System protocol (or DNS protocol) enabled a global list of addresses to be formed so that in the network any node could be connected to any other. At the time of the newly born net, the quality of any-to-any connectivity was conceptualised in an artwork by Heath Bunting. The internet artwork *_readme.html*[16] 'foregrounds the centrality of the link and the domain name' to an extent that each work in Bunting's article is linked to its 'semantically equivalent domain' (Greene, 2004: 43).

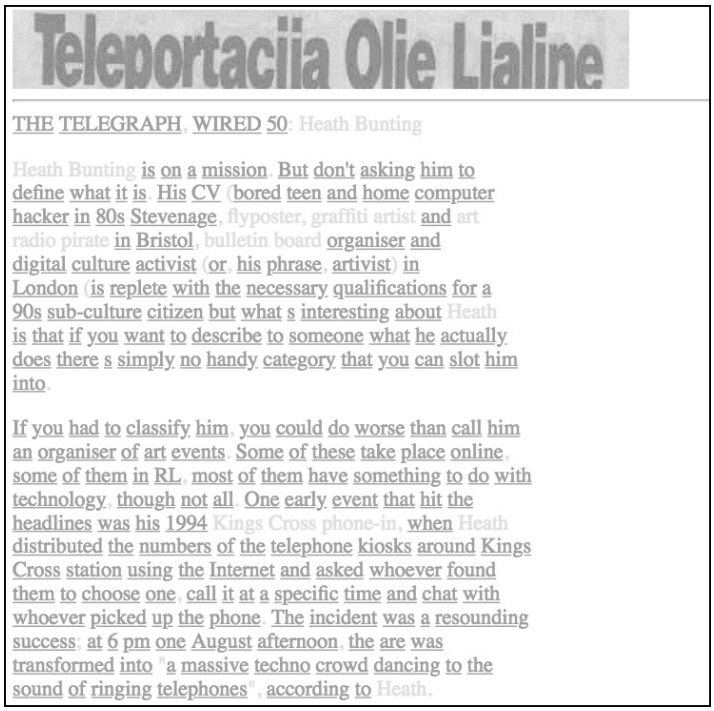

Figure 1.10. Screenshot from *_readme.html*, net.art, 1996, Heath Bunting

For example, the text that appears to be: *'The potential for different possibilities is being diminished by money'*, in fact is: The.com potential.com for.com different.com possibilities.com is.com being.com diminished.com by.com money.com. Thus, every word in his work becomes a dot.com and is connected to another address or location in the network. Please now visit Heath Bunting's work at the following link:

http://www.irational.org/_readme.html

[15] The early device to accommodate this service was named Interface Message Processor (IMP), which is the predecessor of routers that are common in most homes today. In 1969, 'the first IMP went online and initiated a communication between computers at UCLA and Stanford' (Sheldon, 2001: 632).

[16] Also titled *'Own, Be Owned or Remain Invisible'*.

Although Internet protocols operate fairly well, a failure to communicate adequately is not something unfamiliar to online users. These failures, known as a *glitch* or a *crash* in connection, might be experienced by users on a daily basis. For instance, when a text message does not reach the other device or when an audio communication appears to be disrupted (e.g. a WhatsApp voice call), or a video communication appears to deliver broken or distorted images (e.g. Skype, Google Hangouts, etc.). These types of glitch can also take place when a server is unable to response in time to a URL request. I experienced this type of network error recently. Figure 1.11. is a screenshot of the moment that the glitch occurred. This error is the *504 Gateway Time-out,* which is one of the glitches that might take place in the HTTP protocol, responsible for the requests taking place in the context of client/server settings.

The error identifies that the problem is not from the personal computer (e.g. laptop, portable devices, etc.) or due to the performance of the Internet connection, but a *network mistake* or, in other words, an inaccuracy or inconsistency that emerged across the connection in the inner state of the network (Sheldon, 2001). Thus, such probable forms of *network affections* are also inherent in the assets of the sequences of *Technography,* or any other web-based artworks.

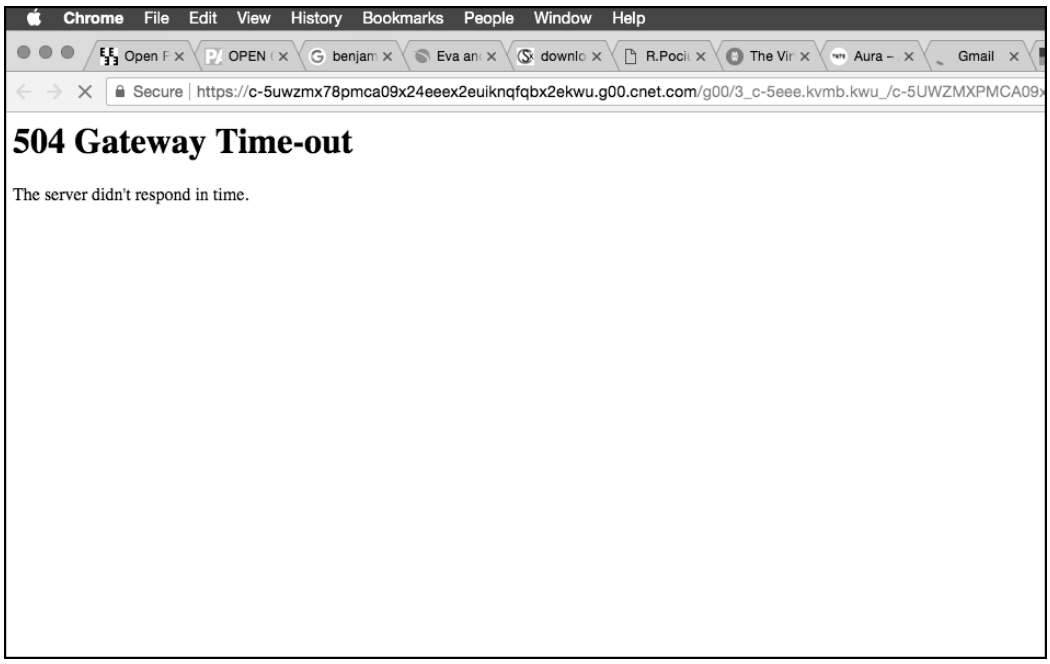

Figure 1.11. Screenshot of a glitch in the network on 2018-07-05 at 11.18.43.

The Transmission Control Protocol (TCP) is a protocol that forms part of the *transport layer* in the architecture of the network. It is responsible for the 'flow controls and reliable data delivery services' (Sheldon, 2001: 1213) used in applications (e.g. web browsers, Skype, WhatsApp, etc.) to access network services. TCP services occur in the computers at either end of a connection and *not* in the network itself. As a result, TCP is a protocol to manage end-to-end (virtual) connections.[17]

TCP's task is to 'break the data, that makes up the communication into packets' and to 'label each packet' (Berners-Lee and Fischetti, 1999: 18) with a distinctive number to indicate various parts such as, *header, meta-data, scripts, tags, links, images, css codes, etc.,* as well as information about *assembling* and *disassembling* at the end of the connection. These packets will be handed to another key protocol, the *IP* that operates by transferring the packets across the network to their destination(s) *where they will be re-assembled* into their original format, once again, by TCP protocol.

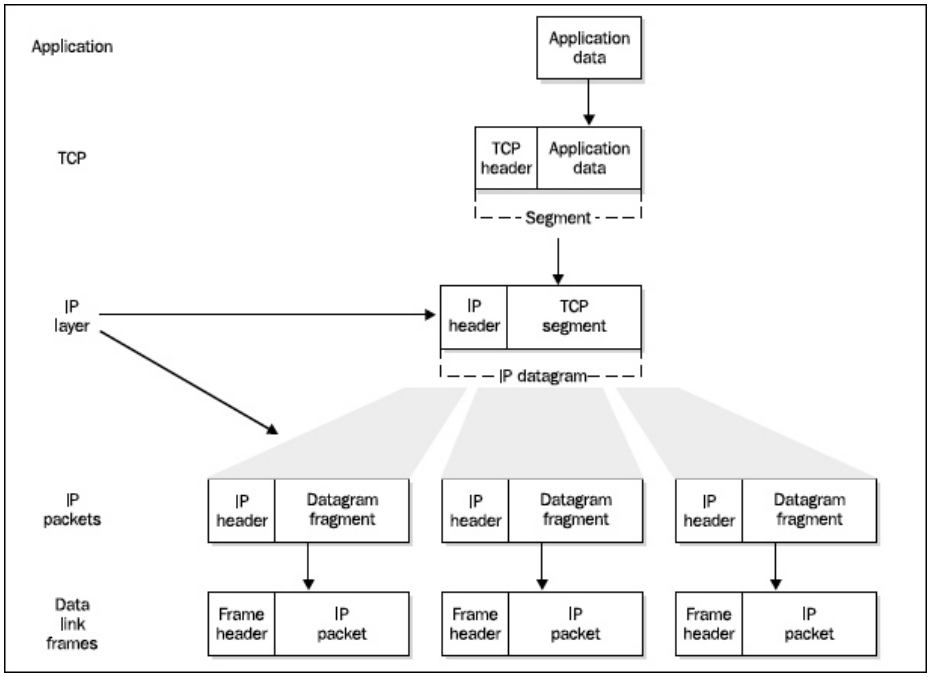

Figure 1.12. Where datagram fit into the TCP/IP protocol scheme.

[17] Since end-to-end connections may exist across a series of point-to-point connections, they are often called *virtual circuits.*

The IP is commonly considered as an, 'unreliable or best effort' service (Sheldon, 2001: 1213). This is due to the original design of Internet architecture that gave preference to the speed of data delivery in contrast to consistency of data transfer. The primary task of the IP is to 'support internet work addressing and packet forwarding' (Sheldon, 2001: 670).[18] It can be imagined as an 'overlay' directing scheme that works for the interconnected networks. One important feature of IP is its *datagram* routing facilities. Datagrams are the packets (i.e. envelopes) that include data and are transmitted across router-connected networks in the internet architecture.

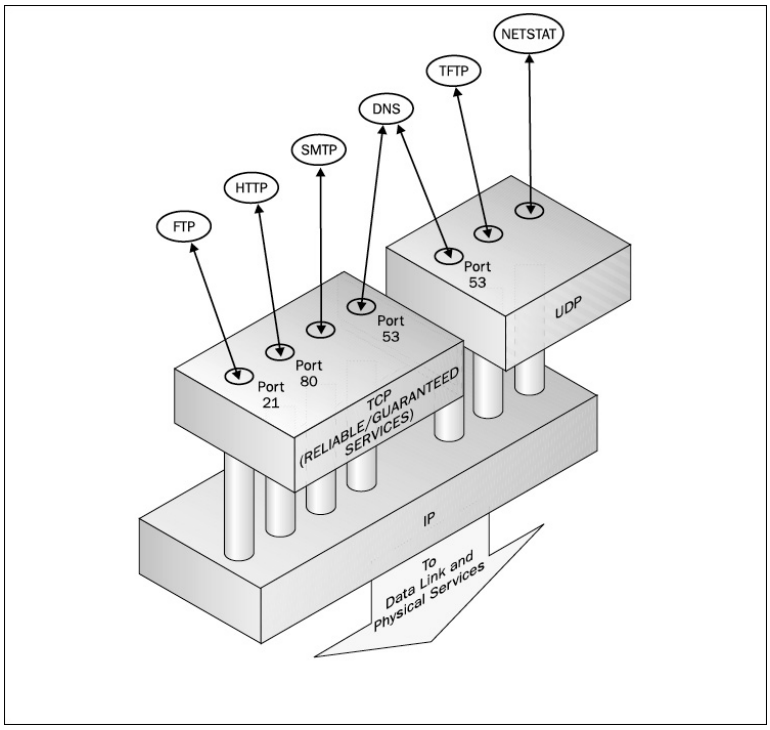

Figure 1.13. TCP in relation to UDP, IP, and applications

Thus, the multiple fragments of *location.405* are placed in the packets of datagrams that travel the network to reach their destination(s). The route that each IP travels varies based on the condition of the network *at that moment in time* and the available paths. The invention of TCP/IP in 1982 allowed all computers and devices on the Internet to communicate with each other (Fall & Stevens, 2011).[19]

[18] Each computer in the network must have an identical address which an IP can provide by containing a network address and a host address. Routers read these addresses to forward the packets along the network, toward their destination.

[19] TCP and IP are only two individual protocols. The Internet architecture utilises the Internet Protocol suite, which comprises the entire set of protocols developed by the Internet community throughout multiple decades. A selection of these protocols are: ARP (Address Resolution Protocol), DNS (Domain Name System), FTP (File Transfer Protocol), ICMP (Internet Control Message Protocol), IMAP (Internet Message Access

In my practice-based research, internet materiality is considered as: *the technology that triggers or enables the transmission, allocation and movement of data in various carriers* (e.g. software, cables and satellite channels). This technology includes unique models for network communication (*distributed network*), specific methods for data transmission (*packet switching* and *multiplexing*), a unique protocol suite (*TCP/IP*), network devices within the layer stack (i.e. *layering*), programs and application software (e.g. *web browsers and web servers*) for data transmission, communication, rendering and visualisation (Berners-Lee and Fischetti, 1999; Fall and Stevens, 2011; Sebesta, 2009; Sheldon, 2001).

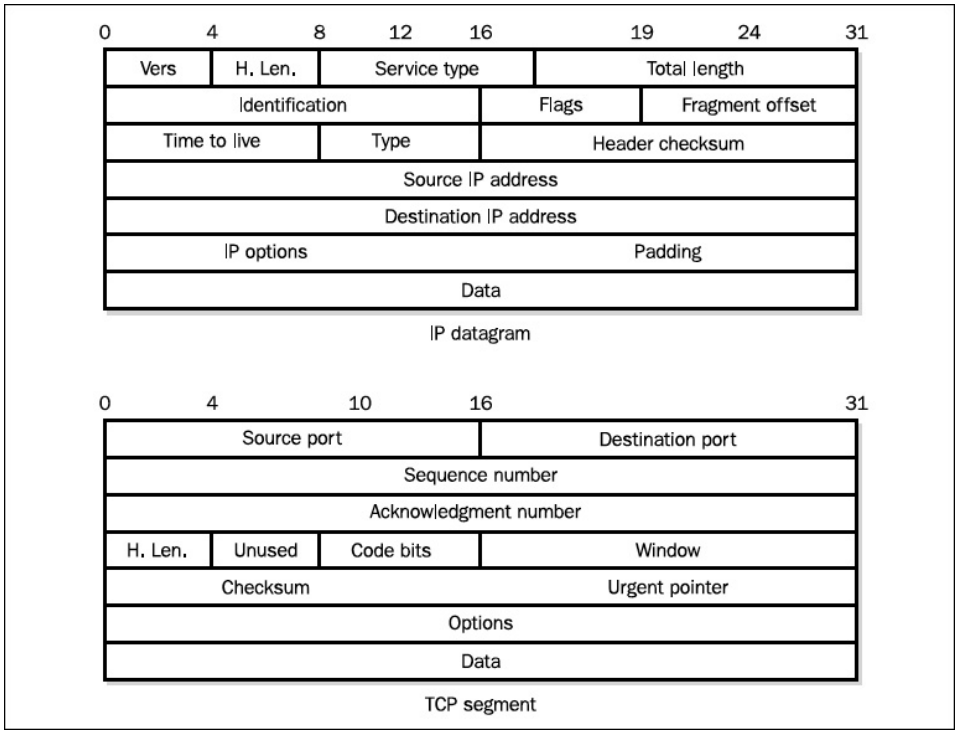

Figure 1.14. Comparison of IP datagram to TCP segment

Thus, once the experience of an artwork such as *Technography* is intertwined with internet materiality, then its constituents are inherent and integrated within the telecommunication technology of the Internet and the specific space-time condition of the network. To send, receive, or share web-artworks engages participants/users with the topology of the distributed network, packet switching and multiplexing, the protocol suite, the network architecture and the software of the World Wide Web.

Protocol), IRC (Internet Relay Chat), POP (Post Office Protocol), RTP (Real-Time Protocol) (Fall & Stevens, 2011).

In reality, some attributes of the materiality of *Technography,* although inherent in the artwork, are not exposed to their users in the event of their activation. In this research, these technicalities, which might be unknown to their users, are important as they provide the constituent of the artwork as live event. Thus, to fully perceive how the *Technography* series is realised and encountered, these hidden and sometimes invisible layers must be unpacked. Thus far, I have presented how the materiality of the Internet applies to the realisation of the *Technography* series. Henceforth, I will examine the artwork in terms of web materiality.

01.03. The World Wide Web

It is important to clarify that the Internet and the World Wide Web are not the same thing. As mentioned earlier, the *Internet* is a collection of devices connected to each other for communication purposes. However, the *World Wide Web* 'is an overlay hyperlinking technology that runs on top of the Internet' (Sheldon, 2001: 1354). It is introduced as a *model* for information sharing on the Internet and includes, 'a collection of software and protocols that has been installed' (Sebesta, 2009: 25) on most devices. The aim of the Web was to harmonise the *diversity of networks and devices* connected to one another so that all would be able to communicate with each other. Tim Berners-Lee writes that: 'The art was to define the few basic, common rules of "protocol" that would allow one computer to talk to another, in such a way that when all computers everywhere did it, the system would thrive, not break down' (Berners-Lee and Fischetti, 1999: 36).

For the World Wide Web, in decreasing order of importance, these protocols are: (1) 'Universal Resource Identifiers (URIs)' —today renamed as Uniform Resource Locator (URL); (2) 'Hypertext Transfer Protocol (HTTP)'; (3) 'Hypertext Markup Language (HTML)' (Berners-Lee and Fischetti, 1999: 36). The HTTP protocol enables 'all web communications transactions', which involves two discrete phases of operation, the request and the response (Sebesta, 2009). Each HTTP communication, whether a request or response, involves a browser and a web server and has two parts *a header* and *a body*. The header comprises of the data about the communication and the body holds the data

Figure 1.15. screenshot from Google Chrome search engine, indicating the moment that 'http' protocol requesting the technography assets from the server via the URL.

Users communicate with web servers via HTTP to obtain information identified via a URL. The web is based on hypertext and hypermedia documents that are situated over the Internet. Most of the HTML documents are linked to each other via hyperlinks. Therefore, any web-based artefact (e.g. visuals, sounds, artworks) is potentially available to all other content in the web.[20]

[20] There are multiple programming languages are also used on the web such as, JS (JavaScript (JS)), CSS (Cascading Style Sheets), PHP (Hypertext Preprocessor (PHP)), or, as described earlier in the chapter,

The Web can be thought of, as an immense assemblage of Document Assets–a term I use to refer to the artefacts, units and information on the Internet. *Document assets* on the web are provided by *web servers* (Apache, Nginx, IIS, etc.) and retrieved by *web browsers* (e.g. Internet Explorer, Firefox, Google Chrome, etc.) (Sheldon, 2001). According to Tim Berners-Lee, in the early days of the invention of the Web/Internet, what was hard for people to comprehend about the design was that 'there was nothing else beyond URIs, HTTP, and HTML' (Berners-Lee and Fischetti, 1999: 36). He states:

> *There was no central computer "controlling" the Web, no single network on which these protocols worked, not even an organization anywhere that "ran" the Web. The Web was not a physical "thing" that existed in a certain "place." It was a "space" in which information could exist* (Berners-Lee and Fischetti, 1999: 36).

Early internet-based artists deploying the non-physical and virtual space of the Web as an artistic tool initiated a movement in the early 1990s known as net.art at a time when the Internet/WWW was just becoming available to a wider public (Greene, 2004). By engaging with the Web, the early net.art movement artists projected a confrontational and punk spirit approach, which stood out as unique and separated them from other art developments at the time. These artists used the medium of the Internet/WWW to produce multiple and diverse experiments, which are important for this research as they comment on the materiality of the Internet/WWW while at the same time exploring new methods of engagement.

An archive of this work can still be found at *Rhizome.org*, which was founded in 1996 by artist Mark Tribe. Tribe, using Deleuze and Guattari's concept of a *rhizome* as an, 'anti-hierarchical, decentralised network', constructed a framework referred to as a 'social sculpture, an interconnected, collaborative platform' (Greene, 2004: 57). This platform was operated by artists, curators, critics and participants online and some of the early web-based artworks that are now almost a quarter-century old are archived and analysed through the Net Art Anthology page on the Rhizome website: https://anthology.rhizome.org/.

Cascading Style Sheets (CSS), amongst others. , etc. However, the HTML is always the backbone of any website on the web and is considered as the source code. Other programming languages are used as attachment files to HTML to introduce other functionalities on the web that HTML is not capable of (W3C, 2018).

This repository has been an invaluable resource for this research and it is worth outlining some of the artworks found there in order to give a contextual reading for my web-based practice. *King's Cross Phone-In* (1994) is one of the early net.art experiments that formed a live event in a public space by instructing online users to participate in a group activity. Taking a Situationist[21] form, Heath Bunting staged an artistic intervention that unveiled how a webpage could extend its capabilities and impact on public space (Greene, 2004).

Bunting published online the numbers of public telephone kiosks around King's Cross station in London and invited users to contact these numbers at a specific time and date (5thAugust, 1994 at around 18:00 GMT). Thus, by creating a telephonic musical symphony in an area of public transportation the artist disrupted the flow of usual transit of the passers-by.

Figure 1.16. Heath Bunting, *King's Cross Phone-In*, 1994, screenshot from the artist's website

[21] The Situationist aspect of *King X,* is primarily seen by art critics in its effective social engagement and discourse that reverberates in a public space. To engage with such situations through the Internet/WWW Heath Bunting established the potential strategies that could be deployed in order to provoke social interaction and urban intervention (Greene, 2004).

The years 1995 to 2000 relate to the so-called 'heroic period' of net.art with the artists mentioned above being amongst its main representatives. The aim of the net.art movement was to present 'a subversive and anti-institutional attitude' and equally to suggest a 'new dematerialized, de-authored and unmarketable reality of collective, collaborative and participatory culture' (Magagnoli, 2015: 124). These artists experimented with social online attributes by directly engaging with users of the network and who equally became the participants in their artworks. For example, JODI explored the browser's limitation in rendering visuals on the screen. This includes the live events that occur in the real time[22] transformation of codes into images (Dorsch and Ratiu, 2015).

In the artwork *http://oss.jodi.org/ss.html* (1995-2000) JODI examines the relationship between assets and the limitation of the browser in translating tags and visualisations. As a consequence of JODI's specific way of writing tags, the browser experiences a moment of dysfunction in execution since the code written by JODI are directed precisely at the browser's inability to read, understand or translate codes into appropriate tasks.

This results in multiple unexpected pop-up pages with random movements that can disrupt the operation of the web browser application. Therefore, the user encounters a live event performance as a result of the encounter of inoperability in HTML tags, which might lead to the browser crashing and its failure to respond. Please now visit the artwork at the following URL.

http://oss.jodi.org/ss.html

[22] In this research the term *real time* refers to the actual live realisation of the web-based artworks, occurring in the moment of the encounter.

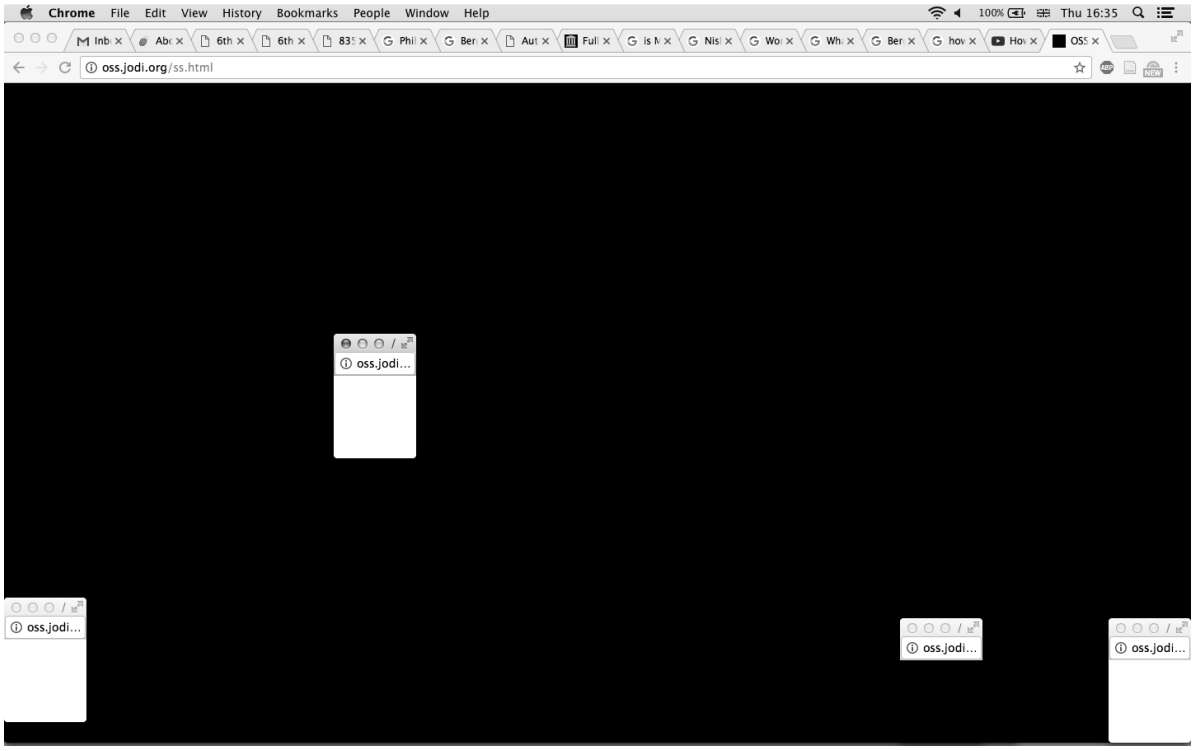

Figure 1.17. '*http://oss.jodi.org/ss.html*', JODI (1995-2000), screenshot from JODI's website, 05.2017

In another example, Alexei Shulgin uses the web in a way that is contrary to JODI by de-familiarising the very features of the web browser such as scrollbars, buttons and tables. This reframes them into a web-based artwork engaging users with the materiality of the web, as well as its time experience. In other words, Shulgin uses and repurposes web content (available as open-source data) to deploy it as readymade code in order to produce his artwork. The image below is from the series *Form Art* made by Shulgin in 1997 (Rhizome, 2018).

Here, the participants of the network can engage with Shulgin's artwork features by clicking the buttons and moving the bars, which leads the users to other web assets and pop-up pages. This procedure engages users with multiple interactive encounters within the time experience of the Web.[23] Please now visit this sequence of *Form Art,* by browsing the following URL:

http://archive.rhizome.org/artbase/48528/index1.html

[23] Although web technology has now developed and it is not the same as in the 1990s, it still shares the same foundational aspects today.

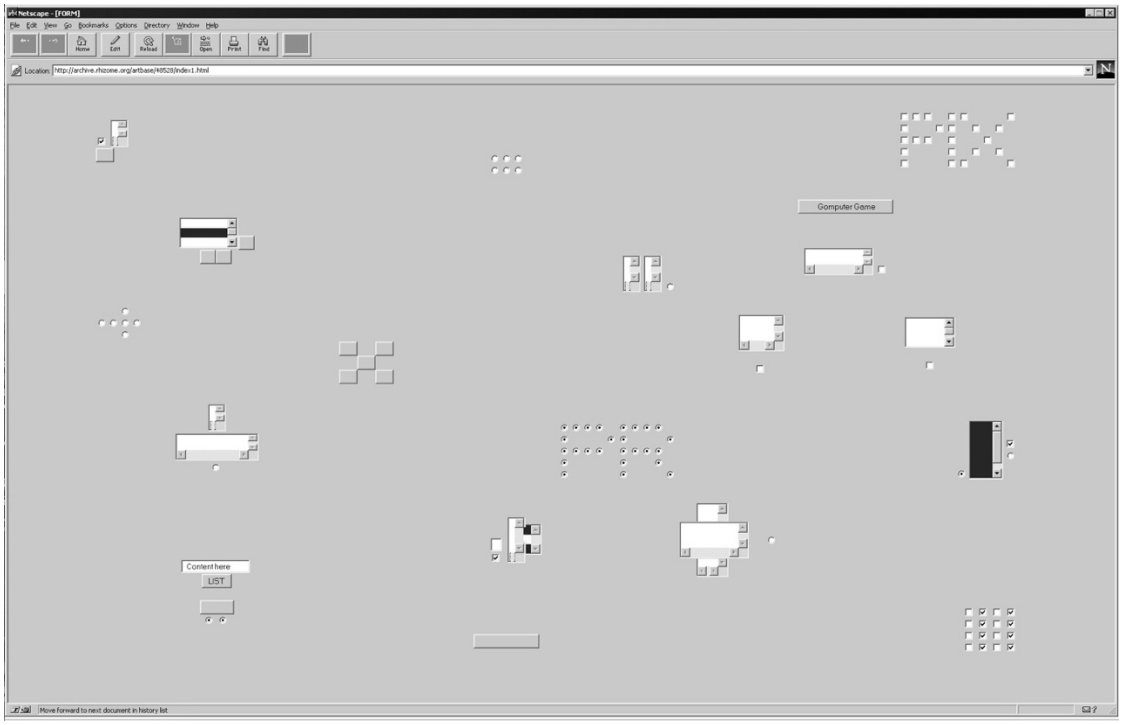

Figure 1.18. Form Art, 1997, Alexei Shulgin, HTML buttons and boxes, image: Rhizome website

01.04. The Web Encounter

As described above, these artworks were achieved by using the stream of the Web with its ability to circulate information and involve online users with new notions of encounter, live events and temporal features of the network. These qualities signify unique methods of encounter with works of art that is novel in the reality of their 'live-ness'. The *live* quality is primarily identified by the time-based nature of the web assets that can only be realised through real time connections established in the network. These connections give rise to temporary durations of data streaming (i.e. *the realisations of web assets*) in the network. It is in this condition that *Technography* resides temporally in the duration of the network, while its codebase scripts are being realised by the browsers in real time presentation (i.e. not as pre-recorded content).

Other qualities in the nature of encounter in web assets such as *Technography* can be said to be the case in three ways: firstly, due to the *proximity* of the artwork to those engaging with it (i.e. the fact that they appear on personal devices that one carries around in a pocket); secondly due to the *immediacy* of being able to access them from web space in the network duration of web time; and thirdly due to the possibility of its *simultaneity* in that the same information can be in many places online at the same time. This live sense that is created by net artists is, in my opinion, more vivid and effective when the artworks are made in an online-specific condition. For instance, the *Technography* series, enables the artworks to be in motion at all times, floating in the web stream, ready to reach their users.

Technography creates temporal durations of experiences only possible during the event as it takes place on the browser, or in other words when a connection is established between a web browser and a web server. In most cases, when two computers interact across the network, one takes the position of a user and the other acts as a server. This communication is initiated by the user as they call the server (through the URL) in order to obtain specific data, then the server responds to the request by transmitting the information to the user and

immediately closes the connection. The entire web is structured upon these *temporal durations* of a user/server setting.[24]

Servers are *conditional programmes* as they are activated only on the request from a web browser by sending URLs. This opens a temporal network connection with the web server, which indicates a request to "serve' the address of a data file archived on the server' (Sebesta, 2009: 26). The ability of servers to operate as a virtual space where information could reside and be exchanged by online users was challenged in the art project *Life Sharing* (2000 – 2003) by Eva and Franco Mattes.

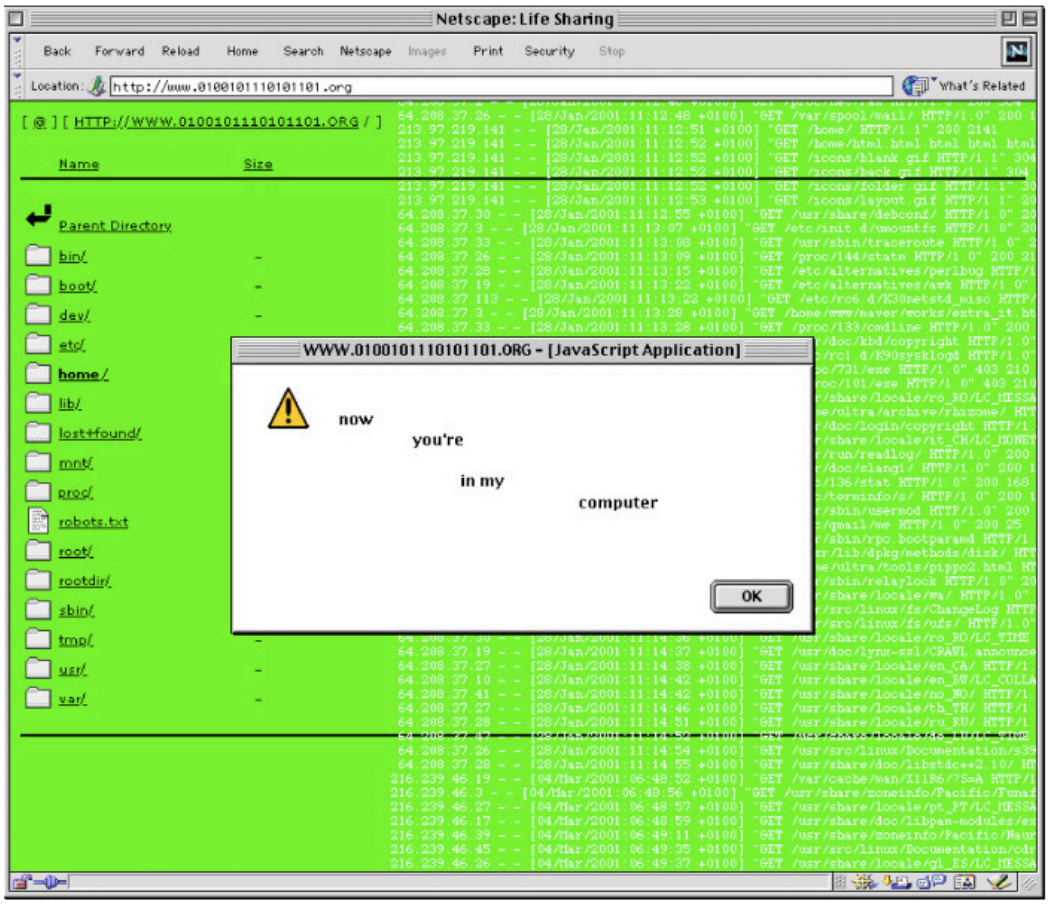

Figure 1.19. Screenshot from the artists' website showing one of the images shared in *Life Sharing* (2000 – 2003)

[24] The early browsers were unable to render or demonstrate any kind of graphic content as they were only text-based. In early 1993 with the release of Mosaic, the first browser supporting a graphic interface, the users' experience of the Web was greatly modified and enhanced.

In this three-year art project, the collective utilised their home computer and transformed it so that it operated like a server. This meant that all of the information found there was available to any of the users who visited their website. The artwork, also known as *0100101110101101.org*, demonstrates the potential capability of the WWW to function as a virtual space where users can share their online experiences with one another as they upload or download information. The project proposes that such a condition of visibility can allow online users to construct new pathways for circulating their online experiences.

https://0100101110101101.org/life-sharing/

Web-based artworks are specific both in terms of *site* and *time*. They are site specific firstly as they can only exist on the WWW and secondly since each possesses a unique location that is retrievable via the URL protocol and listed via the Domain Name System protocol (DNS). Although their digital *assets* such as codes, images, sound, etc. are located and maintained in the physical data storage of web servers or in the virtual space of cloud network technology, they only come into being when included in the temporal *stream of the web* (i.e. network duration) and computed, rendered and realised by browsers software. In other words, they can only appear within the client/server context of a request and the utilisation of URL, HTTP and HTML protocols. Therefore, they are specific to the settings of the stream of the Web and the duration of the network connection.

Such works of art are specifically made to be used and experienced on the web as a site with a specific temporal state. They are distributed in time in the nonlinear flow of information movement on the web and they can equally be present many places at once. As a result of multiplexing and an asset's digital attributes they can be rendered by multiple browsers simultaneously, as well as being exhibited on multiple screens, interacting with countless users at the same time. Hence, they are simultaneously atemporal and time specific.

As mentioned earlier, the WWW can be imagined as an assemblage of document assets. These *assets* are inherent in temporal appearances and realisations in the virtual state established in a user connection. This research and practice is based on the non-physical, virtual *space* of the web and artworks I have made for this research, reside in this space similar to any other kind of information that inhabits the Web by utilising the protocols of URL, HTTP, and HTML.

Pages, documents and *resources* make reference to the units of information on the web. They are called hypertext, to refer to 'text with embedded links to other documents' (Sebesta, 2009: 24).[25] In other words, hypertext is an electronic text-based system that is interconnected through hyperlinks that can potentially be activated by a mouse click, a key press or a screen touch. They can also include images, audio (voice or music), video, or a combination of these with other forms of media. When a document on the web consists of 'nontextual information, it is called hypermedia' (ibid). This is how *Technography* is identified as a hypermedia document, through utilising animated forms only by HTML tags and CSS codes.

Both hypertext and hypermedia documents, constituting the entire WWW, are forms of 'nonlinear information' (Sheldon, 2001: 1355). They are nonlinear as they produce *non-sequential* data *browsing*, in which the user *switches* between documents with just a click (Sheldon, 2001). When a web document does not include hyperlinks, it is still attached, connected and flowing into other distributed documents via means such as hashtags, meta-data or a search engine's algorithm deployed to identify data stored somewhere in the network. This condition enables users to locate specific data without being informed of its particular URL or DNS while surfing the www (Sebesta, 2009).

Furthermore, while I share/exchange information with my friend on the train, we create a record of our data streaming as well as a correspondence history. This type of *memory* (capable of being stored on the cloud network on the web, devices and servers) enables us to go back and forth between the exchanged data at anytime. This also creates a nonlinear condition in which the document assets are enabled to come to life again at any moment in time. Additionally, while I am exchanging data with one user, other users are capable of sending data and can

[25] The concept of hypertext was established prior to this and was applied on Xerox's NoteCards and Apple's HyperCard in the middle of the1980s (Sebesta, 2009).

still reach me. Simultaneity is inherent in network architecture, dictating how data can traverse within the web thanks to the multi-tasking ability of the servers. I can communicate with other users simultaneously, yet they might be located on other trains, in cities or even countries. In other words, when I switch between my application pages (e.g. WhatsApp pages) to communicate with other users, I am also switching to other locations, times and experiences with multiple users on the web at the same time. Thus, packet switching and multiplexing enables my virtual presence into other spaces and times that are different to mine. Such forms of these encounters were explored in Bunting's *King's Cross Phone-In* (1994), in which his web activity was realised within the public realm—without his presence.

The simultaneous and nonlinear condition of network interaction with various users, documents, times and spaces, opens a new temporal and spatial experience that might conflict with traditional means of accounting for such experience. I believe that this is an important phenomenon to examine further at a time when web time and space is embedded into the life of the majority of societies around the globe.[26] With the transitioning of Web1.0 to Web2.0 in 2002, the Internet/WWW has become more interactive and ubiquitous, with a significant increase of online users. Users are enabled to interact and collaborate in various fields, in virtual community web-settings such as online education, online banking, online galleries, social media, blogs, Wikis (Gehl, 2011). This transition in software/application has led to a new age of information, encounters, and time-space experiences. These encounters are inherent in the architecture of the network and how it is structured. Various *layers* in the network provide specific services that enable a *space* and a *hyphen* for *information* to transpire, reside, travel through and disperse once the temporal connection ends.

[26] This is especially applicable to the Web 2.0 era when methods of interaction with the web increased significantly from the early 2000s (O'Reilly, 2004).

01.05. Network Architecture

The transference of information in the network can be demonstrated through a conceptual *architecture* that defines the actual discrete phases of communication and the movement of data. This architecture clarifies the settings, foundations and standards designed to connect with computers and other devices. In this research, the standard Open System Interconnection (OSI) model is used to study the network architecture. Here I will describe this architecture and relate it to *Technography* to analyse how the assets of the web-based artwork traverses the network through its various conceptual architectural layers.

The protocol suite operates in four abstract layers in the network architecture. From bottom to top, 'each underlying layer provides *services* to the layer above it' (Sheldon, 2001: 870). It is designed in layers to facilitate and increase software and hardware development and compatibility.[27] When *Technography* is requested the assets will travel all these layers to reach the browser for code reading and realisation, which I will discuss shortly in more detail. The base level includes the *physical layer* and the *data link layer* indicating the cables and connectors responsible for carrying data, such as telephone lines or fibre optic cables (Fall and Stevens, 2011).[28]

The *data link* layer is concerned with 'how bits are framed and transmitted across the physical link' (Sheldon, 2001: 871). The second layer is the *network layer* that interconnects different networks and holds the Internet Protocol (IP). Above this is the *transport layer* where the Transmission Control Protocol (TCP) is hosted to provide a reliable service and guarantee that packets are completely transmitted between the sender and receiver. Lastly, at the top of the stack, is the *application layer* to support web servers or the operation of web browsers.

---

[27] For example, if a developer is producing a network switch, they only need to set the product consistent with the protocols that are allocated in layer two of the protocol stack. This enables various products (such as web browser applications) to be compatible with each other and therefore it creates a society of online users who can communicate with one another utilising various devices and configurations (Sheldon, 2001).

[28] It is important to clarify that no Internet protocol exist at the *physical layer*. This is because the Internet protocols were designed to accommodate any underlying network technology (Fall and Stevens, 2011).

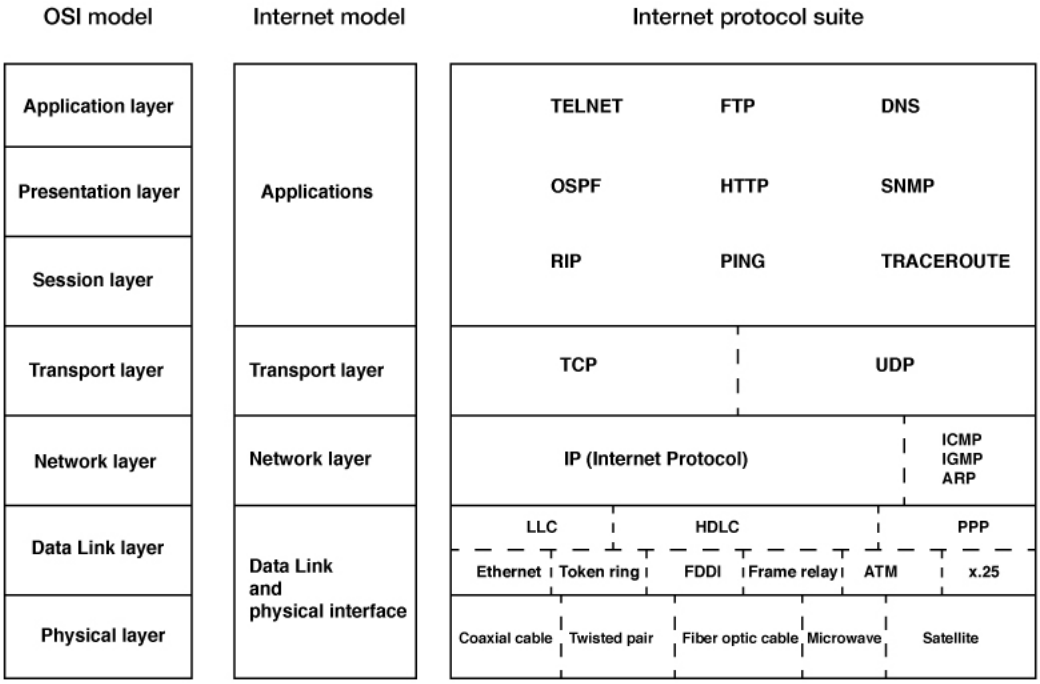

Figure 1.20. The protocol suite and relation to the OSI model and the Internet model.

Our interface and interaction with the network takes place through the *application layer*. Packets are constructed in the *network layer* and then pushed down to the *data link layer*. This is where the packets are 'encapsulated in the frames of the underlying network' to be transported along 'multiple router-connected' links among network devices and to be delivered to their destination(s) (Sheldon, 2001: 960). The *application layer* is where the assets of *Technography* are located. This could be either in my local software computer or in the software of the server. When the making procedure of *Technography* is completed, the assets will be transferred to the web server via the network to be located in their specific URL address.

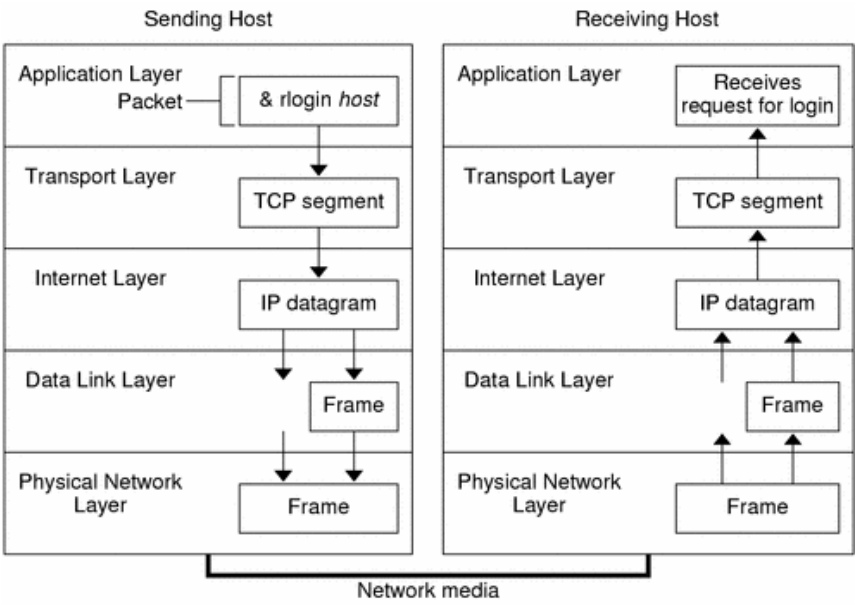

Figure 1.21. The layers in the network architecture and the transmission of data in the stack.

The collaboration between TCP and IP results in delivering data packets to the *data link layer* to be prepared for their transportation in the *physical link* layer (e.g. physical cables, wires, radio wireless local).[29] TCP is layered on top of IP and deploys IP's delivery service from the *network layer*. The procedure begins when IP encapsulates TCP's information in *datagrams* and delivers the information across the router-connected internetworks. This transportation is monitored and guaranteed by TCP reliable data delivery service to reach the specific *software* application in users' devices. Therefore, when *Technography* is requested, the data encompassing all the assets will break into pieces to be inserted into TCPs. Then IP encapsulates TCP's data and transfers the packets.[30]

[29] It is important to note that the TCP protocol resides only in each end of a connection and in the software program of devices (i.e. in the *Transport layer*).

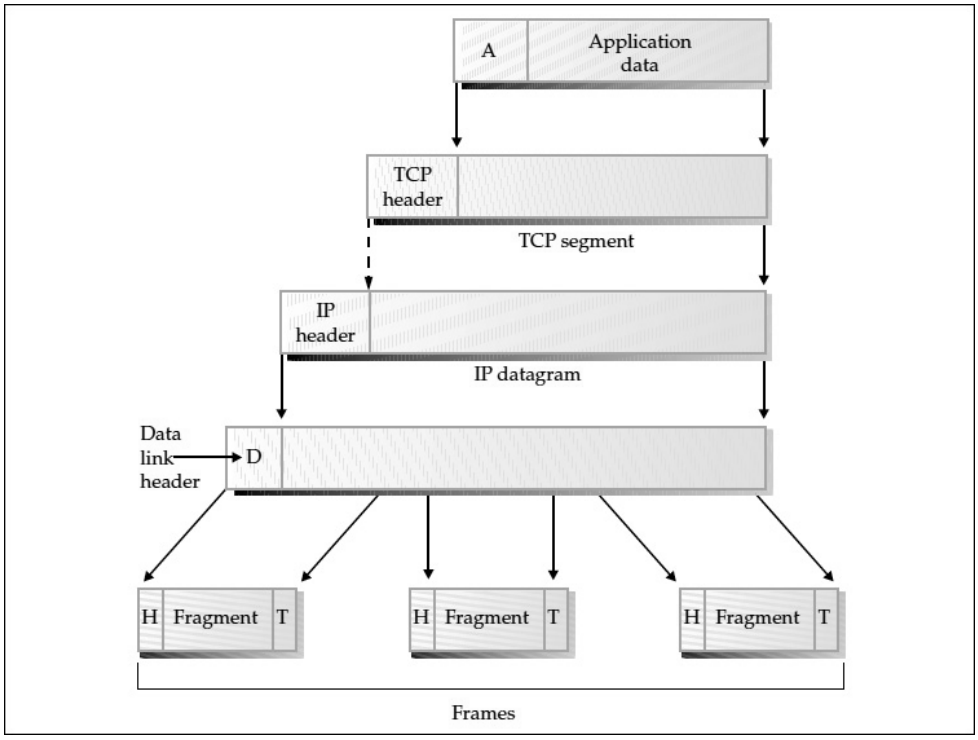

Figure 1.22. Packets and frames in TCP/IP

As a result, the procedure of the delivery of *Technography* will include the following phases:

(1) *Technography* is requested by a web browser via the URL
(2) Assets are pulled out from their DNS locations in the server
(3) Assets are divided into packets and labelled by TCP(s)
(4) They are handed to IP(s) to be encapsulated in the datagram(s)
(5) IP passes down the datagram to the *data link* and *physical layer*
(6) It is framed into blocks to be transmitted across the network.

The reverse procedure occurs in the end user's device. This is so that the packets are reassembled into their original files in preparation for them to be handed over to a web browser or web server. [31]

[31] In the internet protocol suite, information formed at the application layer is called a *message.* A message is sent to the *transport layer* where it is packed into *segment* in the TCP. Segments are sent to the *network layer*, where they are packed into *datagrams,* and then sent to the *physical layer*, where they are framed for transmission across the network (Sheldon, 2001: 873).

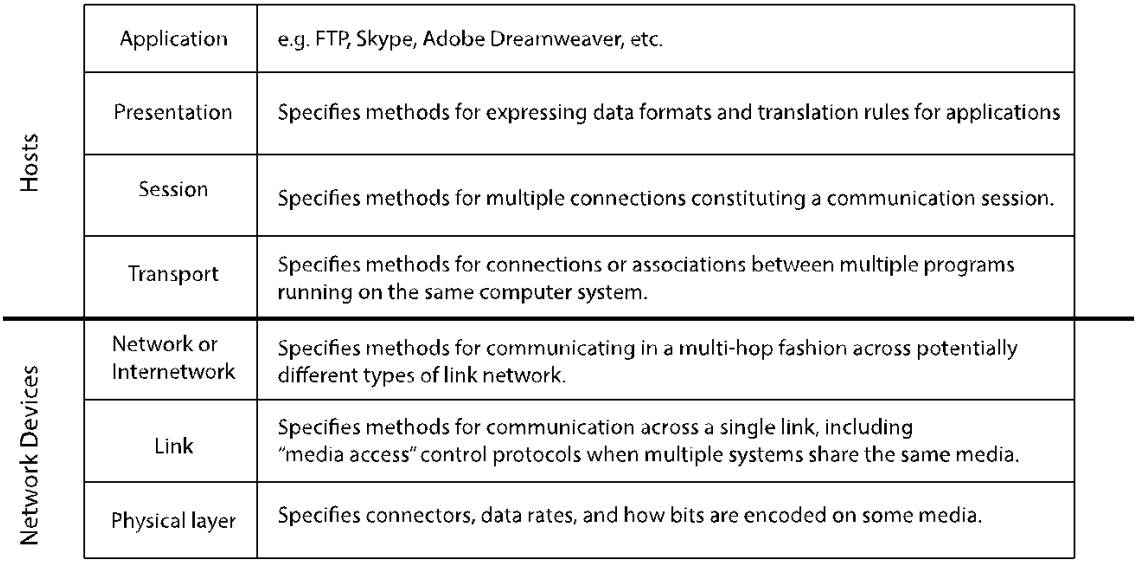

Figure 1.23. The Layers of the protocol stack in the network architecture

In the realisation procedure of *Technography*, packets of data do not travel through a specific route. This is due to the ability of IPs to travel the network *nonlinearly*. This capability is due to the redundancy topology of the distributed network, designed by Paul Baran. An IP changes its pathway based on the temporal condition of the network in each moment, selecting the best possible physical delivery service available in the network at that moment in time.

As mentioned previously (01.02), in the architecture of a packet, the *header* contains the address and the information for routing and the *data region* contains the actual data.[32] In the network architecture, *routers* read the routing information printed on the header to send packets to their destination via the quickest and the most practical route. In the case of *Technography*, thousands of packets might be needed for its transportation procedure across the network. This scheme helps overcome transmission problems. If a glitch occurs, only one packet may be affected. Then it is only necessary to retransmit that one packet rather than the entire file (Sheldon, 2001: 959).

Figure 1.23. demonstrates a network built on packet switching. When computer A requests to transfer a packet to computer B, the packet first travels to R1. Then, by analysing the pathway table, R1 inspects the network route and

[32] In telecommunication references, the architecture of a packet is usually illustrated as an *envelope*.

decides that the most efficient route is along the R2 line. However, in the case of a *damaged* node or a *disturbance* in connection between these two nodes, R1 reconsiders its journey and re-analyses the network to look for alternative pathways to reach R2. Therefore due to the network's *redundant topology* a new pathway along R3 and R4 will be chosen to reach R2 (Sheldon, 2001).[33]

Additionally, the multiplexing principle of a packet-switching network enables packets from multiple sources to travel across the network, links and routers by alternating between them; in other words, in an interleaved style. This usually occurs when a single user initiates multiple, simultaneous connections that 'transmit packets across the same link' and therefore, the packets are 'interleaved across the link' (Sheldon, 2001: 960). For instance, an online user can initiate multiple requests by opening two browsers to encounter *either the same* or *two different* versions of *Technography* simultaneously.

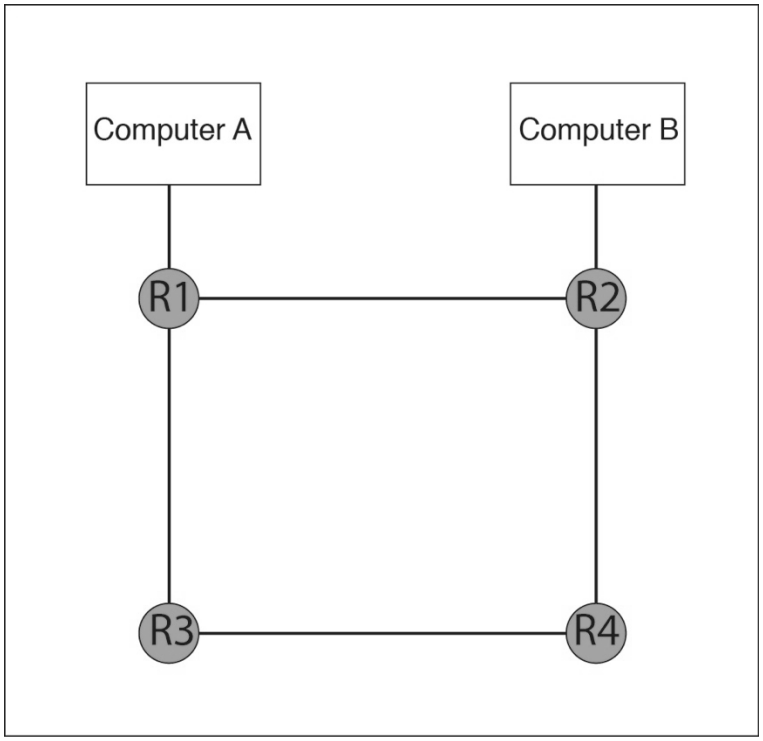

Figure 1.24. A network based on packet-switching

[33] Routers run specific *routing* protocols to find most efficient pathways in order to travel the network. These protocols enable routers to share information with one another for a better understanding of the network state at each specific moment in time.

The behaviour of packets for the delivery of data and the multiplexing principle of packet switching is significantly important for this thesis. It is significant due to a number of reasons:

(1) Such behaviour can suggest a concept of network memory (see: 02.05)
(2) It can represent the eventful nature of the inner body of the network
(3) It portrays the nonlinear form of movement and data transaction within the network architecture
(4) It can contribute to an understanding of the network time-experience

The internet/web materiality of artworks such as *Technography* and their temporal realisation or positioning within the network, indicates that there is a specific quality of encounter inherent in the WWW that we can start to understand through the concept of duration. I anticipate that these temporal online-specific encounters of the web could suggest a time experience that is divergent to a spatial sense of time. Henri Bergson describes the notion of time experience with the term *durée*, which consists of a heterogeneous sense of time (Bergson, 1889). In the following chapter I will use this concept to further my exploration of *network duration* and the time experience, or temporal encounter, of web-based artworks.

Chapter 2.

The Network Duration – The Inner-Continuity of the Self and the Duration of the Network

---

02.00. Chapter Overview – In this chapter I investigate the theory of *durée* (i.e. duration) as defined by Henri Bergson. I examine whether Bergson's concept is a useful aid for theoretically understanding the realisation and experience of web-based artworks in the network topology of the Internet. In order to make this enquiry, I will utilise the research presented in the previous chapter.

As I will explain, Bergson stresses the differences between experiencing durée (which is an encounter in the virtual inner self) and the experience of time in physical space (i.e. chronological time). The latter is seen as *an unreal, constructed time* that is exterior to durée. Bergson refers to this time experience as *spatialised time.* In this chapter I will examine how duration resides in *live-ness*, allowing encounters to be temporal. My main interest will be to explore the *live* aspect of durée, which I will explain as taking place in our virtual inner self and as having a similar capacity to the *live* nature of time-based artworks, especially in internet/www artworks.

While proceeding with my exploration into a Bergsonian account of duration, along the way, I will examine Bergson's theory in relation to time-based artworks, including the *Technography* series. This method is employed to co-relate and interlink aspects of practice and theory together. My web-based art resides within the network topology and the general attributes of the Internet as a medium, manifesting only in the *duration* of a request, which takes place between a user/server.

I will take as my starting point the notion of duration in order to explore how the temporal attributes of the Internet/WWW might suggest new notions of time experience created by this network. The concept of duration will equally be employed to explore the encounter of online users while they are engaging with the specific attributes of telematic space-time and the (virtual) simultaneity of experiences within the network duration.

I will use this chapter in order to outline and expand on the following phases:

(1) To explore and perceive the concept of *durée* as described by Henri Bergson

(2) To explore other readings and analyses of the Bergsonian account of duration—mainly through Gilles Deleuze, Christian Kerslake, Jay Lampert and Tiziana Terranova—in order to better understand the practice element of this research

(3) To test how such conceptions, readings and analyses of duration can aid our understanding of experiencing network topology/architecture.

(4) To critically examine both historical and contemporary time-based artworks, including my web-based artwork *Technography*, throughout the above phases

02.01. Heterogeneity of Intensities

The philosopher Henri Bergson (1859 – 1941) began his analysis of durée in his doctoral thesis *Time and Free Will: An Essay on the Immediate Data of Consciousness,* written in 1889. He continued to develop his analysis following publications, namely, *Matter and Memory* (1896), *Creative Evolution* (1907) and *Duration and Simultaneity: Bergson and the Einsteinian Universe,* published in 1922. In his work, Bergson categorises time into two types: *spatialised time* or that which is external and measurable (associated with location in space) and *duration*, which refers to a virtual and qualitative type of time such as the inner self of human experience (Bergson, 1889). To explain duration, Bergson utilises a reading of Zeno's paradoxes.

Zeno of Elea (c. 490–430 BC) applied geometry to movement to suggest that the theory that space-time is an infinitely divisible entity is paradoxical. He stated that if space were *indefinitely divisible*, then a movement from one point to the next would never be completed. For instance, *if an arrow has to pass through an infinity of points, how will it ever reach its target?* Or in another example, *how could Achilles catch up with a tortoise if he has to go through an infinity of points to reach the animal?* (Terranova, 2004).

Bergson draws on Zeno's paradoxes to indicate that if we think of space as an infinitely divisible being that is only understood by the passage from point A to B to C ad infinitum, then it completely withdraws this space from an essential quality. Bergson describes this quality as an ontological shift that occurs, or in other word, the duration of an event.

Bergson's argument is that 'movement does not imply a simple passage between points, but involves duration that is a *qualitative becoming*' (Terranova, 2004: 50). This impacts the whole framework of any situation in physical space (e.g. the arrow, the target, the archer and the whole milieu of an event).

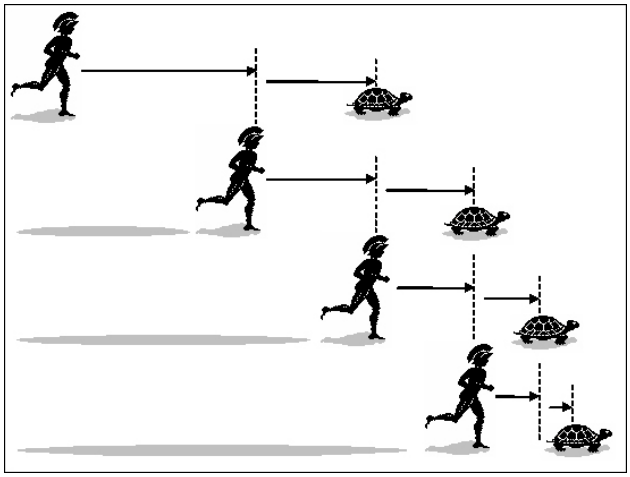

Figure 2.1. Zeno, argues that between a point *A* and a point *B* lie an infinite number of points, therefore, Achilles will never catch the tortoise.

Bergson observes that our tendency to focus on points A, B, C and so on, demonstrates how the conscious mind unwittingly prioritises space as a 'homogeneous container of objects', and thus misjudges the reality that *duration is linked to the 'process of becoming'* (Terranova, 2004: 50). For Bergson the *process* of the *qualitative becoming* refers to the uninterrupted and continuous progressions that transpire only in the state of duration. In short, a continuous *to and fro*, an encounter that Bergson believes is attached to the conscious mind and its relation to our memories, which can only be described genuinely within our inner self.

The argument that Bergson puts forward derives from a critique of Western metaphysics that is concerned with the belief that space is *continuous, enduring and lasting* – i.e. a condition that one place (A) leads to another (B) with no divisible sections between these two points.[34] For example, a movement that can be assigned to a position between the point of departure *A* and a point of arrival *B.* (Bergson, 1896).

[34] Henri Bergson rejected the theory of space and time proposed by the philosopher Emanuel Kant in his book *Critique of Pure Reason* (1781). Bergson values Kant's conception of space elaborated in the section of 'Transcendental Aesthetic' in which, he attributes 'space with an existence independent of its content' (Bergson, 1889: 92). Yet, Bergson's criticism of the Kantian space-time derives from his attempt to detach the effective intervention of the mind and consciousness from the experience of the space. Bergson suggests, theoreticians such as Emmanuel Kant, 'regard sensations as inextensive and make a radical distinction … between the matter of representation and its form' (Bergson, 1889: 93).

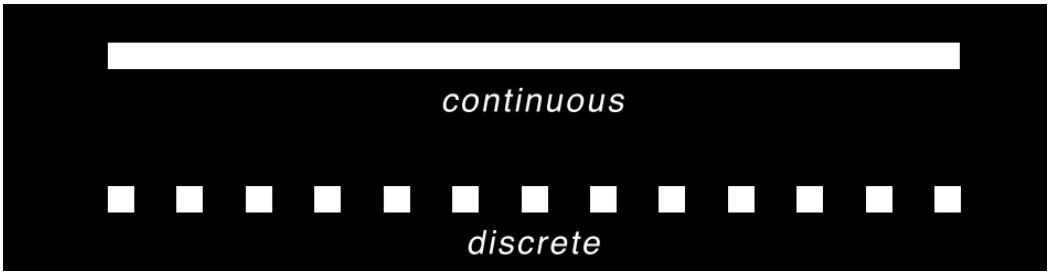

Figure 2.2. Bergson argues movement in the spatial physical world is continuous, as opposed to the continuous nature of movement in duration.

This account of movement for Bergson is problematic and produces two entities that are *in contrary to the nature* of durée:

(1) A *homogeneous, linear time*, as in the chronological clock, which indicates, for example, the time that a train leaves at 14.00 and arrives at 19.00, or the timespan of 120 seconds controlled by CSS code, providing the encounter of *location.406* on the web.

(2) A *homogeneous space* that defines the actual space that something can travel through, for instance when *location.406* travels through the actual network of *nodes, wires and cables* that are connected from a *web server* to a *web browser*, or the actual space that a train will leave, arrive or travel through when going from Brighton to London (including many stations in between).

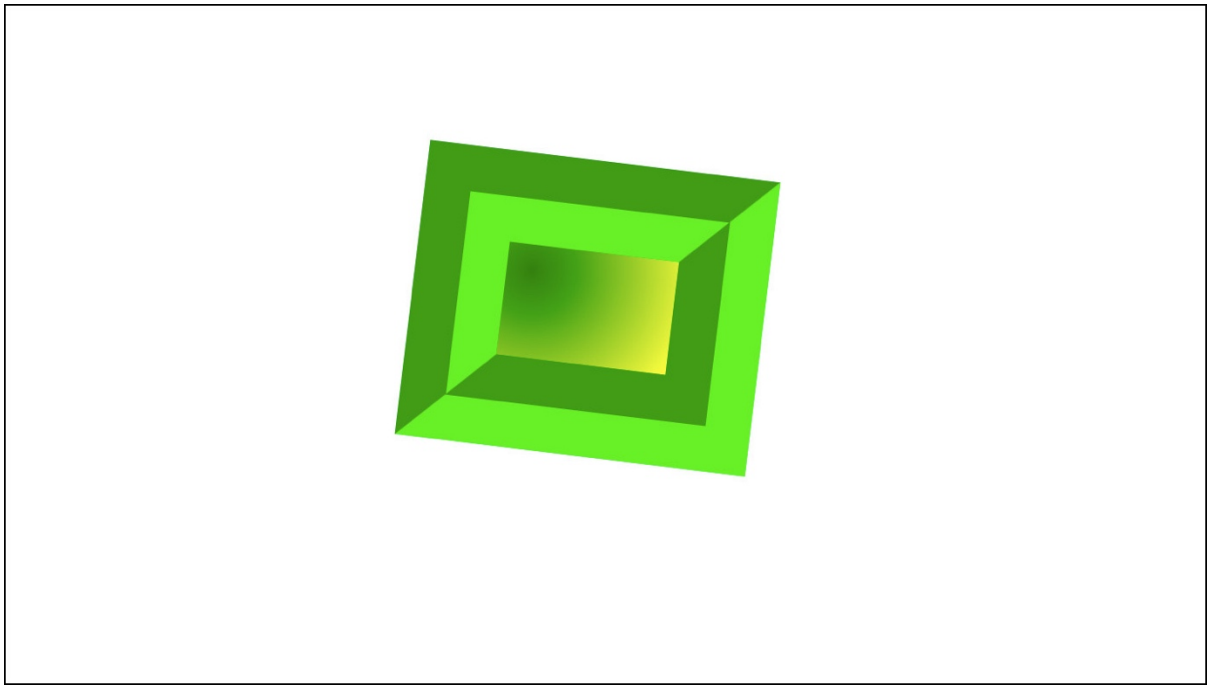

Figure 2.3. Screenshot of the encounter of *Location.406,* a few moments after starting its live event

Although Bergson defined real movement as the condition of a line connecting two points A and B, including all other in between positions across these two points, this account was unable to define pure duration as, for Bergson, duration is a non-spatial virtual state, a realm that relates to our conscious mind and an inner sense of time.

In his first writing on duration in *Time and Free Will* (1889), Bergson states: *'Pure duration is wholly qualitative. It cannot be measured unless symbolically represented in space'* (Bergson, 1889: 104). Bergson's observation derives from an initial critique of the psychophysical experimentations of the time, namely those conducted by Gustave Fechner (1801–1887) and Joseph Delboeuf (1831–1896), who aimed to provide a mathematical strategy for associating, 'mental events with physical stimuli'[35] so as to give a quantitative account of mental events (Kerslake, 2007: 10).[36]

However, Bergson objected to this mathematical approach for two reasons. Firstly, in spite of our ability to indicate when we sense being hotter or colder, the correlation we reach to compare our feelings/intensities of warmth and the actual grade in temperature is based on convention. Secondly, the 'degrees' of sensation/feelings are heterogeneous, abstract and conditional, in contrast to the degrees of physical stimulus as calculable entities (Kerslake, 2007).[37]

For example, the level of pain experienced from an injection is not simply calculable since it is linked to our inner world, in other words, if we are distracted or anticipating an injection. Previous experience and associations are

---

[35] A physical stimulus is considered to be a thing (or an event) that rouses or incites to activity (Miriam Webster, 2018). In addition, it can evoke functional reaction in an organ.

[36] Fechner and others sought a method to calculate *units* of sensation and they introduced two qualities in order to identify changes in sensations. Firstly, they aimed to detect the *'absolute'* of a sensation, and secondly, to separate its *'differential threshold'*. Therefore, in Fechner's account, an absolute threshold defines the 'point at which a summation of stimuli breaks through to conscious awareness' (Kerslake, 2007: 11). To explain more in detail, refer to the example provided in the next footnote.

[37] To explain this in an experiment on temperature, the absolute threshold would be the smallest intensity of stimulus that is required to feel cold or hot by a human subject. Having determined the absolute threshold of temperature sensations (e.g. 4°C to feel cold, and 38°C to feel hot), we can increase or decrease these intensities of heat gradually until a subject reports a change in experience of the temperature. Then the difference between the amount of stimulus already registered and the intensity when a change in experience is noticed comprises the differentiated threshold as *just noticeable differences* (JND). This suggests that one experience of change in intensity of a stimulus is not continuous because there are changes of intensity that go unnoticed. Equally the conventional aspect of feelings, determine that for example, a subject might not report sensations of coldness even at 1°C while being under the test, however another subject might detect that at 3°C.

also connected to the way in which we will sense the impact of stimuli differently.

Sensations have qualitative features that are not subject to measurement such as emotions, thoughts and memories. Bergson states that, 'the mistake which Fechner made […] was that he believed in an interval between two successive sensations S and S, when there is simply a *passing* from one to the other and not a *difference* in the arithmetical sense of the word' (Bergson, 1889: 68). Bergson affirms that there is a *continuity* of experience between two identified intensities, yet we are not conscious of it, nor do we recognise it.

According to Bergson's enquiry, feelings/intensities/sensations are not calculable in the same manner as stimuli. In other words, my passage through two successive sensations of heat would not take place if they did not flow into each other. In 1874 another critic of Fechner's methods, Jules Tannery, published a series of problems found with Fechner's psychophysics that reflected aspects of Bergson's critique: 'The essential characteristic of directly measurable dimensions is *homogeneity*: whatever is added, such that something increases, is of the same exact kind as that which was already there: length, surface and time are dimensions of this kind' (Tannery, 1875: 1019).

Tannery indicated the unaccountability of projecting a series of homogeneous stimuli upon a series of sensations due to the activation of multiple nerves by the mere rise of one stimulus. This is to say, for instance, by applying a specific degree of a stimulus, a range of sensations, feelings and memories all together are potentially aroused, in contrast to only one specific unit of threshold or experience. This observation indicated the heterogeneous quality of sensations (Kerslake, 2007). Bergson, echoing Tannery, formulated this critique, leading him to define his theory of duration.

Bergson asks us to imagine the feeling of pain created by a pinprick. He proposes that according to Fechner and Delboeuf, we should envisage a gradual sense of pain by applying a slow but continuous rise in the force of a pin. Yet, what actually occurs is the fulfilment of thresholds at specific moments in time, e.g. (1) noticeable, (2) irritating, (3) alarming, (4) agonising (Bergson, 1889). These thresholds indicate qualitative jumps in our sensations of pain as a consequence of a change in attributes that affects the pain quality. This condition may explain

that a series of feelings (e.g. emotions, memories, pain, sense of temperature, etc.) demand their own thresholds, independent of a series of stimuli. For instance, the extent of feeling pain, 'may have internal, relative thresholds which cannot be deduced from physiological stimulation' (Kerslake, 2007: 12).

This condition could be described by Tannery's account as he suggests an appeal to various nerve regions and their roles in the body. It is here, however, that Bergson argues against Tannery to form his own position. He infers that the state of feeling is *also* significantly attached and impacted by *'how long'* we have been tolerating, undergoing and bearing the pain and thus 'time, or *duration,* makes a difference to sensation' (Kerslake, 2007: 13). For instance, In Bergson's pinprick case, we are not obliged to necessary increase the level of force to reach maximum threshold, instead by prolonging the same degree of force the same threshold can be reached. This signifies that *duration* has an impact on *how* we encounter feelings, sensations and our perceptions of experiences.

In this way, the encounter of *location.405* should vary to *location.406* due to different attributes such as timespan, colour, arrangement of form, speed, etc. But more than this, I will argue, web-based artworks such as *Technography* are capable of disturbing a homogeneous (linear) sense of time, offering a metamorphosed time-experience due to the fact that they encountered online. I propose that this quality of encounter is inherent in the character of the movement of data packets and their oscillations in the network, creating a flux of information. Could we identify correlations between the movement of data packets and the way in which Bergson describes the nature of movements in durée?

Henri Bergson argues that time should not be taken as a homogeneous volume, but is instead a heterogeneity that is attached to a *succession of feelings*. Bergson's analysis of the qualitative and heterogeneous nature of sensations and their intensities leads him to suggest new insights into notions of time and its unique experiences. This is contrary to the quantitative and mathematically oriented systems, which we will explore in the next section.

02.02. *la durée*

In *Time and Free Will,* Bergson identifies two types of reality, the heterogeneity of sensible qualities and the homogeneity of space (Bergson, 1889). Bergson acknowledges that there must be a spatial dimension that enables us to calculate, make distinctions, abstract, etc.[38] Yet he objects to theories that suggest a reduction of either time or space into one another. As a result, he states that:

> [T]he philosophers who have tried to reduce one of these ideas to the other have thought that they could make extensity out of duration […] [T]ime, conceived under the form of an unbounded and homogeneous medium, is nothing but the ghost of space haunting the reflective consciousness (Bergson, 1889: 99).

Bergson distinguishes time from space and in *Time and Free Will* explains that there are two possibilities for conceptualising time, 'one free from all alloy, the other surreptitiously bringing in the idea of space', whereby the former refers to *pure durée* and the later indicates *spatialised time* (Bergson, 1889: 100).

For Bergson, *spatialised time* is theorised, conceptualised and is separable, in order to be measured, whereas duration (i.e. inner continuity) runs virtually, continuously, accumulatively and indivisibly. This can be depicted by the concept of memory, where once we recall a memory, some associated feelings with that memory might arise and soon this feeling might trigger another memory and hence another feeling.

Memories, feelings and emotions are somehow associated with one another in the *inner continuity* of human experience, resembling an image of a virtual flux of never-ending interaction and *not* a virtual *chain*. In a chain model, we have isolated instances of experience, memories and feelings, which is against the nature of experience in pure duration as an *organic whole*. In other words, pure

[38] By introducing the example of the sound of a bell and the experience of hearing the bell ring, Bergson presents his certainty about space where the operation occurs: 'The question now is, whether this medium is time or space. But a moment of time, we repeat, cannot persist in order to be added to others. If the sounds are separated, they must leave empty intervals between them. If we count them, the intervals must remain though the sounds disappear: how could these intervals remain, if they were pure duration and not space? It is in space, therefore, that the operation takes place' (Bergson, 1889: 87).

duration only transpires by projecting past into present. This occurs through streaming the *live experience* of our present moment (not yet memories) into the accumulation of memories perceptible at that moment, in order to create a *whole,* bound from past to present (see: 02.05).

This is an important account for my practice, as it enables me to explore the time experience of *Technography* in a condition (i.e. the web) in which the notion of space is not analogous to the physical world (Berners-Lee, 1999). Moreover, the notion of time in the Web is unparalleled to the physical world. For instance, once artworks such as *Technography* are requested (i.e. via URL), from Tehran, Zürich, London, or anywhere else, they take more or less an equal time to reach their destination, therefore suggesting a *no time* condition (Castells, 2000). Rather, a *temporal informational space* is present within the realisation procedure of *Technography* (see: 01.01). This leads my research to enquire whether *Technography* resides only in *duration* in the *non-spatial* realm of the informational space. These features (i.e. temporal duration and non-spatial) are inherent in the nature of durée, defined by Bergson as an experience of internalised time.

Figure 2.4. Screenshot from Google Maps indicating a journey from Tehran to Zürich to London.

Bergson insists on this point by stating that pure duration, 'does not set [former states] alongside its actual state as one point alongside another, but forms both the *past and the present* states into an *organic whole*, as happens when we recall the notes of a tune, melting, so to speak, into one another' (Bergson, 1889: 100). For Bergson, duration is a succession of memories and sequences of progression that are dissimilar yet penetrate one another mutually. Equally, each could potentially represent the whole and are incapable of being detached from it, except by *abstract contemplations*.

This is what Bergson means when he describes duration as a *continuous moving state of alterations*, with no attachment to space, but *familiar* with it (Bergson, 1889). Comparably, once the URL of *Technography* is requested, all the assets travel the network *simultaneously* and arrive as a *whole*. Therefore, the intelligence behind the internet/www ecosystem (see chapter 1) operates to introduce an encounter similarly to how we recall a tune.

This aspect of the realisation of *Technography* provides an encounter that can produce similar time-experience qualities as when a feeling/memory is realised in the live experience of the present moment. In both conditions, the event of realisation occurs as whole, while binding pieces together, or in other words it represents a durational encounter. While *Technography* is realised only in the *duration* of the network, its assets are preserved in the data storage of servers as digital information. Servers are ready to respond to URL requests and *retrieve* the web assets of *Technography,* enabling its realisation in the *non-spatial* realm of the network. In other words, although web-based artworks reside and are realised only in the non-spatial realm of the network duration, they are dependent on the actual response of servers to retrieve their web assets. Therefore, web assets are dependent on spatial assets.

Bergson indicates that we are effected by the idea of space and therefore we introduce it 'unwittingly into our feeling of pure succession' (Bergson, 1889: 101). This leads us to lay out the order of our 'consciousness side by side in such a way as to perceive them simultaneously', thus not any more merged in each other, but separated out, resulting in a projection of time into space (ibid). This is how we can mislead our experience of pure duration by mixing it up with our familiar knowledge of the spatial world. Therefore, we are constantly pushed toward imagining our spatial understanding in our conscious mind and hence, merge it

into our experience of duration. This account leads us to manifest durée in attributes that include a perception of space (i.e. extensity), thus succession becomes linear, as in a chain model, and without penetration that merges instances together (Bergson, 1889).[39] As a result, while imagining the potential of reversing the series of experiences in duration, or when thinking of creating a specific 'order of succession in time', both infer the depiction of space and therefore do not genuinely describe pure duration (Bergson, 1889: 102).

For instance, while I encounter *location.405,* I begin to translate the passage of live events into seconds or minutes in a method so that the mind *homogenises* time and turns it into a linear conception. Thus, as Bergson indicated, due to the presence of the conscious mind encountering *Technography* (or any other time-based artwork) is unable to take place as pure durée. As mentioned previously, this is due to the presence of the conscious mind and its intrusion into the act of encounter, imposing spatial conceptions into the experience of time.

Manifestations of Bergson's theory were experimented with in the live events of *Standing Wave*, a kinetic artwork made by Naum Gabo in 1920. Gabo admired Bergson, referring to him as 'his teacher' (Hammer, 2000: 69). Bergson's ideas seem to underlie Gabo's assertion that 'time is continuous in its real duration', and his dismissal of the Futurist depiction of movement through time, which appears fragmented and sectioned (ibid). Gabo fabricated *Standing Wave* to represent the notion of *kinetic rhythm*. It is comprised of a thin vertical metal rod, which a motor causes to vibrate such that its oscillations describe a virtual volume or waveform in space, 'as an effect of motion over time' (Shanken, 2009: 56).

[39] Bergson explain this situation through the sensations achieved, when moving his hand across the length of a line or a surface. This can lead to various qualitative sequences of feelings, leading to the occurrence of one of the following states: 'Either I picture these sensations to myself as in duration only, and in that case they succeed one another in such a way that I cannot at a given moment perceive a number of them as simultaneous and yet distinct; or else I make out an order of succession, but in that case I display the faculty not only of perceiving a succession of elements, but also of setting them out in line after having distinguished them: in a word, I already possess the idea of space' (Bergson, 1889: 102).

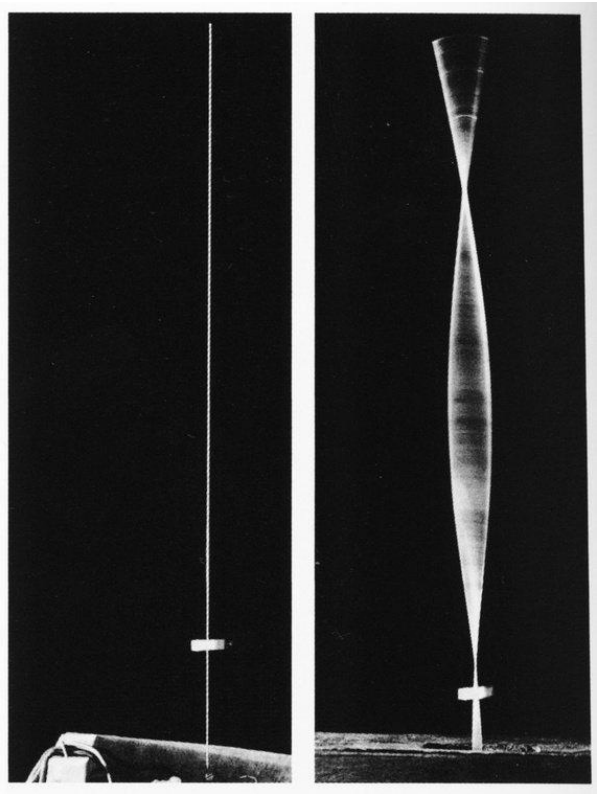

Figure 2.5. *Standing Wave, Naum Gabo, 1920*

Gabo integrates kinetic elements in his artwork as a means of constructing a situation where form is a consequence of extension in time and space. Therefore, exhibiting a time-based object that only exists when it is activated, highlighting the live event of the work and the encounter of its *temporal duration*.

It appears that Gabo aimed to illustrate the nature of movement in durée. I will discuss my own encounter with *Standing Wave* in the next chapter and how I became engaged and immersed in the course of its live event—activation, motion and stillness. For now, it should briefly be said that in the encounter I became engaged with the spatial sense of the illusionary wave constructed in the temporal moment of the work's realisation. When in the motion an uninterrupted duration depicted a spatial realm in the installation where time and space co-related with one another, representing a state that was unrecognisable from the actual strand producing it (see: 03.03).

Bergson utilises the term *inner continuity* to refer to durée. He utilises the word *inner* to refer to the *ego*, or the internalised experience of the *self*. Equally, he associates duration with a fluid encounter of sensational flow that moves *to and fro* continuing in progression and the succession of experiences. This nonlinear

account of movement is inherent within durée, illustrating the *virtual* sense of motion in how mental images/sensations penetrate into each other from past to present or from present to past.

The nature of movement in the inner state of the internet/www ecosystem performs similarly. With each request, once the network duration is activated, data packets travel the network nonlinearly to reach their destination(s). The inner state of the network deploys a redundant topology, causing each movement in time to differ from the previous one (see: 01.03). In other words, data packets never go in a straight line nor via the same route. They travel a diverse network, a mixed-up route in a mishmash of nodes to complete their journey. Each node indicates specific memories about the current state of the network, so that other parts of the network (such as routers)[40] are able to 'remember' or 'forget' specific memories/data for their future passage in the network (Terranova, 2004).

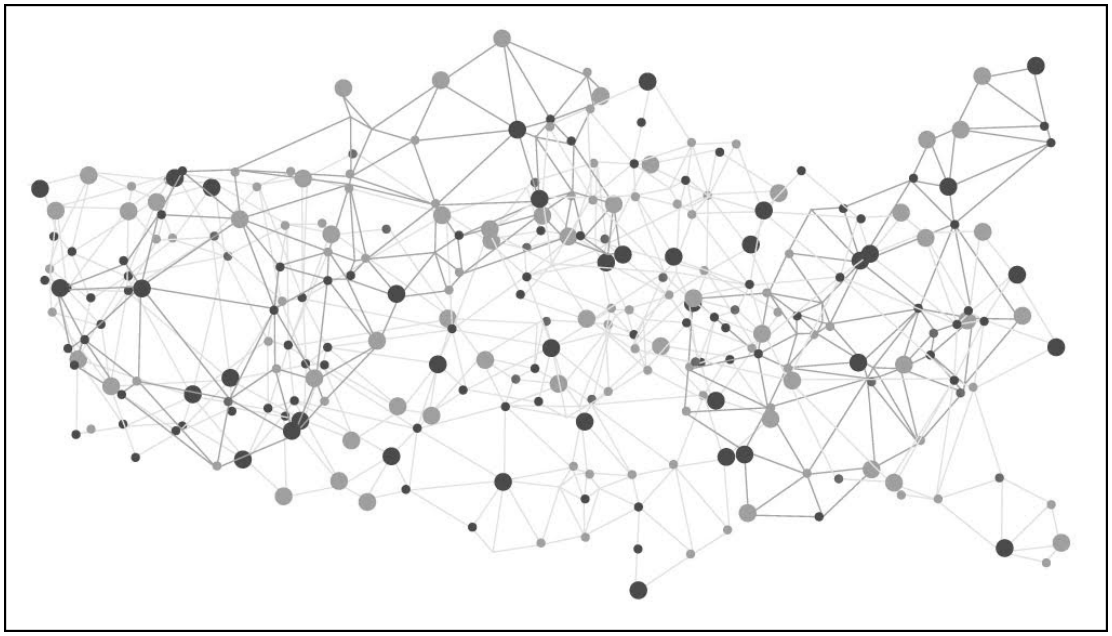

Figure 2.6. An illustration of the network representing how packets should travel through heterogeneous pathways in the network.

Even though the assets of *Technography* travel nonlinearly through the heterogeneous state of the diverse networks, they reappear as a whole at the end of the connection, thus enabling them to appear. Therefore, the time experience

40 Within the network routers utilise *routing protocols* in order to identify their neighbouring routers and other various networks that are attached to them. These protocols (e.g. RIPv2, IGRP), are used to let routers share information about the topology of the network at each moment in time to identify and report new or failed links in the network (Sheldon, 2001).

of *Technography* is inherent within the heterogeneous state of the network, including its nonlinear and non-spatial features.

Henri Bergson's theory of time derives from his belief that in the ego, 'there is succession without mutual externality; outside the ego, in pure space, mutual externality without succession' (Bergson, 1889: 108). Mutual externality is a term deployed by Bergson to refer to the co-existence, separation and divisibility of material objects in space. Mutual externality is a condition where discrete events can occur, without succession. In other words, a condition that belongs to the spatial dimension enabling objects, events, bodies, etc., to exist/emerge/occur next to one another simultaneously and discretely.

Technography reflects both states indicated by Bergson in the *ego* and in *space*. That is to say, web assets present both durational and spatial features. They are durational, due to residing temporally in the network duration, as well as their capacity for endless iterations. In addition, their spatial aspect could be explored through their ability to operate simultaneously. Document assets can travel the network at the same time, no matter from which vicinity, in the spatialised sense of space-time. Manifesting the Bergsonian account of space-time in the inner state of the Internet/WWW, we could identify both the *spatial and temporal* qualities categorised by Bergson:

(1) *Succession without mutual externality*; due to the virtual, non-spatial and temporal aspect of the network duration where successions of web assets can iterate infinitely through multiple requests

(2) *Mutual externality without succession*; due to the ability of packet switching in multiplexing when framing the blocks of data and preparing them to go through the physical cables and wires simultaneously

Thus, the condition of time in the temporal state of network duration has both aspects of Bergsonian concept of time: *spatialised time* and time as *duration*. *Location.405* and *Standing Wave* share some aspects in the discrete event of their realisation procedure. For instance, the discrete events of packets (e.g. TCP/IP) being switched in *location.405*, can be similar to the discrete events of the oscillation of the metal strand in *Standing Wave*. Nevertheless, web-based artworks such as *location.405* are inherent in the *nonlinear virtual* domain of the

WWW and are only realised in the non-spatial temporal duration of the network. Due to these differences in materiality the encounter of these two artworks are never the same, however they might still share similarities in their time-experience when we encounter them.

In my investigation as part of the exhibition *Around Hospitality* (2016)[41] (see: 03.04), I exhibited three parts of the *Technography* series*: location.327, location 580,* and *location 585.* During the course of the exhibition, I understood that when an encounter with *Technography* is staged outside of its network settings, i.e. outside of the everyday use of a personal device and into the fixed use of a gallery experience, its time experience becomes modified and dislocated from its online-specific condition.

For instance, in the case of *location.580* (see: 01.01), some visitors encountered the artwork as an offline 2D vector animation, rather than a web-based artwork. I came to realise, that it would be confusing and difficult to represent web-based artwork in a gallery setting. As a result, the *pure* encounter of *Technography* is inherent only in the virtual duration of the network and its specific online usership.

41 *Around Hospitality* was my solo exhibition at BALTIC39 in Newcastle in February 2016. As part of the exhibition, I presented many offline and online artworks covering a range in media that I will explain more in Chapter 3.

Figure 2.7. *Location.580*, installation view at the exhibition *Around Hospitality, Baltic 39*, 2016

Similar to how Bergson illustrates the *temporal* encounter of mental events in durée (e.g. the pain of a pinprick or movement of a hand on a surface), the realisation of web-based artworks also take place in the *temporal* moments of network activation, when protocols are exchanged, enabling data packets to complete their journey.[42] Is this condition of durée similar to the nonlinear flux of information that streams in the web ecosystem?

[42] Here the temporal reality of web-based artworks is seen through (1) their transient realisation that only can exist in the context of a request (i.e. user/server), and (2) their transferal progression condition, when assets being unpacked, moved, and re-packed through protocols, e.g. TCP/IP, HTTP, and HTML.

02.03. Multiplicities of the Inner Continuity

Within inner human experience, the flux of memory-time experiences can blend into one another and create a virtual state. This is where past memories and experience can co-relate and interact with present experiences in an inner continuity to form the time-experiences that Bergson describes as *real time* (Bergson, 1907). Our engagement with the spatial world results in the extension of these experiences into our conscious mind. This is why Bergson believes that, 'little by little our sensations are distinguished from one another like the external causes which gave rise to them, and our feelings or ideas come to be separated like the sensations with which they are contemporaneous' (Bergson, 1889: 126).[43]

Bergson suggests that 'measurable time is nothing but counting simultaneities' (Bergson, 1889: 108). Here Bergson draws an important link between the two types of time in relation to our consciousness. He suggests that a form of *interchange* occurs between *succession without externality* (i.e. duration), and *externality without succession* (i.e. simultaneity). While our successive realm of consciousness correlates separately with the fluctuation and oscillation of inner continuity, it is at the same time influenced by the spatial world. As a result, we tend to enter into the routine of constructing a similar spatial distinction in relation to the successive phases of our conscious existence, for example, from childhood to adulthood or from a student to a teacher, etc. Thus, suggesting a 'homogeneous inner duration, similar to space', where moments of time are 'identical and follow', with no intrusion or melting into each other (Bergson, 1889: 109).

At this point, I want to summarise a Bergsonian concept of duration into three possibilities of time experience, which transpire from the to and fro movement that is performed between the *real* and *imaginary*, the *physical* and the *virtual*:

[43] When we learn how to understand to isolate the movements of the pendulum in relation to the dial of a clock, in essence we are constructing a spatialised notion of time to project it into our consciousness and to merge it into our durée. 'Now, let us withdraw for a moment the ego which thinks these so-called successive oscillations: there will never be more than a single oscillation, and indeed only a single position, of the pendulum, and hence no duration. Withdraw, on the other hand, the pendulum and its oscillations; there will no longer be anything but the heterogeneous duration of the ego, without moments external to one another, with out relation to number' (Bergson, 1889: 108).

(1) We have the reality of space, which contains no duration. Experiences (i.e. events, sensations) emerge and fade away simultaneously in relation to our state of consciousness.

(2) We have real duration (i.e. *pure duration*), which refers to the *heterogeneous* points in time, that merge and melt into each other. Bergson emphasises that each of these instants are potentially projected into the external world at that moment in time (i.e. as memory images).

(3) A comparison of these two realities, suggests a symbolic depiction of duration – i.e. *a type of duration that is triggered from space*. It is in this condition that duration is an illusionary manifestation of a *homogeneous* medium – *what bridges space and duration, is simultaneity*; that which could be explained as the crossing point of time and space (Bergson, 1889).

As a result, there are two different ways of addressing duration, which represents two forms of multiplicities (i.e. heterogeneity) that have to be differentiated from one another and that represent the two features of consciousness. Bergson explains these as:

(1) 'Below homogeneous duration, which is an *extensive symbol* of pure duration' (Bergson, 1889: 128). This is where the perception of material objects and the conception of number is instantly applicable, a *quantitative multiplicity*, where, for instance, I am able to homogenise my durée in order to perceive a sense of spatialised time while encountering the live events of *Technography*. In other words, an estimation of, for example, thirty seconds or one minute, etc.

(2) 'Below the numerical multiplicity of conscious states, a *qualitative multiplicity*; below the self with well-defined states, a self in which *succeeding each other* means *melting into one another* and forming an organic whole' (Bergson, 1889: 128). This is where *pure duration* exists, with no potential of projecting numerical sense onto it. For Bergson *pure duration* can be ultimately experienced as in a dream setting when the *conscious mind puts an end to the simulation of the spatial world*. Therefore, within pure duration we have *qualitative multiplicities*: a term to describe the heterogeneous state of inner continuity.

Bergson clearly distinguishes between the two saying:

> In other words, our perceptions, sensations, emotions and ideas occur under two aspects: the one clear and precise, but impersonal; the other confused, ever changing, and inexpressible, because language cannot get hold of it without arresting its mobility or fit it into its common-place forms without making it into public property. If we have been led to distinguish two forms of multiplicity, two forms of duration, we must expect each conscious state, taken by itself, to assume a different aspect according as we consider it within a discrete multiplicity or a confused multiplicity, in the time as quality, in which it is produced, or in the time as quantity, into which it is projected (Bergson, 1889: 129).

In Bergson, the majority of human time experience is framed in the first scenario of duration, the homogenising durée with our perception of space. It is in this state that consciousness is provoked unwittingly to isolate and exchange reality with the symbol, or from another perspective, identifies reality via the symbol (i.e. language) (Bergson, 1889).

This time experience is also applicable to the encounter of web-based artworks. For instance, the artwork *My Boyfriend Came Back from the War* (1996) (MBCBFTW) by Olia Lialina, described by the artist as a Net_Film, is comprised of a series of hyperlinks, engaging users in a nonlinear narrative. This owes to the construction of the artwork with an assemblage of many web assets/documents, using interactive hyper-linked webpages, texts and images to unfold a nonlinear fiction story about a couple that are reunited after a military conflict. Please now visit the following URL to encounter the artwork.

http://www.teleportacia.org/war/

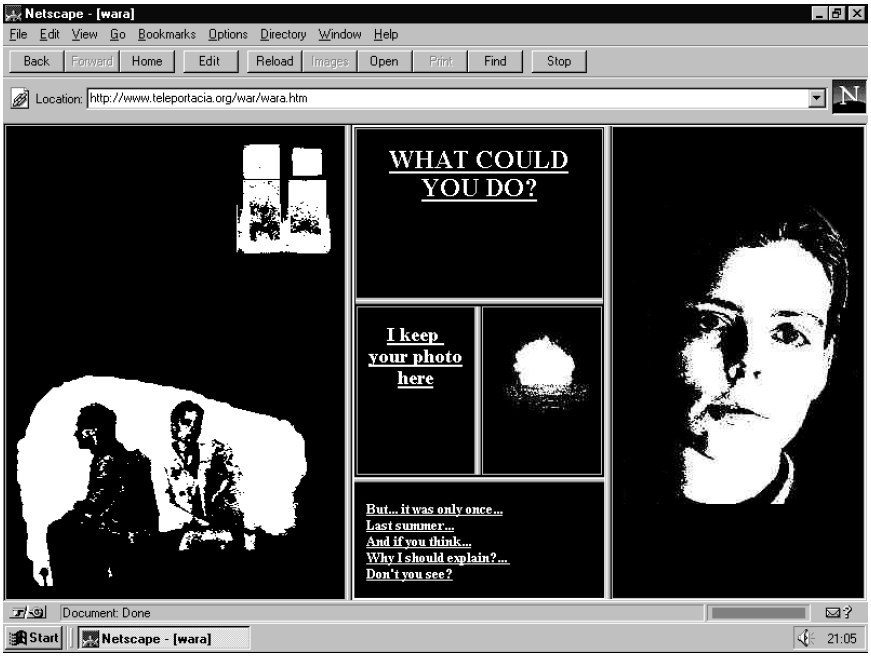

Figure 2.8. *My Boyfriend Came Back from the War*, 1996, Olia Lialina

In the encounter of *MBCBFTW*, participants might be immersed in the flickering visuals, close-up images and the nonlinear condition of hypertexts, to the extent of disengaging from chronological linear time, instead merging into the non-spatial sense of web time. Therefore, in each single webpage, Lialina creates a contrary encounter for the online user, offering specific live events within the temporal duration of the network (Greene, 2004).

However, at the same time, the conscious mind has the tendency to translate the encounters into a symbolic spatial format. In my view, when we encounter web-based artworks, the time experience reverberates in an intersection between these two states, when the conscious mind immerses into the non-spatial and nonlinear state of the web. While I am connected to the web, experiencing online-specific artworks such as *Form Art,* http://oss.jodi.org/ss.html, the *Net_Film,* and *Technography,* I encounter the network duration through the multiplicity of hypertext / hypermedia Document Assets, flowing into one another nonlinearly.

Figure 2.9. *My Boyfriend Came Back from the War*, 1996, Olia Lialina, Rhizome Net Art Anthology, Photo: Franz Wamhof, Rhizome website

This time experience is analogous with the experience of durée where memories flow into each other in the virtual realm of the inner self. While in the course of this encounter my mind/body is in between online and offline spaces, the spatial sense of time is interlinked with the virtual realm of the network duration, offering a new type of time experience as a result of being in a state of in between.

While users interact with artworks such as *Technography*, or *Internet Fantasy* (for a detailed description and analysis of this work please see: 03.01), Roy Ascott considers the body in an abstract sense. He describes the action of intervention into the network through telematic devices (e.g. computer, smartphone, etc.), as an 'out of body' practice: an experience that 'is to be at once everywhere and nowhere' and causes the users' body to be 'fragmented' and 'dispersed' (Ascott in Paulsen, 2010: 8). This encounter is associated with the internet/www environment due to their materiality and their telematic space-time. The net-web/time-space produces a new encounter for the conscious mind as it creates a sense of awareness of the user's spatial vicinity *as well as* an awareness of the

non-spatial virtual vicinity of the WWW. I will discuss this particular encounter in more detail in chapter three, where *Internet Fantasy,* another example of my practice, resembles similarities with this particular encounter. In short, *Internet Fantasy,* orchestrated a live event that was realised when participants engaged with a series of sound arrangements. This particular setting provided an encounter for participants experiencing their online-presence, simultaneous to their spatial interaction with one another (see: 03.01).

The functioning of internet/www architecture offers an encounter with web-based artworks that suggests new types of *succession*, *multiplicities* and *durée,* due to the specific condition of the state of in between found there. To further my research into the encounter of web-based artworks, I will go on to explore the Deleuzian reading of Bergson's account of durée.

02.04. The Agency of Duration

Throughout *Time and Free Will* (1889), Bergson remains coherent in the importance of consciousness and the experience of durée within the two types of time experience. However, as Bergson expands on and furthers the conception of duration in his second book, *Matter and Memory* (1896), he reconceptualises the notion of duration to address the importance of the unconscious role of memory in relation to the experience of pure duration. Therefore, in this new framework, Bergson shifts the role of consciousness to the experience of the present moment (Bergson, 1896). Previously duration for Bergson could only be recognised with the help of consciousness, in the sense that Bergson would reject any association of duration with the objective world (Kerslake, 2007). In other words, in *Time and Free Will,* Bergson describes that mental events are not arranged by distinct representation rather their transpiration (i.e. occurrence) is affected by the form of their emergence. Bergson emphasises that these forms are not discrete but that they flow into one another, in a 'heterogeneous continuity' (Bergson, 1889: 128), or an amassing of occurrence.

Thus, while we think of a feeling and a particular memory, mental depictions emerge in our minds to produce a whole experience, which can be enduring (in the sense that it can prolong the experience of the past) and equally, it welcomes novelty (in the sense that the accumulated experiences of the past could be brought forward to the present experience). This can turn the iteration of past events into new experiences, while being realised in the encounter of the present moment (Kerslake, 2007).

Gilles Deleuze (1925 – 1995) explores Bergson's analysis in his three texts *Bergsonism* (1988), *Cinema 1: The Movement of Image* (1983), and *Cinema 2: The Time Image* (1985) to identify a new conception of duration in the experience of memory. In *Bergsonism* Deleuze returns to Bergson's first book *Time and Free Will* to state that, 'duration is really defined by succession, coexistences referring back to space, and by the power of novelty, repetition referring back to Matter' (Deleuze, 1966: 60). This is how Bergson himself defined the two different multiplicities found in duration, however Deleuze's contribution to this is observing the importance of the *virtuality* of presences in the mind, and hence, the potential of the co-existence of memory images in succession as duration. In line with this, Deleuze states that: 'Duration is indeed real succession, but it is

so only because, more profoundly, it is *virtual coexistence*: the coexistence with itself […]' (Deleuze, 1988: 60). As a result, the reason for Deleuze to return to Bergson is situated in his reading of Bergsonian duration and its importance for understanding memory.

Deleuze stated that in general Bergsonism is viewed as the idea that duration is both a subjective judgment and the sensations that constitute our internal life (Deleuze, 1988). However, Deleuze then takes a different view by stating that, '[Bergson] came to say something quite different: the only subjectivity is time, non-chronological time grasped in its foundation, and it is we who are internal to time, not the other way round' (Deleuze, 1985: 82).

In other words, in Deleuze's analysis of duration, we are part of a *whole time experience*, which *can co-relate with the spatial world*. Deleuze's observation is derived from the reality that for instance, *my memory coexists with my experience of the present*, therefore memory performs *intermittently* and *sporadically* from an *archived past* and is *not* available in each moment in time in my conscious state. Therefore, in a Deleuzian account the non-chronological time of Bergson is a reference to the significance of memory. In other words, although Deleuze is in line with Bergson's heterogeneous notion of durée, his view of duration signifies a return the importance of spatial materiality and its ability to bring change in durée (Kerslake, 2007).[44] As a result, Deleuze's analysis indicates that duration is more precisely 'relatively indivisible' (Deleuze, 1988: 60).

As discussed earlier in Bergson's example of a pinprick (see: 02.01), thresholds were identified in four phases: (1) noticeable, (2) irritating, (3) alarming, (4) agonising (Bergson, 1889). Although Deleuze acknowledges the in-between (i.e. unnoticeable) phases in these thresholds, he also highlights that these discrete phases are limited and there might not be several *ranges* of thresholds that are generalisable in this way. In the Bergsonian notion of duration the strong point lies in the *potential* possibility of *change in nature*, on the condition that an experience or sensation prolongs.[45] Deleuze has the same opinion as Bergson in suggesting that every single moment in durée engages with something new. This

---

44 It is important to emphasise that Deleuze is not disregarding the Bergsonian notion of duration in any sense; however, his view of duration signifies new readings and findings in Bergson's philosophy (Kerslake, 2007).

45 This feature for Bergson particularly demands an abundance of any type of temporal spatialisation, or any expression of time that includes discrete or homogenous intervals.

derives from Deleuze's belief that durée is the *medium for thorough heterogeneity* (Kerslake, 2007).

The duration of the network also implies the same quality. For example, *Technography* is realised (i.e. an informational flux), as a result of the temporal connection(s) that are established among the *network of the networks*, resonating the flow of assets in *duration*. In other words, assets travel the heterogonous milieu of the Net/Web in network duration (Terranova, 2004). The web assets of *Technography* are in constant motion, while crossing the diverse networks of the *world* of the Net/Web. Thus, any web-based artwork (i.e. *Internet Fantasy, Technography, Form Art, MBCBFTW,* etc.) undergoes a chain of events in the net/web ecosystem (e.g. URL, HTTP, TCP/IP, HTML, etc.) and concurrently effects other assets, nodes, packets and hence the network duration itself. Similar to the notion of durée, explained by Bergson and Deleuze, the network durée also holds a live experience, where all the happenings take place in real time, representing a lively nature (Terranova, 2004).

The live-ness and durational features of the Internet/WWW comprises the constituent aspects of the artwork in *A Live Portrait of Tim Berners-Lee* (2012) made by Thomson and Craighead and presented in the exhibition 'open source'. The artwork emphasises the 'geographical displacement quality of the Internet information, the temporal simultaneity and the live-ness' (Magagnoli, 2015: 145). This condition is manifested in the image of Berners-Lee, which updates every minute by variations in its brightness. Through computer programming, the artists managed to link half of the image's pixels to one web-camera and the other half to another. Due to the rotation of the earth, night becomes day in one camera and day becomes night in the other. Therefore, during a half-day cycle, the picture reverses its colour shades (Magagnoli, 2015).

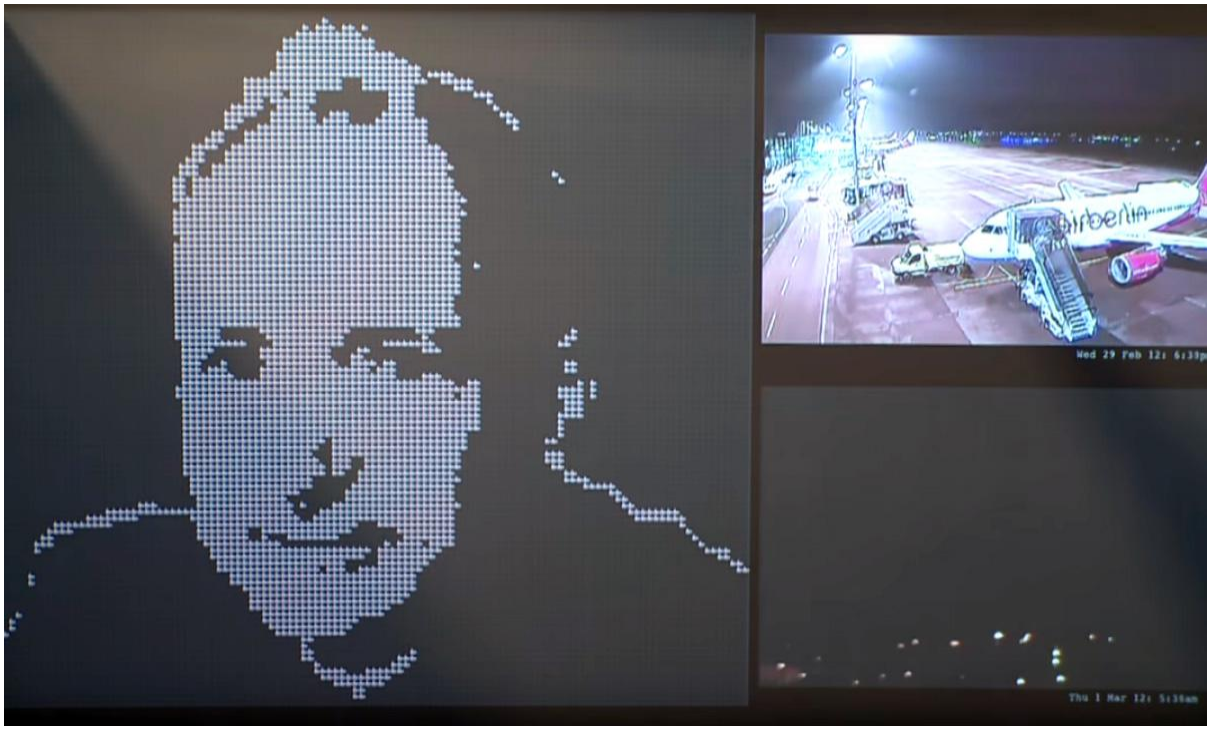

Figure 2.10. *A Live Portrait of Tim Berners-Lee* (2012), Thomson & Craighead. This image is a screenshot from the video where artists discussing this work.

The artwork deploys network duration to establish links between the encounter of the artwork (i.e. in gallery space) and its exterior spatiotemporal reality (i.e. the transition of day to night, and vice versa). *A Live Portrait of Tim Berners-Lee* presents the encounter of the Net/Web as an alternative location for novel experiences of virtuality and duration as a temporal experience. This is when our memory of the spatial dimension of the world is merged and affected by its representation in the net-web/space-time.

The live event aspect of the artwork made visual by the change in brightness, which is live-linked to the Earth's rotation, connects participants with the net-web time experience. Through these interconnections, Thomson & Craighead represent how network duration is enabled to introduce translations of the temporal reality of the non-virtual world with the temporal information flux of the Internet–i.e. a manifestation of the local durée into the network durée.

Gilles Deleuze contributes to the Bergsonian account of durée by stating that the repetition of an event does not *always* involve *difference* and these thresholds are not encountered at every instance in our conscious life. Deleuze expands on Bergson's durée in order to emphasise its ability to frame the intensive thresholds of change and the heterogeneous flow of sensation. Yet, Deleuze's

emphasis is mainly on the *return* to the material thing (e.g. heat, pin, network architecture, screen, etc.) as a result of the limited encounters that transpire in the events of thresholds. This is to say, for Deleuze there is a limited range of thresholds in reality that could be identified as a mental event, sensation, or experience. Thus, the intensive quality of the experience, in a Deleuzian account, is referenced back to the attributes of the *thing*.

The *things* in *Technography* include inherent features such as codes, protocols, software applications, computer processing, packet switching, routers, nodes, digital data, screen, cables and wires. Therefore, in relation to *Technography*, the time experience must be intrinsic in the qualities and the materiality of the artwork itself, as discussed in the previous chapter. *Technography* comprises varied timelines specific to their coded events, impacting on my encounter contrarily.

When comparing two instances of *location.640*, which consist visually of groups of different coloured rectangles (blue, green, red) that oscillate at varying speeds, they should affect my sensations and my durational experience differently. This is to say, various versions of *Technography* on the web (e.g. *location.404, location.580, location.640*, etc.), proffer their *web events* uniquely and indivisibly to others, through differences including timing, form, colour, composition, movements, coding and lifespan. Please now visit the following URL to encounter *location.640.*

http://mohammadnamazi.com/technography/location.640.html

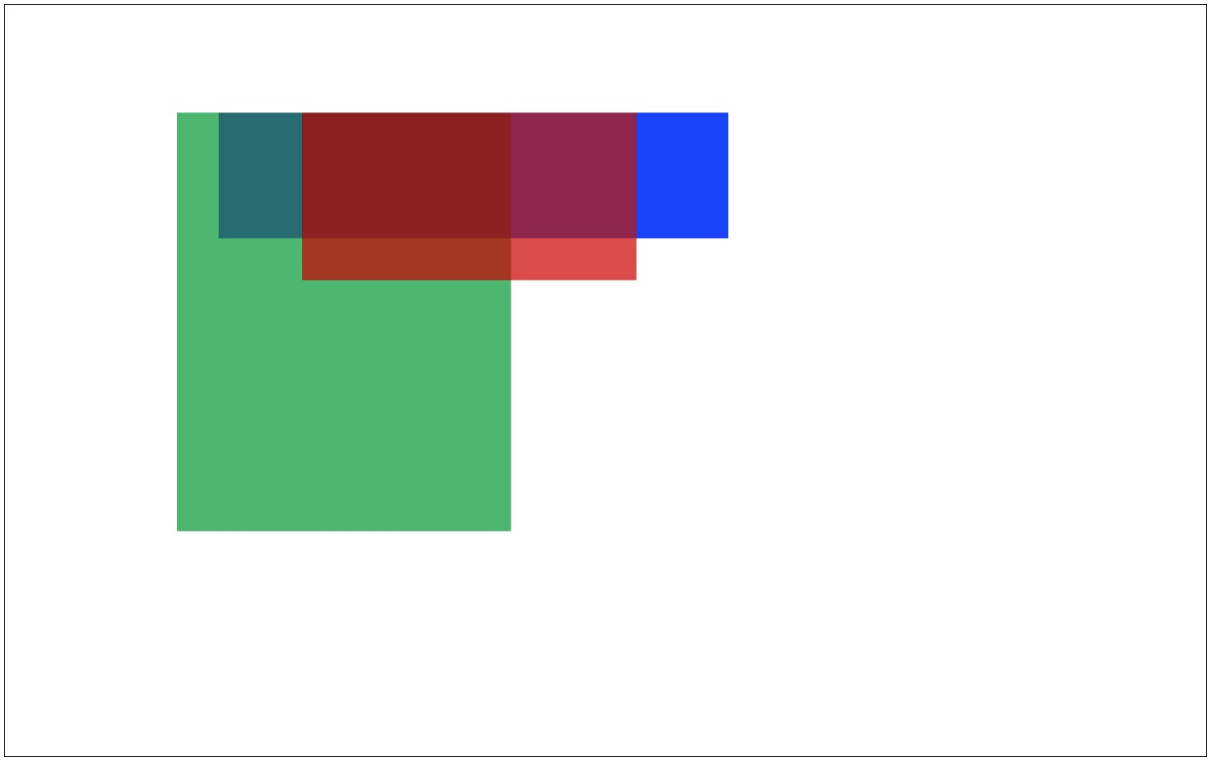

Figure 2.11. Screenshots from *Technography location.640*, 2015

These analogies could also be indicated in Lialina's *Net_Film* mentioned previously. This is due to the change that occurs in each iteration of the webpage when clicking the hyperlinks that enable a new encounter. For example, one page might involve an animated gif, the other just written messages, or just white lines and divisions with black empty boxes. Each of these encounters in a Deleuzian account refers to their specificity in materials such as colour, motion, language, etc. and hence, each triggers a new encounter in durée.

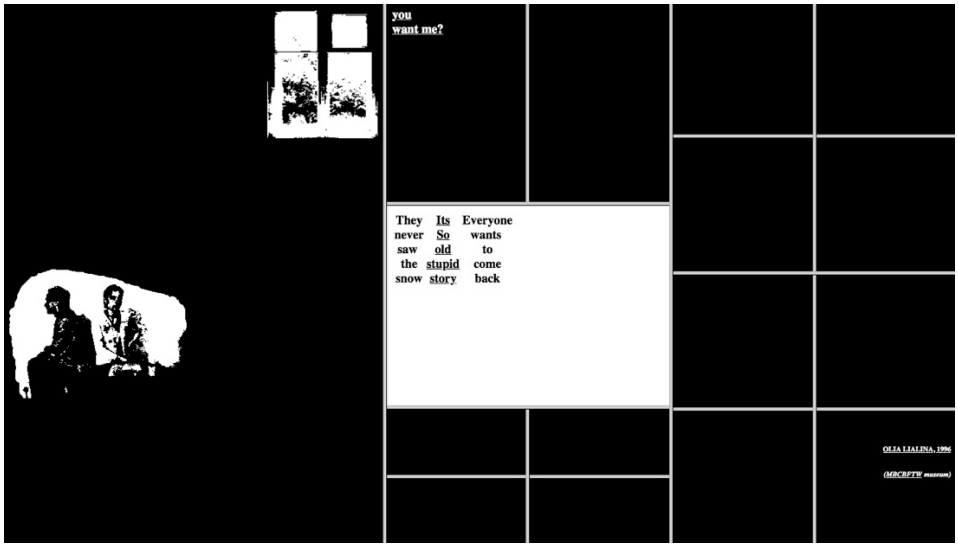

Figure 2.12. *My Boyfriend Came Back from the War*, 1996, Olia Lialina

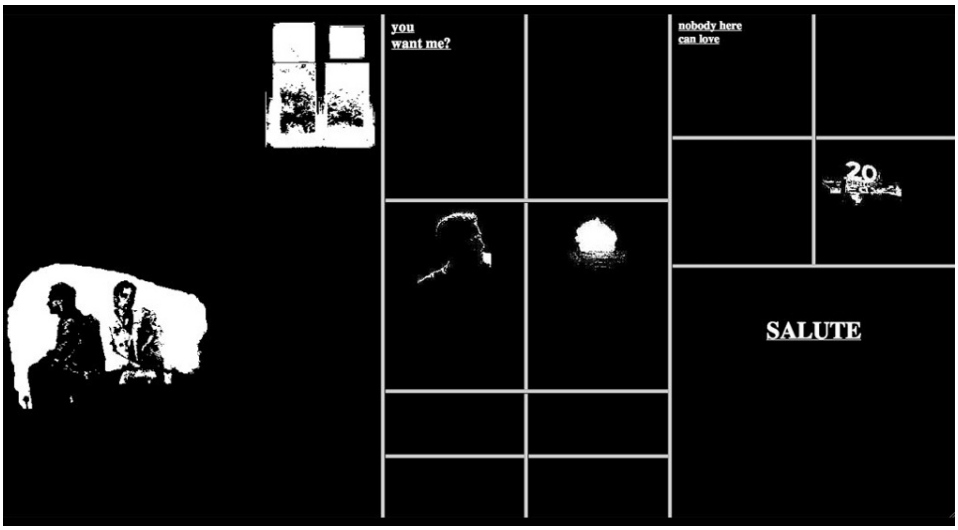

Figure 2.13. *My Boyfriend Came Back from the War*, 1996, Olia Lialina

Therefore, the inherent utilitarian aspects of HTML tags, packet switching, HTTP protocol in *Technography* or in the *Net_Film* in a Deleuzian account produce intensive realms that are specific for their material being, i.e. the variations in the material object of the TCP/IP or the temporal connections between server and browser on the WWW. In line with Deleuzian terms, www/internet materiality can effect the inner experience of duration in its own specific manner, i.e. through its online specificity. This is not something rejected by Bergson, as he acknowledges that, by nature, we tend to spatialise everything around us. Deleuze highlights this fact in his *Desert Islands and Other Texts 1953-1974* (2003) to introduce new readings of a Bergsonian duration that extend its application into the 'things themselves', to indicate the application of

the spatial attributes in how durée is experienced (Deleuze, 2003). As a result, he is suggesting a mid-point between Bergson and Fechner in which Bergsonian durée shades the multiple differences identified in threshold by Fechner. Yet in a Deleuzian account, while the thresholds (either of a pain, a feeling, or a temporal HTTP network connection) are inherent in material structures, we only experience them by enduring their changes, transformations and renewing (Kerslake, 2007). In other words, *only through durée*.

On reflection, the discrete phases taking place in the collaboration between TCP/IP can in principal refer to Fechner's homogeneous conception, as an experience of the discrete phases of thresholds. In contrary, the software HTML/CSS and the transitory state of the network in HTTP connection can in principal refer to the Deleuzian heterogeneous account. As a result, the materiality of the *Technography* series (including the *temporal HTTP connection*, the *packet switching*, the collaboration of *TCP and IP* in the network architecture and the execution of the *HTML tags*) all impact on my encounter with the artwork. Hence, the *events* that occur among these activities in the network and the *live event* that transpires in my web browser will all be attained and experienced through durée.

In my view, the way that web-based artworks are encountered allows for more potential to engage with durée due to their inherent temporal state and their specific network materiality. My practice remarks on the encounter of live events in web-based artworks as time experiences that are comparable to aspects of Bergsonian thinking. As was discussed in the previous chapter, the webpages of *Technography* are hypermedia assets and therefore a nonlinear medium, as opposed to the linear condition of spatial time. This is similar to the entire state of the World Wide Web as a nonlinear medium. Thus, *Technography* is comprised of a nonlinear time-experience potentially analogous with the flow of time in durée.

Bergson demonstrates how the quality of physical matter has potential *to change tone* due to time as duration. He realised that duration gives account to the archive of the past, which led him to alter his thinking. If the experience of durée is only feasible under the condition that the past is stored, then Bergson had to comprehensively adjust and modify his conception of duration and its primary link to consciousness for producing realisation. This is because the past can only

be protected and continue to survive (virtually) through *memory* yet, at any moment in time, a large part of the memory lives outside of consciousness.

Duration stands to represent the extension of the past into the present while most of the time memories are not conscious. Therefore, the perpetual (i.e. durational) aspect of the mind involves and engages with consciousness sporadically, indirectly and nonlinearly. In this new framework *memory,* as the canvas for unconscious mental renderings, now accounts for the majority of durational occurrence. To proceed further, my exploration of duration engages with the quality of consciousness in *the present,* which refers to the role of memory, which preserves *the past,* representing the *virtual*.

02.05. Pure Memory

As Bergson progresses with his analysis, the role of memory and its association with durée become more significant. In Chapter 3 of *Matter and Memory* (1896), Bergson draws on his analysis to differentiate 'pure memory' from 'memory images' (Bergson, 1896: 138-140). A *memory image* constitutes a *mental portrayal* of an encounter that is no longer present. However, *pure memory* belongs to anything that we have experienced in the past that we are not currently conscious of and therefore there is no image of it readily available in our conscious mind at the present moment (Bergson, 1896). For instance, right now while I am writing this text, I may not be conscious of many instances that took place in my childhood, but it might be the case that a *single remark* or occurrence in the future may cause my pure memory to identify/recall a specific event that otherwise my conscious mind would not have been aware of. Afterwards it may appear to me again, locating itself into my consciousness, allowing me to regularly review those particular image sequences from my pure memory.

In Bergson's account, pure memory is the possibility of archiving the past in a *virtual* state and memory images are the conscious, or *actual*, states of the self in each moment in time. Through durée, Bergson describes the past in two ways:

(1) It is a past that no longer actually exists
(2) It is a past that circulates through the present (Bergson, 1896: 150).

Bergson explores the relationship between duration and memory through the temporal realisations that occur in their interconnections. This is when mental events (e.g. memory events, sensations, etc.) transpire in the transitory presence of *the past into the present*, as well as their disappearance experienced as *forgetting*. In Bergson's account the past, to some extent, *resides simultaneously with the present*. Jay Lampert in *Simultaneity and Delay* (2012) quotes Bergson as describing the past as running across the present via 'oscillations', 'generalisation', and 'repetition' (Bergson in Lampert, 2012: 137).

The notion of duration for Bergson is enriched through *repetition*. That is to say, it is in *repetition* that the whole past can become available, in a new way, in the present (Bergson, 1896). For the past to emerge, we have to be capable of

situating, identifying and locating *specific memories,* which Lampert believes causes, 'a problem of delayed simultaneity' (Lampert, 2012: 137), which is the time that is needed to retrieve our memories. This time is processed to go through the sequential memory-images in our past, to perceive the confrontation of the 'simultaneous clutter of possibilities', which establishes a delay to retrieve the *useful* specific memory (Lampert, 2012: 141).

When we participate in the network to access media assets of the WWW, it is as if we are connected to a form of awareness, alertness and consciousness. Once we are online, we are part of the duration of information. URLs, meta-data and symbols such as #, " ", *, $, @, etc. are remarks for us to identify specific web assets. Through these methods various resources and assets in the WWW are retrievable.

The way that our consciousness deals with *pure-memory* as the *virtual past* is a useful metaphor for comprehending virtual space online, but more importantly and in relation to this research, our engagement with the Internet/WWW impacts on the physicality of our minds and the way that we recall and comprehend information. In other words, it creates a new quality of to and fro in any given present moment while we are online. We can retrieve memories but these memories do not exist in our conscious mind at each moment in time, due to nothing in the present moment enabling their existence. In the same analogy, the duration of the network does not hold all the assets at once, however it is capable of retrieving them in the condition of a *single remark* through URL, hashtags, meta-data, DNS, keywords, etc.

These are trigger components for the network memory to recover information, resulting in the realisation of its duration. Therefore, when we activate the duration of the network, as much as we bring change to the internet/www ecosystem, through altering and increasing the flux of information, the network encounter also impacts us through changing our sensations, our sense of space-time and our memory-experiences.

For the inner self, mental activities (e.g. perception, sensations, memory images, and pure memory) are not just a transitory state of the mind but equally they are 'material functions' (Lampert, 2012: 137). For example, perception is an actual interaction and engagement with things, not just an activity of

spectatorship. In other words, perception creates abstract thoughts and ideas that we already have and it utilises memory to do so. In the inner continuity, this activity involves the interaction of both memory images and pure memory (Lampert, 2012) and in the network it involves the memory of nodes, software, computers and servers (Terranova, 2004).

The network memory is 'capable of remembering and forgetting in relation to the perception that nodes have of the network at any given moment' (Terranova, 2004: 67). The short and long-term memory of the network constructs a collective memory that is based on the present condition of the network. The network memory also functions through other means via the hardware and software that are connected to the network, such as server backups, data centres, and the temporary memory preserved as cache data in browsers, etc. (Sheldon, 2001; Sebesta, 2009). Therefore, the memory images of the network include the statistics/data collected by each node in the network, the cookies that are stored within the web browser's application of users and the cache memory in the users' computers. However, the pure memory of the network includes the memory that is preserved in the data centres and their multiple backups in different servers. The combination of these two forms of memory in the network gives rise to a clone of memories that could potentially be realised within the duration of the network once there is a single remark, or request.

The assets of web-based artworks are preserved in the data centres that facilitate servers, which represent the pure memory aspect of these artworks. Once *Technography* is requested, assets are pulled out from their stable location in the network (i.e. the server) and enter into the temporal duration of the network in order to be realised. The assets of *Technography* enter into other forms of network memory that are considered as *unstable* and *transitory* memories such as the cache[46] data or the cookies[47] of browsers. This effects the encounter of *Technography* as on the first initial request, the realisation of *location.630* from the *Technography* series is indeed purely *live* and assets are pulled out from the server, traveling the network duration in an actual process.

---

[46] The cache memory is a *memory area* where, once a connection is established, assets are collected so that they can be swiftly accessible by another user if requested. A cache memory, might be a RAM memory, a disk storage data or a mixture of both (Sheldon, 2001).

[47] Cookies are small files that are preserved in a user's device from previous connections made to servers. These files are detected by a server when a new connection is established. The data in the cookie is read by the server in future connections to enable it to "remember" specific information about that user (Sheldon, 2001).

However, if after this connection a user re-loads their browser (i.e. Command + R), or re-requests *Technography* via the URL, the assets are not pulled out from the server again, due to the fact that they are already present/available in the memory of the user's device (e.g. the browser's cache memory).

Therefore, in this state there is no need for the assets of *Technography* to travel the network duration again. Although this state still maintains live-ness in the form of the software application (i.e. browser) when executing the actions, the assets are not in the duration of the network anymore as they are already settled (temporary) in the memory images of the end users' device. In other words, they have entered into the offline state in the memory image of a device, which is described as cache or cookie memory. These are temporary memory images that either the device forgets in its next mode of activation or it can be erased by users from their browser's application. Therefore, when a user first encounters *location.630,* it is an encounter of the real temporal duration of the network, however if a second request occurs, the encounter is offline. Please now visit the following URL to encounter *location.630.*

http://mohammadnamazi.com/technography/location.630.html

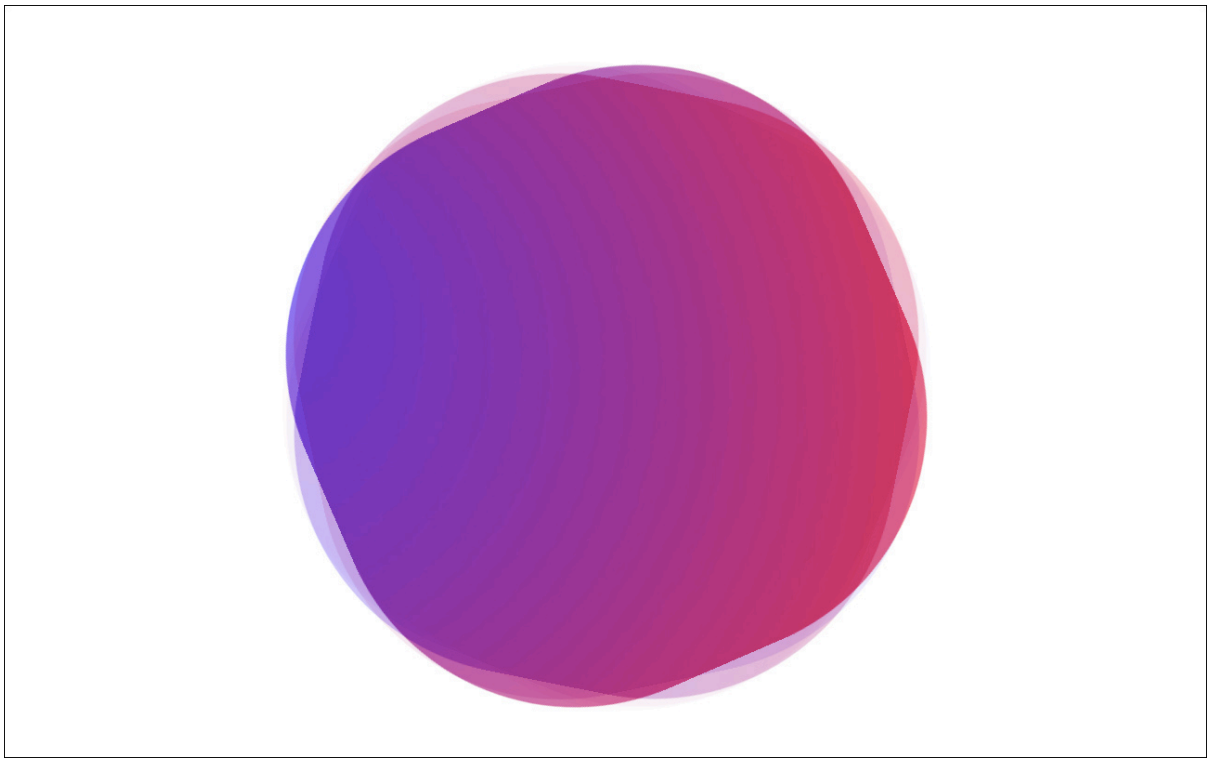

Figure 2.14. Photo representing a moment in the encounter of *location.630*, HTML5, CSS, 2016

Recalling how Bergson explains the constant tendency of our consciousness to spatialise (unwittingly) all of our experiences, in my view, can also include our encounter with network usership. Considering that participants of the network gradually accumulate online encounters, they can potentially form a new type of memory in relation to their online usership. Once an encounter with a web-based artwork (e.g. Lialina's *Net_Film MBCBFW*) has had an impact on memory by acting as a *single remark* for my consciousness to recall a pure memory event, it has the potential to merge into my durée. In my opinion, these encounters can create our online memories throughout our engagement with the network and are more capable of a time experience analogical to durée as the to and fro between recall and memory remains in a virtual space in which supplementary information may be accessed.

While connected to the web, I am connected to the instantaneous potential of a mass of information. For instance, when reading news on an online broadcaster website, if I am not in possession of a specific reference to a particular news item, I am still aware that at any point in time, those unknown references are achievable. In other words, the information is there (in the network), but it is not available in the present moment of my screen and will only be so by means of browsing the web first and then requesting it from a server.

Pure memory for Bergson, being prior to its retrieval as *image segments*, 'is not the content of any present experience', and thus, it emerges in 'the *flow* that survives in itself, rather than the instrumental image' (Lampert, 2012: 138). In sum, pure memory is not available to be consciously experienced, as it represents the *virtual* past. Pure memory is all of the experiences, encounters and sensations that are not currently present, but whose latent potential creates an *organic whole* with the present. It can be imagined and brought into actual image segments, however it can never be actual (Lampert, 2012).

Although materialising pure memory in the form of image segments indicates that it resides simultaneously with our perception in the present moment, 'forms of engagement with events are not on a commensurable time scale'. In other words, 'memories are virtually available, but do not exactly exist in actual time' (Lampert, 2012: 138).

What is interesting for me here is Bergson's description of the *body* as 'the place of passage' (Bergson, 1896: 151). This is because the body endures in the present and is the location of present perception. When I aim to gain access to a particular past memory, I activate my bodily consciousness and proceed to construct a virtual simultaneity of the past memory with my actual present encounter.

To consider the body as a *hyphen,* that is, the potential to piece together the past and present, depicts Bergson's conception of *inner continuity*. In pure duration, as in pure memory, objects of experiences are virtual manifestations of past encounters and experiences that flow into one another within the inner continuity. Now, when we think about the memory effect of the past into the present, is it too far and out of reach to highlight the idea of hypermedia documents as the *memory images* of the network's *pure memory*, which can only be realised in the *duration* of the network? Would it be feasible to think of a webpage as an encapsulated living time, that we can access ubiquitously through the protocols of URL, TCP/IP, HTTP and HTML?

To bring together Bergson, Deleuze, Kerslake and Lampert, it would seem reasonable to suggest that Bergson's conceptualisation of time as duration, manifests itself in a link between the *virtual* heterogeneous inner continuity of pure memory and the experience of the *actual* homogeneity of encounters in the present moment as memory images.

Contemporary philosophers, such as Brian Massumi, extend the Bergsonian conception of the body as the place of passage to explore experiences with computer networks in relation to experiences between qualitative and quantitative spaces. Within the encounter of a computer network context, Massumi suggests the inner sense of human experience (i.e. the body) transforms into a 'topological hyperfigure' (Massumi, 2002: 184). How does the hyper-figure differ from the offline body and how does this impact on Bergson's notion of duration? Furthermore, network theorist Tiziana Terranova, uses the Bergsonian notion of durée to describe the heterogeneous notion of the network duration (Terranova, 2004). What is space-time in an online specific realm and how could it vary from homogeneous space?

02.06. Telematic Time and Space

Here I return to the example of the train in transit and the experience of an exchange of information taking place through the web. In Internet-based communication systems, I experience a sensation of in transit time and space.[48] This sensation may relate to visualising the net/web environment as both an instantaneous entity and as omnipresence, since it is enduring and can be accessed on request.

The space of the Internet differs from that which is territorial, as it resembles a unified space without borders, although of course national politics does come into play with issues such as Internet access.[49] We can say that the map of the Internet/Web contains locations and a language that are by and large accessible and usable by everyone dependent on connectivity (i.e. through URL, meta-data, #, @, etc.). Furthermore, time within the network does not obey the spatial sense of chronological time (as in a linear movement from the past, into the present and with an expectation of the future). Yet, it offers a dynamic and *nonlinear* experience through *temporal* network activations, the *iteration* of webpages, the *duration* of data packet movement in network architecture and with the possibility of *going back and forth* indefinitely.

Such ways of being between the actual and virtual defines the temporal experience of online users as they move in a nonlinear type of time (as in the Web) and a linear type of time (as in the physical world). Since the non-linearity of the flux of information on the Web is similar to how Henri Bergson describes the nonlinear condition of *duration*, I propose web-based artworks such as mine are inclined to proffer particular experiences of time for the user.

---

[48] The invention of the Morse telegraph in the 1840s dramatically increased the speed of communication using technology for the first time. With Morse code, a new form of data exchange dramatically minimised the importance of space and time in the process of receiving information (Meyrowitz, 1985). In other words, it distorted the conventional understanding of space and time and how it functioned.

[49] Censorship in some countries, for example in China, and nationalisation of the network aims to limit data transaction and localise accessibility to information. However, users can employ proxy applications such as VPN to break through these filters and retrieve data. This is possible through either hiding or faking the location of the user.

Figure 2.15. Participants are using their portable devices to engage with *Internet Fantasy,* creating various sound arrangements that are sourced from the web, Transart Triennale, Berlin, 2016

Through the culture of linking, sharing, re-blogging, etc., all content on the Internet *exists to be transferred* from one place/screen/location to another, diffusing the event into an *iterative* condition (see: 03.06). Manuel Castells, a sociologist researching the information society, has proposed the concept of 'timeless time' and 'flex-time' to describe the meaning of spatiotemporal experience in web interactions. Flex-time for him refers to the *flexibility* of time in a network culture in which *clock time* is no longer in control. Instead the time to work or interact with the online can occur *24/7* (Castells, 2000). My experience is intertwined with the web as it intervenes in different ways of living and being. For example, through various web-based applications (e.g. Skype, WhatsApp, Ushahidi, web browsers, etc.) my experience of the virtual nonlinear condition of the web extends into the actual linear space of my physical locality. In other words, the virtual space of the web initiates interactions with the actuality of things in the spatial world for example, in the way I work on this thesis. This occurs in a constant to and froing, for example, when I look for books, codes, images and archives (e.g. Rhizome, Stack Overflow, Flickr, etc.), it is visible with the orientation of my body in urban space while locating a place on

Google Maps and happens when reading an e-book or planning my next journey via web-based weather apps.

In all of these examples I am online and connected to the web constructing online memories in my conscious mind and thus, affecting the experience of my durée in a system that has potential for interactions from both directions: online ⇔ offline. To be specific, while I am interacting with the web, the web also is in an active interaction with me. While I introduce my virtual and actual affects upon the web by means of activating the network to move packets of data and generating or requesting data, the web is also having an impact on my encounter through actual affects (i.e. the changes in my neural pathways as I receive information, or the change in my physical movements in the street while using Google Maps). This condition is the result of the flux of the informational flow that transpires in the context of user/server settings and via the protocol exchanges in the network.

These online-specific relations of requesting, locating, sharing and exchanging transpire through the abstract technical diagrams that facilitate the electronic space of the Internet and that correspond to particular features of the network architecture. For example, to locate a piece of information or a user on the Internet, an *address* is needed that is placed into a list of common addresses. The function of constructing a connected space is enabled through the Internet Protocol (IP) and the Domain Name System (DNS). The IP assigns a specific code (as a unique number) to each machine that is connected to the Internet. On the other hand, DNS relates (i.e. translates) each of these numbers, to a given name. Therefore, the DNS could be seen as the 'spatial map of the Internet comprising a system of unique addresses that makes each IP-coded host and server locatable' (Terranova, 2004: 43-44).

As a result, when we compose an email or a URL into the relevant application, we are referring to a unique address in the universal map of the network. A system that allows me to connect to the global informational space from my spatial location, bound to my locality. As a result, I can connect my spatial sense of duration (i.e. local durée) with the duration of the network (i.e. global durée) (Virilio, 2000). However, this universal map of DNS also reformats electronic space into a modernist conception of space in grid simulations. Therefore it is a purely homogeneous space that can be monitored, controlled and governed

(Terranova, 2004). In other words, is the Web/Internet really an organic whole or a chain of documents?

The internet environment could be seen as a space that represents the structure of a hyper-modernist vision where the network's layout is reflected through the DNS database as a representation of a global virtual city. In this hyper-modernist approach to the Internet, *transferal protocols* such as web browsers (HTTP), applications to transfer files (FTP), or e-mail correspondence (SMTP), can reach in theory any location on the virtual DNS 'map'. The DNS protocol divides the space of the network through a specific list of domains such as .com, .org, .net. In addition, each of these domains is endlessly divisible since a sequence of sub-domains can emerge from the main ones and each sub-domain has the potential to compose an endless sequence of other addresses (Terranova, 2004).

This mapped spatial process is how I locate my web-based works on my website. I can divide my website infinitely into other spaces which I dedicate for various purposes such as the front page of my website profile, multiple back pages to exhibit the web artworks and publicly hidden backspaces for studio practice and experimentations. These spaces all emerge from the same main DNS address of my website.

http://mohammadnamazi.com/technography/location.405.html
http://mohammadnamazi.com/technography/location.406.html
http://mohammadnamazi.com/technography/location.580.html
http://mohammadnamazi.com/technography/location.630.html
http://mohammadnamazi.com/technography/location.643.html

However, how do we address the actual movement that resides in the informational flux? The electronic addresses that are mapped through the DNS protocol do not *just* designate a locality in the network milieu (e.g. I am @ everywhere), but also the potential motion and transportation between two (or several) points (e.g. you can find me @ anytime, or this artwork is at www. mohammadnamazi.com; you can find it there whenever). This visualises the separation of information and its allocation in a space. In this network, each node is given a unique number/name, that data can be effortlessly identified and (almost) promptly available via a request.

The linkage among various locations on the grid of DNS is activated by the tele-command (user/server). Within this context, some have stated (e.g. Manuel Castells), that the Internet could not be a mesmeric virtual truth as the net artist of the cyberpunks imagined it, but a substitute space living 'at the edge of forever or timeless time' (Manuel, 1996: 395). In this conception of the network, the Internet is not much more than just a database with its extensions into the grid system.

A hyper-modernist conception leads to the homogenisation of the universal network as a space. In such an approach, the main feature of the Internet is only seen through the connections that are made in the network and disregards the transformations and *potential sense for becoming*. Taking a contrary position to the modernist approach to the Internet, I explore how the dynamism of the space of the Internet could be elucidated. By thinking of the Internet in relation to the DNS grid system we might have fallen into a typical metaphysical trick, 'that of reducing duration to movement, that is, of confusing time with space' (Terranova, 2004: 50).

Here we arrive at an appropriate point to recall how Henri Bergson describes the notion of movement through Zeno's paradox (see: 02.01). In contrast to Western metaphysics' view of movement as a result of a homogeneous and fixed space-time, Bergson proposed that movement is not just a transferal from A to B, but that it should be considered in association with the *whole* and the effect that it produces in the entire duration. As a result, duration suggests a qualitative alteration of space. Thus movement should be understood as occurring between objects, parts, protocols, codes and as expressing the duration or the whole.

In contrary to how the DNS mapping system in principal aims to produce stasis in the ecosystem of the network, the space of the Internet represents live-ness, dynamism and temporality. This can be manifested through the main function of the Internet/Web to be compatible and reconcile the multiplicities of users that each represent a specific condition, either through software, hardware, or via their locations and times. While users deploy various computers or smart devices to connect or disconnect from the network, their connections are engaged with different times and potentially various identities. Therefore, the tele-command in the user/server setting does not derive from a unique local time and space but from multiple durations. These multiplicities of duration in the nexus of the

network, shapes the flux of movements and contributes to a heterogeneous fluid dynamic of linkages and successions. Thus, the movement of information forces its affect (e.g. distorting, expanding, alternating, reforming) onto the architecture of the network in general.

The Internet has the potential to reconcile the multiplicities of users through its architectural design. It is based on the *any-to-any* principal of the *distributed network* as proposed by Paul Baran in order to challenge and cope with the reality of a decentralised network. This type of network model reflects the reality of multiplicity, fluctuations and the dynamism of temporal connections and linkages in the inner state of the network. Therefore, Paul Baran's network-model has the potential to bring together the heterogeneousness of an infinite communication mode among the users (Terranova, 2004).

The various components that are deployed in the open architecture of the Internet such as packet switching, protocol suite and rooters are not passive or lifeless but independent networks in constant growth, alteration, adaptation and improvement (Terranova, 2004). As stated in chapter one, the utilisation of packet switching means that messages are not pushed or delivered through a single channel but are broken into smaller equal packets. This is in contrary to other telecommunication systems such as telegraphy or radio, where messages are sent through one direct line to reach their destination (see: chapter one). In internet space there is no direct line between one node and another but a multiplicity of feasible routes. The key role for each node in the network is to invent the quickest route for data delivery from A to B – i.e. the least resistant path. But also, each node has to take a record of these routes in its routing table so that it can maximise the communication. For instance, in situations in which one node is broken and non-adaptive, all the other nodes should *forget* that particular intersection and route, in order to find and *remember* a new path, refreshing their routing tables for the delivery service of future data packets (Terranova, 2004).

Keeping track of the quality of movements in the network results in a clone list of guides that are preserved in each node of the network. This condition constitutes a specific *network memory* that has the potential to preserve the past events of movements and to introduce their effects in the present moment. This is the principle that the network can survive through self-learning.

Consequently, in the Internet, the integration of 'packet switching, end-to-end intelligence and routing', establishes a unique 'distributed neural network' (Terranova, 2004: 67). Decisions are made that are *always* based on the present circumstances of the network. In other words, when we type a URL in the search bar of the browser, or when we write a specific key word in the software system of a web search engine, we are engaged with a milieu comprising specific types of memory that are fabricated through the duration of the network and are enabled to introduce their effects at any moment in time.

The self-learning intelligence of the network proffers an informational space that is not just a 'space of passage' for data but an informational machinery ecosystem that is operative, effective, and dynamic (Terranova, 2004: 67). Therefore, behind my computer screen and beneath the applications of web-browsers, an email's interface, or behind the hypermedia webpages of *Technography,* the environment of the Internet is constantly fluctuating through the oscillations of the in transit packets of data. As a result, the inner ecosystem of the internet environment as an informational space is inherently heterogeneous. It functions as a vehicle to make various types of multiplicities compatible, to create communication and the flow of information. The capacity of joining together all the variations in the network gives rise to a type of duration specific to the internet medium and its internal ecology. The network duration is capable of connecting various users' durée with one another from anywhere in the universe and offers a virtual simultaneity of the time-experiences that contribute to the formation of specific memory related to internet/web encounters.

However, these memories are also *actual* memories in the moment of the encounters (as memory images) and they maintain a residence in our pure past memories as *virtual* experiences that, similar to all other past memories, have equal potential to insert/announce their impact and influence our present moments. I propose that this condition can suggest a new type of memory that takes place in our conscious mind, which could be labelled as our *online memory*, *internet memory*, or *web memory*.

We create this type of memory through our online usership via the encounters and events that we experience in the internet ecosystem. These encounters with

the network establish their own time experiences, which due to the materiality of the Internet/Web, are inherent in a heterogeneous type of time. The conscious and self-learning *inner continuity* of the internet ecosystem proposes an analogy with the virtual fluid milieu of durée. Is this condition a type of migration from offline local durée experienced in the inner (individual) self to online global 'collective self' form of durée?

Perhaps this migration only applies to the memory experiences that are engaged and linked with online encounters. We apply network duration as a location to archive, store and retrieve our memory-web virtual experiences. Hito Steyerl, in her article 'Is the internet dead?' published in *e-flux* journal in 2013 raises questions in relation to the digital quality of the Internet and its capacity to represent real time (Magagnoli, 2015: 145). Steyerl draws attention to the fact that the flexibility and dynamism of digital media produces an ability to be iterated, re-iterated and circulated (to fit in different scenarios) infinitesimally.

Therefore, this flexibility represents the reality of how social and economical systems work within an 'unstable' and 'fragile' network (ibid). In line with this, Steyerl asks, if everything (e.g. images, text, videos) can be shared through the Internet, why can't private property? Equally, in the context of my thesis, why not artworks?

Through the internet network model, its architecture, design and the establishment of the protocol suite, 'local areas of connectivity' are bound 'within an open information space' (Terranova, 2004: 70). The artwork *A Live Portrait of Tim Berners-Lee* (2012) signifies such features of the network. This setting enables the Internet environment to introduce its own duration that is specific to the network and has the potential of superimposing various simultaneities of users' encounters, time experiences and durations with the network.

Due to the open architecture of the Internet, the network is equally effected by the intensity of the informational flux that brings influences from the outside, such as, 'the rhythms of the geopolitical events, social debates and cultural trends that are the whole onto which a network duration opens' (Terranova, 2004: 70). Thus, the receptive and responsive features of the network reflect its temporal characteristics as part of the *collective inner continuity* of its online users, where there is no *space* but *duration* as an infinite notion of *continuity*.

Chapter 3.

Art as Live-Event — The Felt Duration in the Act of Encounter

---

03.00. Chapter Overview – This chapter analyses notions of *event*, mainly through one of my artworks *Internet Fantasy*, in order to describe how the attributes of the event are integral in the realisation of web-based artworks. I apply the term *live event* to signify the encounter of an event in real time which takes place in a defined location that is perceivable but not necessary visible in every sense.

The question *'how is an event manifested within Internet Fantasy?'* forms the core of this chapter. The temporal state of *Internet Fantasy* is an example of network duration evident in the transient connections made in the context of the user/server. This creates a time-based dynamic and eventful nature for web-based artworks. In this research the term *live event* refers to both spatial and non-spatial encounters, equally representing the temporal and vibrant state of the network duration.

Live event also draws on an art historical usage to expand the field of art by representing a lively aspect of an artwork through actions, arrangements and encounters occurring in the 'real time' of its audience. In other words, constituting a shift from art's traditional (mainly static) status to become more active, dynamic and engaged, in which those who encounter the artwork have transformed from audience to participant (Brett, 1968; Popper, 1968).

A number of historical examples that I will selectively analyse include *Standing Wave* (1920) by Naum Gabo, *Light-Space Modulator* (1922-30) by László Moholy-Nagy, *18 Happenings in 6 Parts* (1959) by Allan Kaprow, *Bicho* (1960) by Lygia Clark, *One Day in the Street* (1966) by The Groupe de Recherche d'Art Visual (Group for Research in Visual Art, shortened to GRAV in French) and *The Pleasure of the Text* (1983) by Roy Ascott.

Analyses in this chapter are derived from an analogy between a Bergsonian understanding of durée as a temporal experience of the inner self, consciousness, and memory with *live events* composed from various discrete sections that

interact and blend into each other. In order to achieve these goals, throughout this chapter I will give an historical reading between works of art and the concept of the event. This will situate and engage my practice-based research with the concepts of live-ness, participation, duration, site/time specificity and temporal points of experience.

03.01. *Internet Fantasy*

In August 2016, I was invited to create an artwork for the *Transart Triennale* programme hosted by the Transart Institution in Berlin, Germany. I exhibited *Internet Fantasy*, which is a sound work that is web-based, participatory and temporal, as it is only available for twenty minutes. *Internet Fantasy* was an exploration of encounter through a live event that took place in both a spatial and non-spatial sense of time. In other words, the encounter with the work took place by engaging both with the spatial sense of the physical world as well as the non-spatial web environment and its time experiences. *Internet Fantasy* required the involvement of participants for its realisation and thus it would have remained unrealised without this contribution. With this specific understanding, I instructed the organiser to invite the audience to participate in the encounter of the work. I used a web strategy to interconnect a range of soundtracks (MP3 files) with online users who were equally *participants* in the actual space of the exhibition event in Berlin, as well as being participants of the network (i.e. online).

Online and active only for twenty minutes, participants were guided to access a webpage that had been coded and programmed specifically for the event. While connected to the webpages of *Internet Fantasy* the participants could engage with various short soundtracks via their own portable connected devices. An important aspect of this project is the relationship between me as the proxy organiser for this event and the on-site curators of the wider exhibition.

Not physically present in the event location, I constructed every aspect of this work remotely (from London) through online communication, providing instructions for the curators to follow. To instruct those participating with the work, I produced an A5 sheet with information about the project and sent it to the curators to print and distribute among the audience. The text included general information about the project, the URL address of *Internet Fantasy* and a note indicating the twenty-minute temporal availability of the artwork.

Internet Fantasy is comprised of multiple audio files and a hypermedia HTML document for structuring and sorting these audio files. Throughout the making process, I utilised readymade codes combined with custom scripted codes. The functionality of some features I require in my artworks such as movement,

direction, size, etc. are already coded as value functions defined and available as open source material for anyone to use. As a result, the fabrication of the *webpage* of the artwork was realised by locating appropriate readymade-codes and combining this with custom-scripted HTML fragments. The image below shows how the webpage appeared on a mobile phone screen.

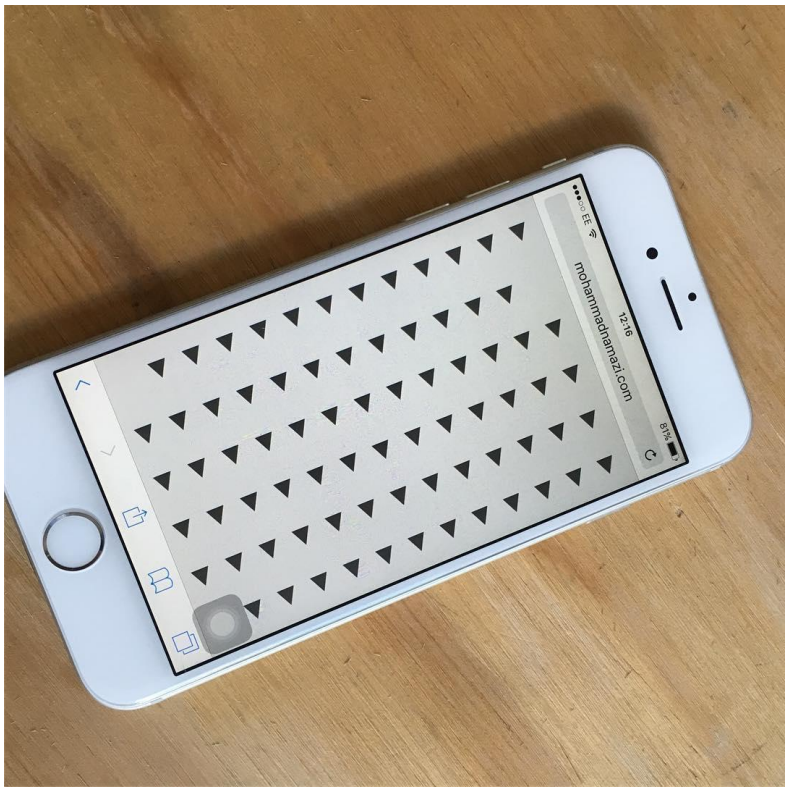

Figure 3.1. *Internet Fantasy*, HTML code, sound performance and participation, 2016

Internet Fantasy consists of 98 audio files, some of which are generated from scratch by utilising the Adobe Audition application programme to make different audio noises and frequencies. However, some other audio files were also generated through post-production and the re-use of audio materials that were generated in my previous sound artwork *Five Minute Conversations* (2015)[50] (see appendix). I decided upon the repeating triangular 'play' icon as the visual element to this work due to the fact that it is widely used in most offline/online interface applications and is therefore well known among users as representing an audio asset.

50 One aspect of experimentation with *Internet Fantasy* was to explore how the *iteration* of previously generated material could contribute and manifest themselves into a new framework, medium and context.

The position of the audio formed a configuration that could be reached and pressed comfortably. I aimed to fabricate the hypermedia in such a way that on encountering the webpage, those participating would interact without any hesitation. Please now visit the link below on your portable device, to experience how the audio files appeared to function in the HTML document. Please note, this page was coded for portable devices and therefore appears differently when encountered on a computer.

http://mohammadnamazi.com/Internet-Fantasy.html

Figure 3.2. The audio icon used across many analogue and digital interfaces

Once I had made the work, I uploaded the hypermedia HTML documents including all the MP3 audio files into the public folder of my website. This is indicated as: *Public_html* folder, which identifies the *root directory* of my website (i.e. public_html/mohammadnamazi.com). This is the location encompassing all the files that are available on my website. This procedure is similar to all other web-based artworks I make with a specific URL as a new branch from my website DNS (i.e. mohammadnamazi.com) to create new virtual spaces for the realisation of my artworks. In order to upload the assets of artworks (e.g. *Internet Fantasy, Technography,* etc.) into their locations in the network, I use a *File Transfer Protocol* software (FTP) known as *Fetch*, which is shareware specifically coded for Mac OS X users. To begin uploading the audio files to their specific locations, first I have to provide the specific *FTP* information to enable *Fetch* to make a connection to the server. This is so that it enters into a virtual location where my website and all other assets that belong to it are placed. The images below show the moment the software requires the input and when I insert the *FTP* information, enabling the software admission.

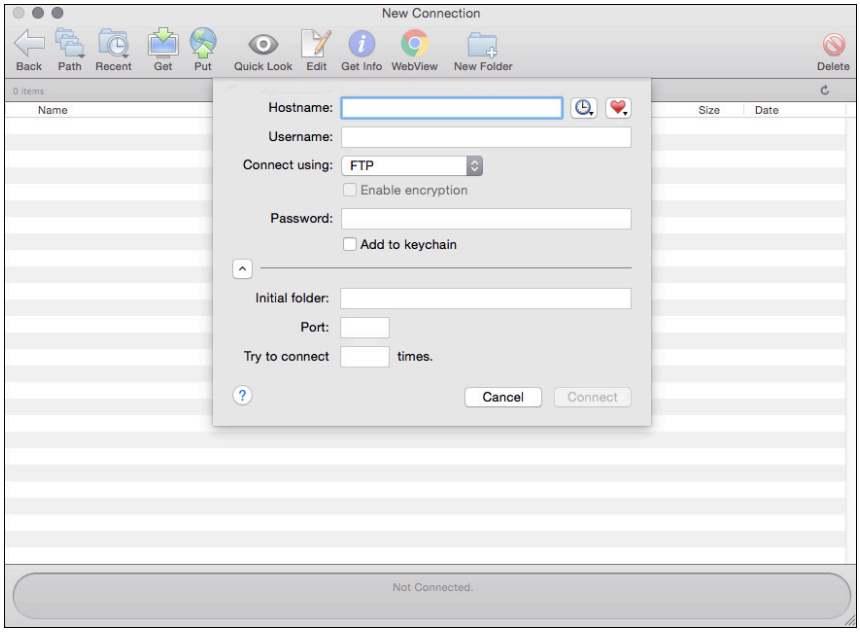

Figure 3.3. When FTP software (Fetch) requests specific information in order to connect to server

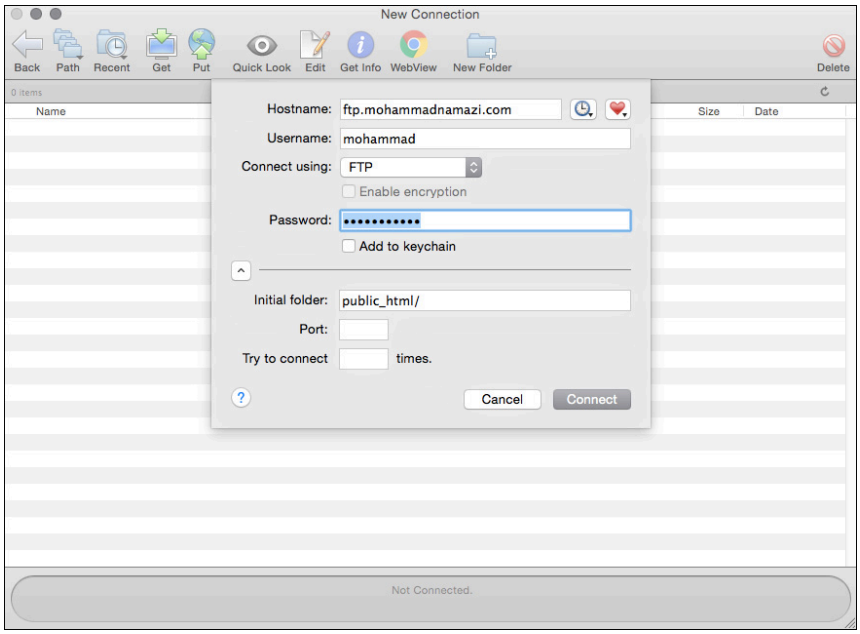

Figure 3.4. When I provide specific data such as Hostname, Username and Password to enable the FTP software (i.e. Fetch) obtaining access to the virtual space of my website in the server.

Once the connection is established the *FTP* software gains access to the server and is enabled to either *upload* new assets (i.e. the MP3 files), or *erase* the previously uploaded one. Therefore, when the assets are located in the server, *somewhere in the distance*, the audio files are ready to be requested by users. The images below represent the document assets that currently shape the content of my website and some of the audio assets that are located in the specific folder of *Internet Fantasy* respectively.

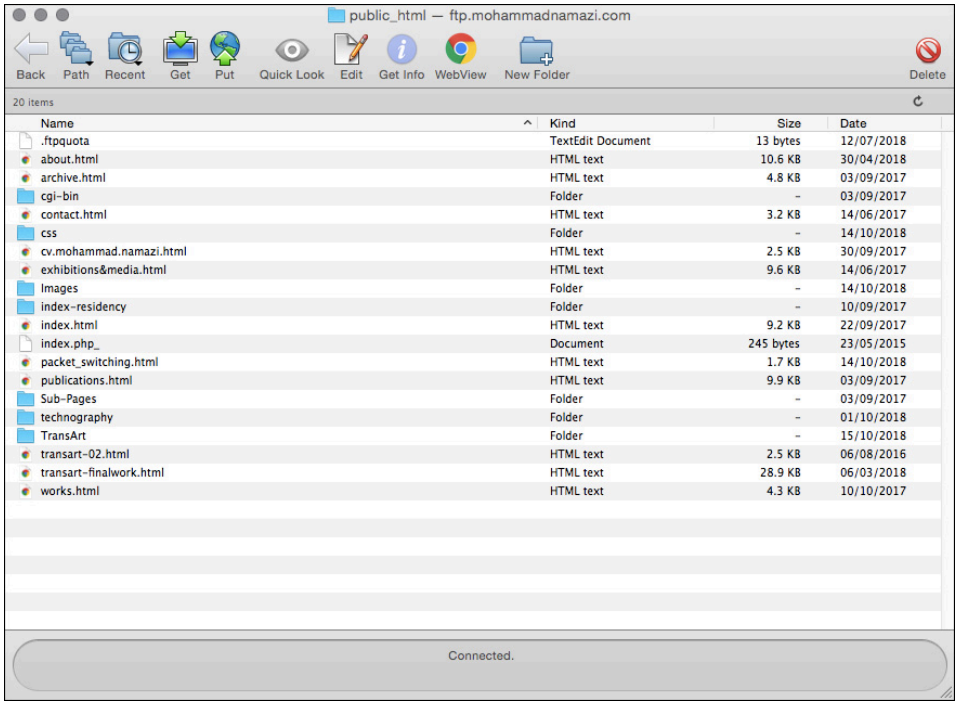

Figure 3.5. When I press connect to enable FTP software entering into the website root directory.

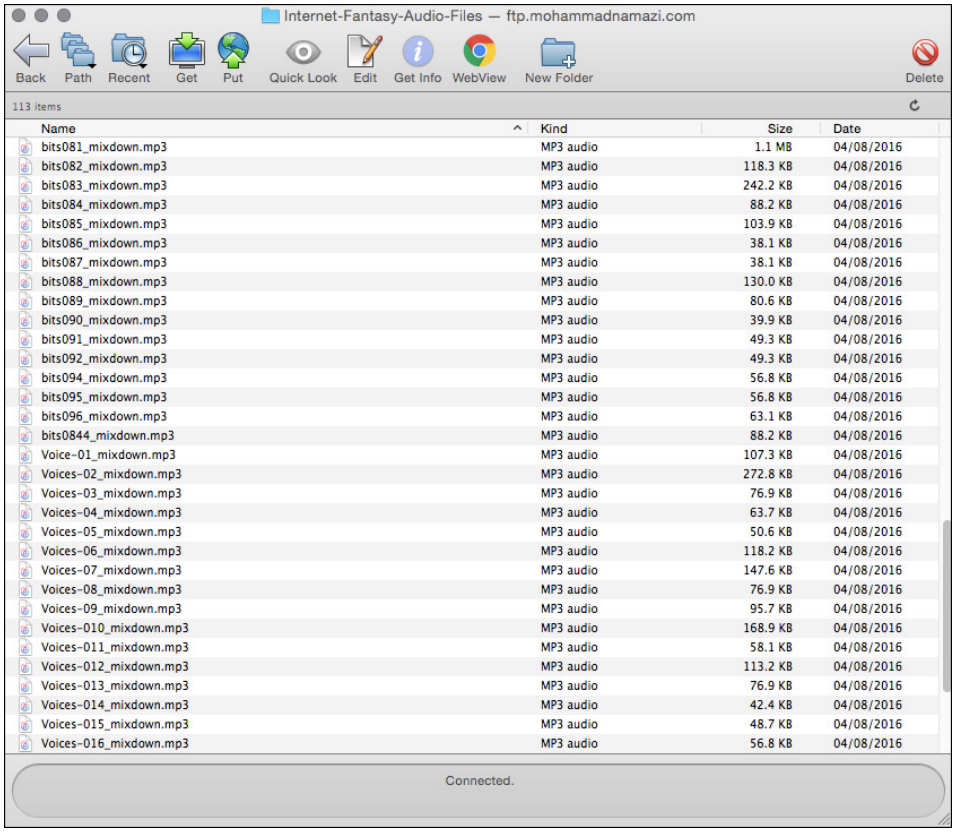

Figure 3.6. Screenshot of the location of MP3 audio file on the server. These files were uploaded on 4th August 2016 two days before the event in Berlin.

Throughout the making procedure, while communicating with the exhibition curators, I requested access to a space in the stage hall where three technical microphones could be hung from the ceiling with a specific one metre distance from the ground. I arranged these microphones into a triangular shape imagining its potential to provide form, dimension and physicality to *Internet Fantasy*. They were set up to enable a gathering space that could visualise and frame the activities of the live event, as well as enabling the participants to amplify the live duration when engaging with the audio files.

Figure 3.7. The microphones used for Internet Fantasy. This image was sent to me as a reference for the position of the microphone in the stage hall.

On the event day, I was in constant communication with the curators through WhatsApp making sure that the technical aspects of the project (the operation of the webpage, the internet connection, the microphones, etc.) were in full operation. The curators distributed the A5 sheets and invited those present to participate in the artwork by utilising the specific space allocated in the stage hall. After a few minutes some participants began interacting with *Internet Fantasy,* creating many random sound arrangements.

Figure 3.8. This image represents moments before the audience were invited to participate at the live-event of *Internet Fantasy*, Installation view at Transart Triennale, Berlin, Germany, 2016

When the participants accessed the URL, they could engage with various short soundtracks via their portable connected devices. In each interaction with the audio icons (►), the audio assets were pulled out from the webserver to travel the network to reach the participants' device, which led to the projection of the audio assets into physical space.

Proximity to the microphones allowed individuals to amplify the sound while making random arrangements. At the same time, the engagement with the microphones created a social hub within the larger space, where the participants began to interact with one another as well as the webpage of the artwork. Fig. 3.7–9 demonstrate how participants engaged with *Internet Fantasy* and how they interacted with one another to make various sound arrangements.[51]

[51] In Fig. 3.7. some participants are depicted wearing blind folds. This image is related to the event after *Internet Fantasy* which required some present to cover their eyes. The image here is used only to provide visual evidence of the space of the room.

Figure 3.9. *Internet Fantasy*, Installation view at Transart Triennale, Berlin, Germany, 2016

Please now browse the following link to see the video documentation of *Internet Fantasy* made by Tani Ilichenko for the organisers at *Transart Triennale*.

http://mohammadnamazi.com/Sub-Pages/work.no.670.html

In essence, *Internet Fantasy* functioned to create a live event through the engagement of users/participants with a selection of web assets in the network duration. Through sound arrangements, the virtual space-time of the web was stretched out into the physical and local environment of the participators. A key feature with the participants of *Internet Fantasy* resides in their role as both engaging at an actual sound event and as online users simultaneously. Thus, they play two roles at the same time:

(1) Participants encountering a temporal event in physical space
(2) Online users of the artwork's hypermedia in the virtual space of the web

Participants were required to engage their bodily presence within the space by moving towards the microphones and then holding their devices in a suitable manner to enhance their experience with the artwork. While the participants were aware of their spatiotemporal state in the physical space, equally they were immersed in the temporal duration of each audio asset as they triggered them and the sounds were projected and dispersed into the physical space. Therefore, these multiple sound interactions create a sense of mutual duration shared among the participants.

Figure 3.10. *Internet Fantasy*, Installation view at Transart Triennale, Berlin, Germany, 2016

However, in another interaction, participants are activating the network duration through their multiple requests to access the audio assets. Therefore, creating online impact upon the inner state of the network when the nonlinear movements of the audio data packets (TCP/IP) begin their journey. In addition, while the participants are aware of their presence and immersion into one single webpage (i.e. the URL), they *unwittingly* begin to spatialise their virtual duration in the hypermedia of *Internet Fantasy*. This introduces an imaginary mutual duration as a result of the simultaneously shared durations of the offline and online dimension of the live event.

Figure 3.11. *Internet Fantasy*, Installation view at Transart Triennale, Berlin, Germany, 2016

Artworks such as *Internet Fantasy* that represent these two states also have the potential to produce *temporal durations* when encountering them. A unique experience of time and space occurs due to the multiplicity of temporal experience in discrete environments: the virtual and the physical. This is to say, temporality is experienced via the shared mutual sense of duration among the participants in addition to their online presence on the webpage of *Internet Fantasy* and thus their simultaneity of presence in the network duration.

The complexity of the encounter of *Internet Fantasy* is due to the participants' consciousness of their actual/virtual collective presence in both online and off-line environments. This stages a condition where the simultaneity of the local durée is shared with the simultaneity of the experience in the network durée. In other words, when the audio assets are shared, encountered and materialised in the physical space.

Figure 3.12. *Internet Fantasy*, Installation view at Transart Triennale, Berlin, Germany, 2016

03.02. Live-ness and the Art Object

The context of event as a medium for art production, either practically or theoretically, has been a subject of interest to artists for several decades, as has been evidenced by the writing of scholars, theoreticians and art critics such as Frank Malina (1967-68), Frank Popper (1968), Jack Burnham (1968) and Guy Brett (1968). For instance, Guy Brett's *Kinetic Art: The Language of Movement* (1966) portrays the practice of a selection of artists such as Naum Gabo, László Moholy-Nagy and others. He describes their work in relation to the time-based element of kinetic art practice—their eventful and dynamic forms in the process of realisation and their features of participation and active engagement. All of these elements are discussed as being embedded in the *object* of the works of art (Brett, 1966).

One important aspect that is shared among all of these artworks is that they introduce an *interaction* between the *object* with its surroundings. As Brett writes: 'The space conception of the Renaissance was static. […] It was the space of common sense; the shape of the appearances were final. The work of art was as clearly marked off from its subject as it was from the spectator' (Brett, 1968: 11). Artist and theorist, Moholy-Nagy imagined a more dynamic *space* for the artwork that would be appropriate for the period in which he lived. In his 1922 manifesto 'Dynamic Constructive System of Forces' published in the journal *Der Sturm,* he expressed his standpoint in the following way:

> *We must […] put in the place of the static principle of classical art the dynamic principle of universal life. Stated practically: instead of static material construction […] dynamic construction […] must be evolved, in which the material is employed as the carrier of forces'* (Moholy-Nagy in Brett, 1968: 23).

Moholy-Nagy's manifesto articulates two points relevant to my practice: (1) the importance of using *dynamic construction* in relation to the *principal of universal life,* and, (2) the idea of material, e.g. electricity, wind, heat as the *carrier of forces.* These qualities are also applicable and similar to the electronic status of *Internet Fantasy*. In fulfilment of his manifesto, Moholy-Nagy developed a methodology to instruct the attributes of an event as a framework where/when the artwork could be realised in *time* as well as *space* (Brett, 1968). Moholy-

Nagy's experiments are derived from pioneering eventful attributes in the art object that have the potential to change the course of experience from traditionally passive spectatorship to an active and dynamic form of engagement with the artwork.

In order to visualise and materialise his 1922 manifesto, László Moholy-Nagy began to fabricate the artwork *Light-Space Modulator* (1922) in the experimental environment of the Bauhaus art school (1919 –1933). The piece is considered as a device that manifests compositions of both light and movement.[52] The artwork is a motor-driven structure with beams of multi-coloured light bulbs and polished plates with rods that spin and make shadows on the surrounding walls, when presented in the dark. Consequently, as Guy Brett describes, the artwork becomes a *spatial experience* through motion and light transformation (Brett, 1968).

Figure 3.13. *Light-Space Modulator*, Laszlo Moholy-Nagy, 1922-1930

[52] The model consists of a cube-like body or box, 120 x 120 cm in size, with a circular opening at its front side. On the back of the panel, mounted around the opening are a number of yellow, green, blue, red and white-toned electric bulbs. In accordance with a predetermined plan, individual bulbs glow at different points in its trajectory. They illuminate a continually moving mechanism built of partly translucent, partly transparent, and partly fretted materials, in order to cause the best possible play of shadow formation on the back wall of the closed box.

Light-Space Modulator is an investigation into art taking place in the real space and time of the audience/participant. Forces (e.g. electricity) are used to form an endlessly changing expression that is a constructed, immersive experience for people.

As Brett observes, Moholy-Nagy stages a spatial condition in which the encounter with the work transpires over a series of discrete events, including the movement of different parts, the change in light, the rotation of the whole structure and the nearness of the walls, which impacts on the shadow formations (ibid). In other words, the dimension of time and its temporal qualities free the artwork from an isolated existence and place it in relation to its surroundings. This process occurs in a sequence of encounters with the participants in the environment of the work. Guy Brett writes that: 'Time therefore involves the idea of replenishment, that the work [*Light-Space Modulator*] is always new. Precisely because it is always changing and lives in the present' (Brett, 1968: 25).

The discrete events generated throughout the realisation of *Light-Space Modulator* create distinct durations that are specific to those events. For example, the movement of one rod, or the change of one beam of light. Considering Brett's analysis, these temporal moments of experience change the artwork from discrete object into an *event work*.[53]

When Guy Brett writes of his encounter with the artwork in 1968, he discusses his experience from his own historical context of the sixties. In other words, he examines an iteration of the same live event that took place in 1922 depicted as it occurred as a further event in 1968. This is a similar situation to when I encountered a replica of *Standing Wave* at Tate Modern in 2017, which was originally made by Naum Gabo in Moscow in 1920, as I will discuss further in the next section. The durational aspect of live events creates a refusal to become autonomous expressive objects. In contrast, these artworks engage with their environment and create a *spatial experience* realised in real time. Guy Brett sees

[53] In his book *The New Vision* (1928), Moholy-Nagy pinpoints a process of dematerialisation in the work of modern artists, which is mainly concerned with the change from form to force and from matter to energy (Brett, 1968).

Light-Space Modulator as an artwork that, 'exists only as a means of reflecting, deflecting and mixing the light beams falling on it, which in turn animate the surrounding space. The object becomes an event' (Brett, 2000: 14).

These events disrupt the barrier of traditionally isolated art objects and suggest a dynamic space where the artwork, those coming into contact with them and their environment are not perceived as separate entities, but that they can interact with one another (Brett, 2000). As Henri Bergson defines, the time of these discrete events becomes spatialised within the whole body of the artwork and its dynamic features. Thus, the realisation of *space*, only comes into *being* during the time that these *events* occur. In other words, the emergence of *the events constructs a space* for the artwork's realisation by those engaging with it.

The temporal condition in *Light-Space Modulator* is similar to the discrete-events that transpire within *Internet Fantasy*. However, the nature of the events in the network varies, as they belong to a non-spatial state, in contrast to the discrete events in *Light-Space Modulator*. As discussed in the previous chapters, packets of data are transferred through a specific step-by-step communication system in the network architecture. This is when the discrete events of the communication process occur mainly among URL, TCP/IP, HTTP, and, HTML. Therefore, while *Light-Space Modulator* demonstrates its encounter as an art event in relation to its spatial surroundings, *Internet Fantasy* elaborates the encounter of its art event by adding additional layers of *interaction*, *simultaneity*, and *temporal* moments within its realisation.

My analysis of network memory and its intelligence (see: 02.07) becomes more familiar when we add the reality of lived duration into the encounter of web-based artworks. Participants of *Internet Fantasy* internalise their encounter with the virtual informational space and construct their memories (which I refer to as our *online memories*) as the real experience of the artwork, regardless of its virtual dimensions. These online memories are potentially stored as pure memory in the participants' virtual pure past. They are also capable of introducing their effects and influences in the present moment at any time and in any location. In other words, they become part of the durée – part of the inner continuity and the internal flux of a users' heterogeneous sense of time-experience.

03.03. The Encounter with *Standing Wave*

As briefly mentioned in the previous section, in 2017 at Tate I encountered a re-iteration of *Standing Wave* first assembled by Naum Gabo in Moscow in 1920. This experience engaged me with the duration of a live event realised in the exhibition hall and led me to later imagine how the same encounter might take place on the web. When I came into contact with the replica[54] of *Standing Wave,* I was already familiar with the artwork through various visual documentation, and hence, immediately engaged only with encountering the work.

Standing Wave was installed on a plinth and protected by a transparent Plexiglas with a button for activation. Once the button was pressed, the static thin metal strand in middle of the box began to move swiftly, creating the illusion of a wave for about thirty to forty seconds. During this period of time I was immersed in the illusionary space created as a result of the oscillation of the metal strand.

The encounter of the live event of motion engaged me with the spatial sense of the illusionary wave sculpted in the transitory moment of the work's realisation. When in motion, the oscillation of the strand created a continuous and uninterrupted duration, representing a spatial realm in the installation where time and space co-related with one another. This merging meant that no discrete image of the actual strand was detectable, instead one continuous series of animated images were in oscillation.

This encounter with *Standing Wave* created a connection to the time of the1920s, when Naum Gabo constructed the work. The *iteration* and the *live event* of *Standing Wave* in my present time*,* operates as a type of Wayback Machine[55] (Internet Archive), intending to represent a time, duration, memory and event that belongs to 1920s.

---

[54] The replica that I encountered of *Standing Wave* was made in 1988. I see the replica as an iteration of the original work that still has the same capacity for the encounter as it used to have initially in 1920.

[55] WayBack Machine is an Internet Archive, initiated in 1996, by archiving the internet itself. The organisation is building a digital library of Internet sites and other cultural artefacts in digital form. For more detail see: https://archive.org/about/

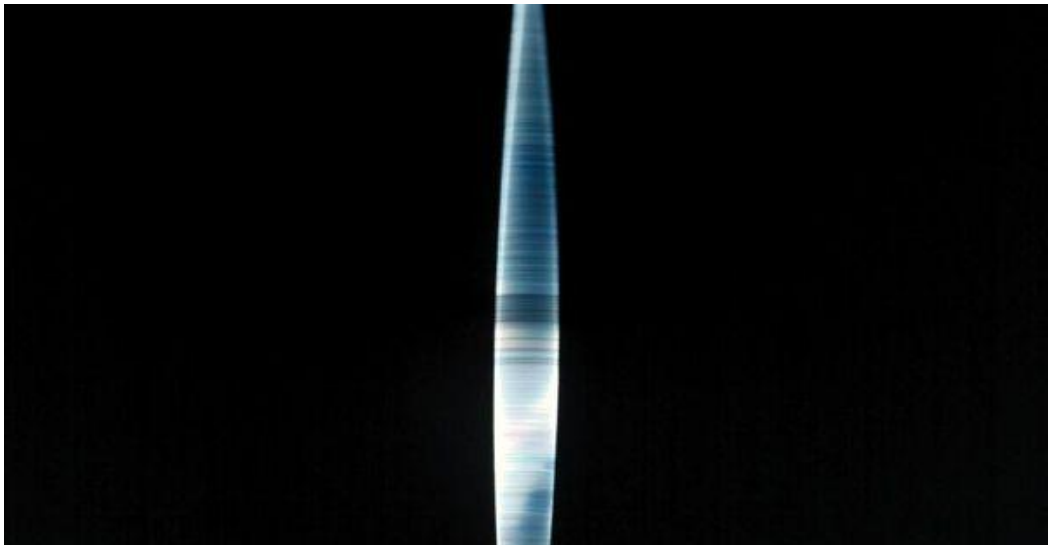

Figure 3.14. *Standing Wave*, (*Kinetic Construction*), Naum Gabo, 1920 – detail

In other words, the work has the potential to extend its *duration* and the formation of an illusionary *space,* through its live event to my time and potentially to any time in the future. Within this encounter, I began to think of *Standing Wave* through HTML tags and CSS coding practice as an iteration on the web. Considering its potential representation, within an online-specific realm, equally I attempted to connect my local experience of durée with the experience of a network durée.

I view the construction of *Standing Wave,* not only as a time-based artwork, exposing the temporality of its live event, but also as a construction that is designed and coded to form specific encounters. These include specific visual effects, durations, relations, experiences and types of engagements. Therefore, I explored the possibility of implementing these attributes in *Net_Standing_Wave* (2018), employing internet/web materiality.

Once I began to code the web-based version, I deployed the same spatial off-line attributes that were originally introduced by Gabo. For instance, the duration of the event and the button feature. I also introduced some new features such as a border around the digital graphic strand and placed two strands as opposed to one. These decisions were made to highlight the duration of the live event as well as the oscillation effect. Please press or type the URL below to visit the live-event duration of the *Net_Standing_Wave.*

http://www.mohammadnamazi.com/technography/standing-net-wave.html

In this experiment, the HTML elements and CSS codes were able to produce an oscillation of a digital object (e.g. a rectangle) and produce similar effects as the *Standing Wave,* yet they also introduced new effects in motion that are specific to web materiality, code behaviour and their limitation in functionality. For instance, one limitation involved the CSS's inability to transform a line into an animated wave. As a result, I experimented with two attributes of *speed* and *iteration,* to create a rapid oscillation. I also used *two rectangles*, which had to be visually wider than the *thin* metal strand Naum Gabo used in his work. These two rectangles are placed on top of each other and are therefore not perceptible when the hypermedia is at rest before the moment of pressing the virtual button to trigger the tags/codes. The critical attributes assigned for this experiment are the *timeframe of forty seconds*, the speed of *ten millisecond* oscillations of two digital rectangles and *4000 iteration counts* of the rectangles.

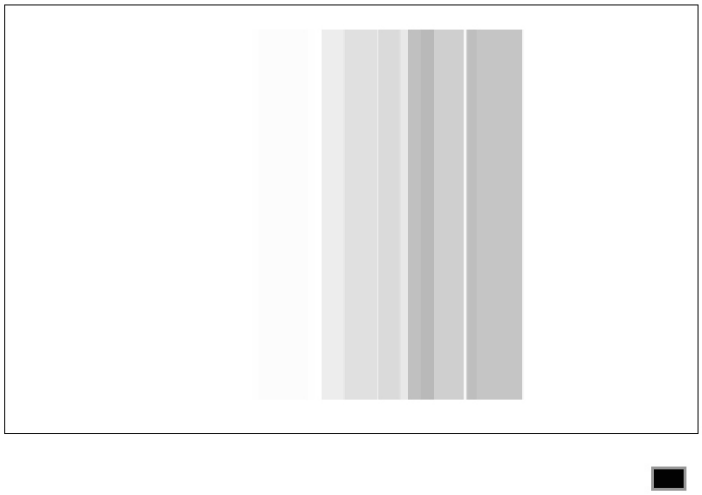

Figure 3.15. Screenshot from *Net_Standing_Wave,* HTML & CSS language, 2017

These attributes result in staging a live event and an encounter of optical illusion that can replicate forms of light waves on the web due to the rapid oscillation of grey rectangles merging into one another. This also recalls the light wave forms that Moholy-Nagy creates with *Light-Space Modulator,* one of the eventful features that Guy Brett describes (see: 03.02). Transferring an iteration of *Standing Wave* into the online space portrays specific experiential aspects particular to the web. In addition to the online time experience the work is also inherently capable of endless iteration in the web ecosystem. Alongside this, once

placed in the network duration, these web assets have the potential for simultaneous encounters by users in connections established between browsers and servers (see: 03.06).

The time experience of *Net_Standing_Wave* establishes connections with the time-experience of inner continuity, in the Bergsonian account. This can be explained through the lived duration of the encounter, when we are most capable of making connections with *pure memory* and thus experience durée. However, in the case of the replica of *Standing Wave,* the act of encounter resembles an *iteration* of the *temporal duration* that was initially *felt* in 1920 and embodied by Gabo in the original *Standing Wave.*

From this aspect, the replica of the artwork embodies a symbolic iteration of a *live duration* in 1920. When migrated online, it is as if, its merged into the universal network of the collective durée. This is to say, the *felt duration* encountered in the live event of artworks such as *Standing Wave* and the *Net_Standing_Wave,* is capable of transpiring time experiences similar to the nature of durée in the Bergsonian account. These are nonlinear flux, virtual and temporal existence, live-ness, now-ness and the heterogeneous quality to this sense of duration.

03.04. Event as Theoretical Time and Place

In 1966 Alighiero Boetti made *Lampada Annuale* (*Annual Lamp*), which consists of a light bulb placed inside a box accompanied by a hidden electronic programmed component (Godfrey: 2012). According to Boetti the artwork is constructed around the event of the light bulb illuminating, which he programmed to turn itself on randomly for only eleven seconds per year. As a result, the likelihood of an individual being present at the moment of illumination is remote and almost impossible.

By exaggerating the reduction and limitation an event's duration, Boetti goes beyond the experiential reality of time and therefore uses the context of this artwork metaphorically to suggest an abstract live event, which is generally conceivable, but rarely perceivable. However, the work serves as an encounter and an anticipation of time in an abstract sense. It is a conceptual reflection on temporality within the aesthetics of a static installation—a box with a bulb in an exhibition suggests an imaginary experience of duration for the observer as an *inner continuity* as the event is never experienced in a spatial way.

Boetti himself explained that the work is made from 'a theoretical-abstract expression […] not of the event, but of the *idea* of the event'. *Lampada Annuale* introduced the concept of time and sequence into the vocabulary of objects through a conceptual and theoretical approach (Bennett, 2008).

According to The Museum of Modern Art in New York no one has reported seeing the lamp illuminated since its initiation in 1966 (MOMA, 2016). *Lampada Annuale* raises the question of whether Boetti has deliberately fictionalised the illumination as a means of making the action exist in the minds if those who see it. In the encounter one pictures those eleven seconds of light, willing the illumination that no one has yet witnessed.

Figure 3.16. *Lampada Annuale*, Alighiero Boetti, 1966

I recall standing next to the artwork *Game Plan* by Alighiero Boetti at Tate Modern in 2012, longing for the moment that the lamp might possibly light while I was present in the space, but it never did. The anticipation and imagination of experiencing the actual event of illumination has remained with me until today.

With this work Boetti deployed a specific strategy that gave rise to an imaginary encounter of the event of illumination in my memory. Henri Bergson explains the typical sense of durée as an experience of mirroring/projecting our sense of space into the inner continuity when a *virtual homogenous* sense of time is mirrored in durée (see: 02.02, 02.03).

This is in contrast to a sense of *pure durée,* when the time experience is heterogeneous. Therefore, those imaginary eleven seconds belong to a projection of an imaginary encounter (in the physical sense) into the durée to create a virtual sense of a constructed homogeneous time (Bergson, 1889). Even though on first contact *Lampada Annuale* appears not to take the dynamic effect of an event, in my observation, it goes beyond the abstract idea of an event artwork. This is to say the event is the promise of an encounter that never arises.

Figure 3.17. *Lampada Annuale*, 1966, (in the middle of the gallery) Alighiero Boetti, Tate Modern, 2012

This encounter has the potential to internalise its experience within the durée, as an *imagined homogenous* time experience. My encounter with the artwork constructed a *pure memory* experience that on retrieval will consistently be the sense of a potential occurrence that would have influenced a present moment physically (if the light had turned on). Although this did not happen, it is the anticipation that is enduring as memory. Therefore, *Lampada Annuale* takes the theoretical character of a time-based artwork.

03.05. Event as Medium in Social Practice

Another important link for art as *event* can be traced in movements such as *happenings* and *participatory art* during the 1950s to late 1960s (Popper, 2007). With live events there is a shift of emphasis for the people participating in the event. For instance, as part of the article 'Should the Artist Be a Man [sic] of the World?' published by *Art News* in 1964, Allan Kaprow stated:

> *Deprived […] of imaginary ideals, [the artist] must work towards an art, which [he/she] sees functioning neither for church nor state nor individual, but in a subtle social complex whose terms [he/she] is only beginning to understand'* (Kaprow in Buchloh and Rodenbeck, 1999: 37).

A re-imagining of the role of those coming into contact with art is part of the expression of this concept of 'social complex'. 'Audiences', rather than passive bystanders, became part of the artwork and their position shifted from observers to users, collaborators and participants (Brett, 1968) who were required to activate the work. This can be seen in a very real way with *Internet Fantasy* as the artwork would have remained unrealised without the contribution of the participants.

Kaprow made use of a set of instructions and rules for the participants of his artworks, which is equivalent to the software code I constructed in *Internet Fantasy*. For instance, as part of *18 Happenings in 6 Parts,* an invitation was sent to each 'audience member' that comprised of an envelope, containing a variety of materials such as images, photographs, wood and painted items, explaining each *part* of the event and their procedure. In line with this, *Internet Fantasy* also utilised an instructional format to guide the participants on how to engage and participate in the course of the live event. This included the distribution of the URL, the coded hypermedia document that controlled the interaction of the audio interface (►) with the participants, as well as the instructions in the physical space such as the time to start and finish, the twenty-minute temporal encounter and the operation of how to interact with the suspended microphones in relation to their portable devices (see: 03.01).

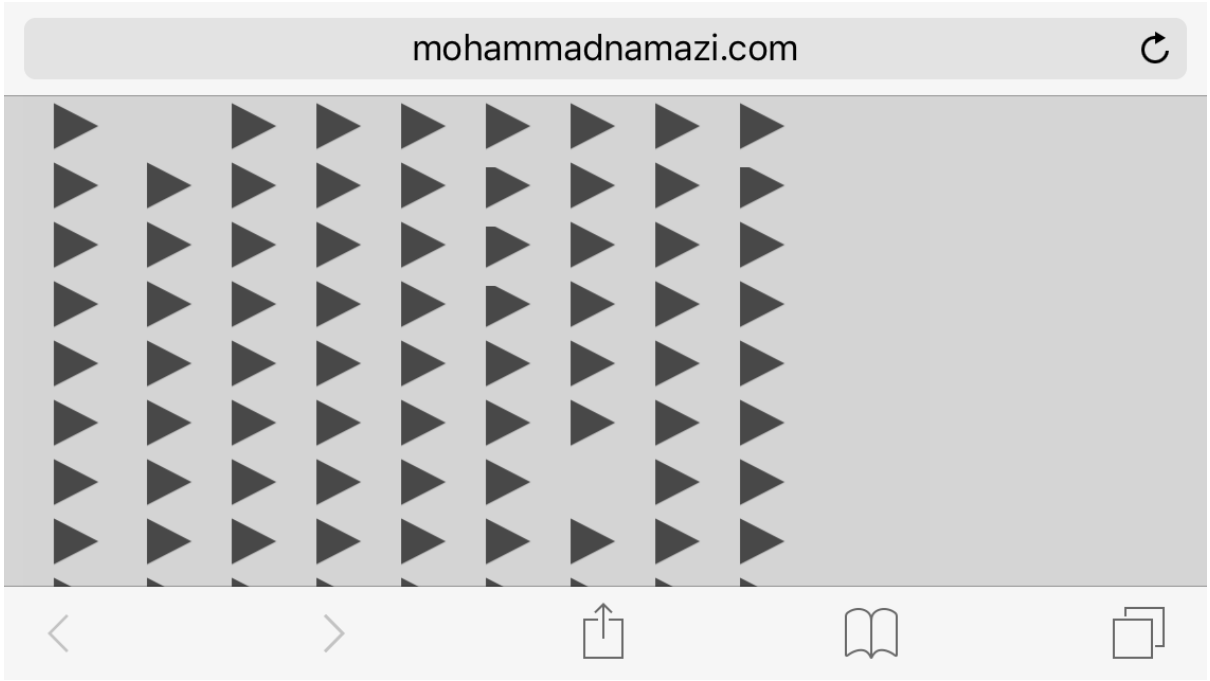

Figure 3.18. Detail from a screenshot showing the audio-play icons in *Internet Fantasy* on a screen device.

In relation to the instructions, or score, of each artwork, Kaprow usually assembled a collection of 'self contained segments of text', that each signified 'a single event or action' (Kaprow in Meyer-Hermann, Perchuk and Rosenthal, 2008: 17-25). For example, in the event *Record II for Roger Shattuck* (1968), organised at the University of Texas at Austin, Kaprow instructs the following phases for the event:

'BREAKING BIG ROCKS
PHOTOGRAPHING THEM

SILVERING BIG ROCKS
PHOTOGRAPHING THEM

SCATTERING THE PHOTOS
WITH NO EXPLANATION'

(Kaprow in Buchloh and Rodenbeck, 1999: 59).

Influenced by Meyer Schapiro's writings in 'social philosophy of art' in 1936, as an invitation for an, 'art attuned to the world', Kaprow also called for an 'art of

the world' that could engage in social space (Kaprow in Buchloh and Rodenbeck, 1999: 37).[56]

Kaprow extends Moholy-Nagy's concerns with the participatory and eventful condition of works of art by including the spectators as part of the *process* and *realisation* of the artwork. In other words, by turning them into participants, collaborators and users within the framework of an art event.[57] Kaprow describes the framework of his happenings as: Words, sounds, human beings in motion, painted constructions, electric lights, movies and slides—and perhaps in the future, smells—all in construction space involving the spectator or audience; these are the ingredients […] (Kaprow in Brett, 1968: 59).

Figure 3.19. Allan Kaprow, *18 Happenings in 6 Parts,* 1959, Reuben Gallery, New York

[56] Kaprow's approach to art as live event resembles similarities with the practice of the group GRAV in 1960s. GRAV emerged in 1960 in Paris and remained active until 1968. The group consisted of François Morellet, Julio Le Parc, Francisco Sobrino, Horacio Garcia Rossi, Yvaral, Joël Stein and Vera Molnár They joined the wave of movements seeking autonomy from art through a closer relationship between the artist and society. For example, in their artwork-event *One Day in the Street*, which took place on April 19, 1966 in Paris, passers-by could voluntarily participate in a series of activities, such as walking on uneven blocks and/or experiencing a distorted world by wearing elaborate spectacles (see: appendix) (Bishop, 2012).

[57] This form of practice is also similar to *Five Minute Conversations* (2015) another artwork I made that is based on participation, collaboration and live event. The artwork functioned as an investigational platform where dialogical method and sound performance mediated the production process and included the following two phases: (1) dialogue with the participants, (2) a sound performance composed by the participants, Please see appendix for more information.

It was a similar situation for the online users when participating in *Internet Fantasy*. This is to say that without the involvement of the participants, in reality, *Internet Fantasy* would have remained only as a set of mere instructions, strategies, codes and audios, without being realised, practiced or encountered. Thus, in analogy with Kaprow's artworks, providing a context for participation and collaboration, *Internet Fantasy* also employed a participatory methodology and included human beings, sounds, words, the Net/Web, etc. as the ingredients of the artwork for users to encounter and collaborate with.

Artworks that are based on a set of instructions have the potential for multiple iterations in new spaces and times. This is owing to the fact that their encounter is primarily based on the experiential aspect of their live events that are achievable over and over if the instructions, rules and codes are repeated in their original manner. For instance, the iteration of Kaprow's happenings have been repeatedly 're-invented' in recent times (Barry Rosen and Michael Unterdöfer, 2007: 71).[58] Alternatively, the repetition of historical web/net artworks can be iterated endlessly on the web. Although early net artists made their artworks in the environment and aesthetics of the extinct web 0.1 interface and code technicalities, however the transition of the WWW to Web 2.0, allowed the realisation of historical material to be iterated and encountered as originally instructed, coded and planned. The indefinite and endless iteration of material is an inherent feature of the web, including web-based artworks, flowing in the informational flux of the network. The iterative condition of the live event of web-based artworks such as *Technography* and *Internet Fantasy, MBCBFTW, Form Art,* etc. leads my research to explore this aspect of web-based artworks.

[58] Some of Kaprow's *happenings* were repeated in new locations. For instance, some as part of the exhibition *Agency for Action* in which some of Kaprow's happenings were referred to as being 're-invented' (Barry Rosen and Michael Unterdöfer, 2007: 71).

03.06. Iteration / Temporalisation

The circulation and exchange of data on the Internet creates a complex network of transactions with data packets in constant motion as they split and re-assemble. The Web works as a digital replication machine, enabling online users to continuously share, re-view and repeat information. Participating in the encounter of a time-based artwork (e.g. kinetic-based, event-based, and/or web-based) involves an engagement with multiple stages of *discrete events,* taking place in real time. Such forms of realisation introduce temporal phases of experience for those participating at different moments in time. *Equally*, these artworks reveal various iterations within their duration, for example in *Light-Space Modulator* we witness changes of various light beams or the movements of the metal stands, etc. or the *Technography* series are capable of being requested and seen over and over unlimitedly.

In this section I will concentrate on the iterative condition of data circulation on the web and how this relates to web-based artworks. I took the image below to illustrate the potential iterations of my web-based artworks in the network of telephone wires and equally their potential simultaneous presence in the cables.

This transpires when data packets are travelling in the wires, due to the request initiated from the online users through URL, HTTP, and HTML protocols on the web. The iteration of the artwork reflects its temporal duration as a result of a URL request. The endless potentiality of re-iterations of data packets in the Internet architecture is inherent in the material condition of web-based artworks.

Figure 3.20. Telephone cable pole, London, 2018

The link between iteration and temporalisation of the object of art is not something particular to web-based artworks. Ever since Duchamp presented *Bottle Rack* in 1914–a mass-produced manufactured object–as a work of art, he emphasised the artist's *selection* as equal and as valid as the fabrication of artworks in their traditional sense (Schwarz, 1969).

Web-based art practices reflect commonalities to a post-Duchampian approach in the 21st century. For instance, if the *Bottle Rack* (1914) was realised by iterating an object found in a flea market into an artwork, the iterations of the *Technography* series are attached to the global duration of the network where assets are instantly available to be found and infinitely capable for iterations and globally distribution. In essence all online-users can access the URL and thus encounter and share the artwork with one another in the duration of the network. The iterative condition, although it has its root in new readings of what a readymade could be, creates its own system and strategy. In this network of global connectivity, the 'iteration of node-and-link relations', that takes place in the context of user/server communication, constitute the foundation of the 'distributed network', designed by Paul Baran in 1964 (Munster, 2013: 1-21).

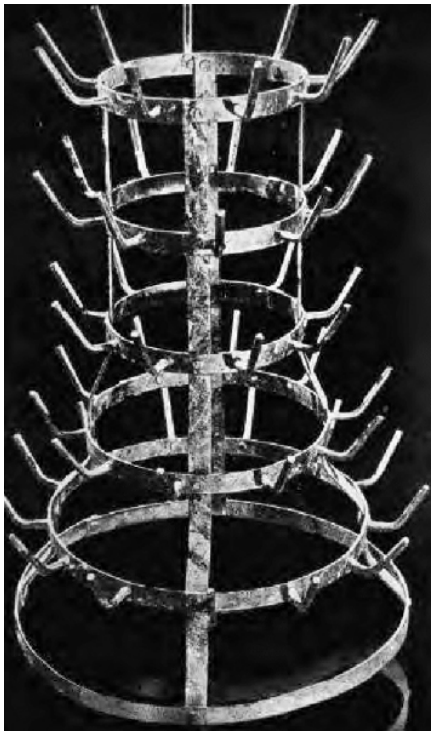

Figure 3.21. *Bottle-Rack* (original 1914, lost), Marcel Duchamp. Photograph is by Man Ray Collection, The Museum of Modern Art, New York.

In the age of information, the challenge for the contemporary artist is how to find methodologies to activate (readymade) data. Today, the web plays a significant role for the circulation of data and its iteration into other forms of representation. For current artists, the notion of the readymade has extended into new realms and interpretations such as online platforms including You Tube (video archive), Flickr (image archive), SoundCloud (audio archive) and Stack Overflow (code archive), which provide immense digital (readymade) data that is mostly free and accessible.

The iterative possibility of internet/web materiality shapes some of Jan Robert Leegte's web-based artworks, namely in *Scrollbar Composition* (2000). Leegte's approach to the materiality of the web resembles similarities with how *Form Art* series was constructed by Alexei Shulgin (see: 01.03). However, in Leegte's practice, the live events of actions and movements are more prominent and vivid. He ironically uses the very shapes and icons familiar to online users, such as the cursor, scrollbars, etc., to use them as readymade material for his work. *Scrollbar Composition* (2000) is made out of the scrollbar HTML code that Leegte deconstructed, iterated and re-wrote (i.e. hacked) to create his own composition and rearrangements. Please now browse the following URL to encounter the artwork.

http://www.scrollbarcomposition.com/

Figure 3.22. *Scrollbar Composition*, 2000, Jan Robert Leegte, HTML language

In the post-Duchampian era, the web offers an endless notion of iteration in the digital realm. Therefore, web-based artworks produced today encompass a past that includes iterations and circulation of data: 'The contemporary work of art does not position itself as the origin or termination point of the "creative process" (a "finished product" to be contemplated) but as a site of navigation, [an iterative process], a portal, a generator of activities' (Bourriaud, 2002: 19). When I think about producing an artwork, my enquiry is, 'how can [I] make do with what [I] have' (Bourriaud, 2002: 17), and resist the traditional expectation of works of art to make something new per se. In other words, every artwork produced today has a temporal existence due to being attached to a long chain of other artworks and iterations (in the past), and due to its material existence (physical, digital or any kind of information) is instantly considered as readymade material to be re-iterated by other artists (in the future).

The net artists in mid-1990s understood the web as a place of freedom for experimental artistic projects. In a 1998 interview, Olia Lialina described her interest in the Internet as a place for *artistic self-expression* where the aesthetics

of networks enabled artists to engage with digital data on the web as the iterative object for their work: 'I spoke of the internet being open for artistic self-expression, that the time had come to create net films, net stories and so on, to develop a net language […]' (Lialina in Droitcour, 2014: 59).

After almost three decades since the web went public, Hito Steyerl highlights that the digital network is not anymore a 'novelty' but intensely intertwined with 'reality' (Magagnoli, 2015: 145), implying that the Internet/WWW is becoming part of our normal everyday experiences. Logically this is the result of the commodification of web technology by corporate and government power, however Steyerl defends the idea that the Internet's 'revolutionary' capability has not weakened. (Magagnoli, 2015: 145). Fundamentally, what Hito Steyerl persists with is rooted in the importance of recognising the Internet and the everyday physical space as 'coterminous worlds' where discrete events occur between both. We are currently living in a time when the boundaries of virtual and actual reality have faded due to the *truth* of the experiences, emotions and feelings that are mainly equal in both environments (e-flux, 2013).

Net-language Lialina suggests, involves a wide range of online-specific methods to connect and communicate with the *networks of data* and the *online users*. Thus *net-language* necessitates insights including coding, hypertext documents, network topology, space-time of the web, iterations and temporal encounters. By employing net-language, Constant Dullaart made his web-based artwork *The Sleeping Internet* (2011), using the Google homepage and adapting it by changing the lighting mode where the page fades from dark to light continuously (Quaranta, 2011; Rhizome, 2017). The artwork is an exact 'cut and paste' of a *functional* Google home page, and the only authentic live event of the artwork transpires in adding extra layers of code, that leads to the light changes within the page endlessly. Please now browse the following URL to encounter the artwork.

http://thesleepinginternet.com/

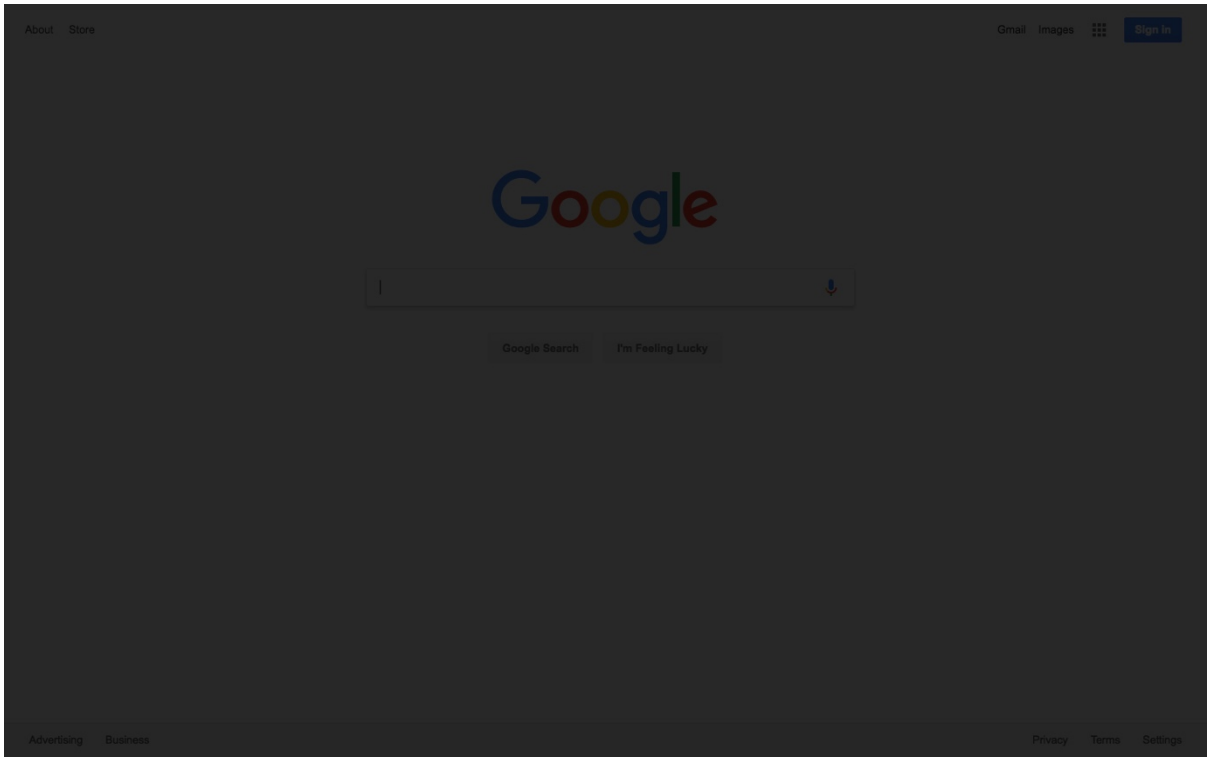

Figure 3.23. page *Sleeping Internet,* 2011, Constant Dullaart. An iteration of the functioning Google home page

In addition to the temporal connection established to encounter web-based artworks, temporality is also evoked within their iterative conditions. The artworks manifest themselves as a 'temporary terminal of a network of interconnected elements, like a narrative that extends and reinterprets preceding narratives' (Bourriaud, 2002: 19). While interacting with multiple online users spontaneously, such works of art are immersed in the transformational flux of the network.

Similar to the time experience in durée, the state of informational flux is also nonlinear and temporality defines its quality through the course of constant iterations, destruction and transformation of assets in the net/web ecosystem. In the network architecture, the duration of the artwork is manifested as the (virtual) object of experience, as part of its iterative reality. This is also analogous with the virtual state of durée in the heterogeneous condition of sensations and their continuous progression.

From a Bergsonian perspective the iterative process can be linked directly with the experience of durée as Bergson defines duration as a state of continuum progressing in temporal settings (Bergson, 1896). In a similar fashion, the feelings and experiences within the consciousness and pure memory change and

iterate into other new insights and experiences in durée. As mentioned previously, this is due to the iteration and repetition of *pure memory* into memory images that new experiences (i.e. novelty) have the potential to realise in the present moment in durée. This is only possible in the live and progressing state of durée as an internalised and virtual experience.

As part of an artist residency project, I aimed to experiment with the notion of iteration that resides in durée. For this project, my spatial experiences of the urban environment (as my first memory-images) were transported onto the web (by gif animation) to explore their potential in the formation of new experiences. These are specific to net/web materiality and space-time where my memories of the initial encounter morph into different realities.

03.07. Entropic Iteration / Artist Residency Project

Over the course of September - November 2016, I was invited by Index Collective to undertake a two-month residency programme in Zürich, Switzerland. I used this period to work on my research and explore the potential for a new project. I intended to link my urban exploration of the city (as my local durée) with an online-specific condition (as the global web durée). I began by mapping out some of the Zürich's drinking water fountains and the social interactions found around them.[59]

Through a series of GIF files, the momentary encounters that occurred around these sculptural public structures was captured once I arrived at each specific location. Equally, through audio field recordings, I documented the sound of the environment at the particular time that I arrived. The GIF-animated files were constructed through shooting multiple sequences of photographs from each encounter. I used the function of my cell phone camera known as *burst mode*, which takes multiple images at once (designed so that users can pick their favourite) to capture a series of still photos of the encounters. Then I edited each photo by modifying colour, light, shadow, size, saturation and contrast. By re-arranging images next to one another, I made sequences and then edited the timings of the GIF frames, e.g. 3 seconds, 5 seconds, 10 seconds, etc. I utilised the *Adobe Photoshop* application to make these animations. Fig. 3.24. shows how the series of still photographs are stacked on top of each other as *Layers* to generate an animated image. Each GIF animation represents the specific time and location when my encounter took place. The making procedure extended across six weeks as I accumulated a collection while I explored various localities in Zürich.

[59] Zürich has more than 1200 water fountains that offer fresh drinking water for the public to use. Some of these fountains are historical monuments integrated with sculptures and statues (e.g. Amazon Fountain, Alfred Escher Fountain, etc. (see: https://www.zuerich.com/en/visit/1200-fountains).

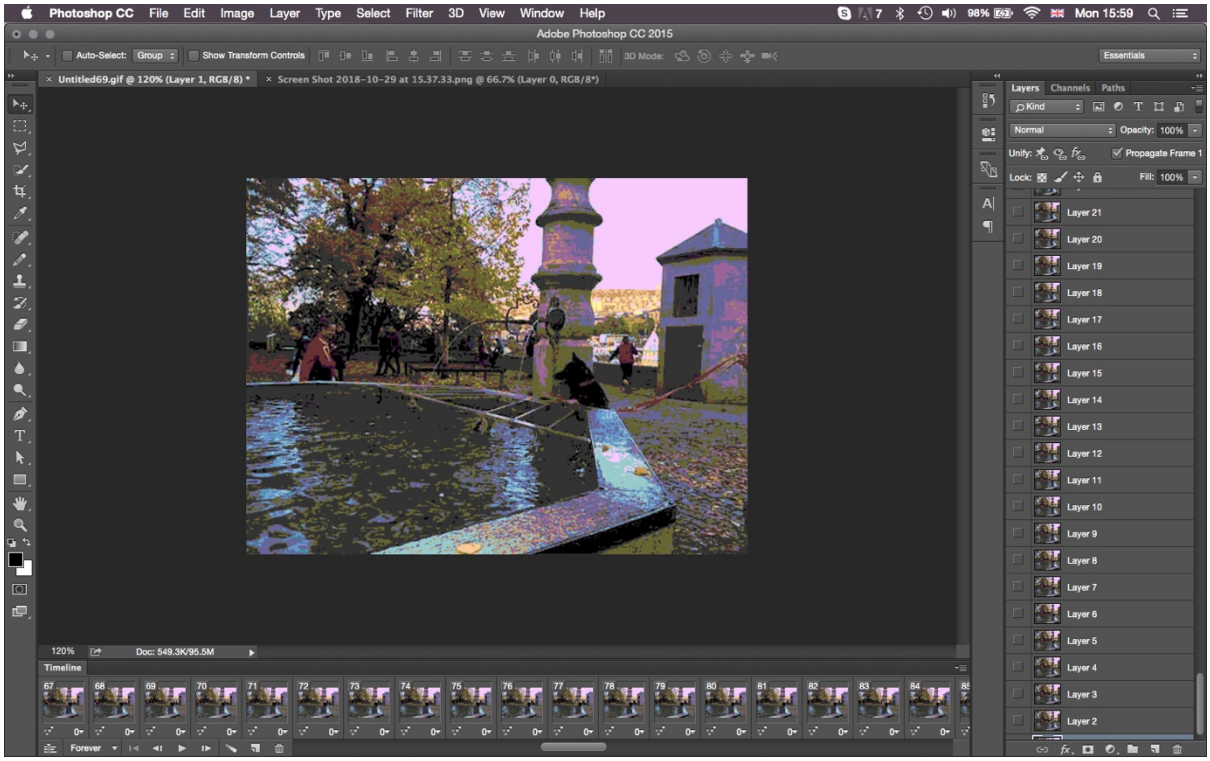

Figure 3.24. Screenshot from the interface of Adobe Photoshop CC when making GIF animations. In the right hand side of the image resembles how each photograph is inserted in each layer. The bottom of the page shows the *Timeline* of the animation.

Figure 3.24 also depicts the *Timeline* of the animation in the bottom of the screenshot. It is in here that I can adjust the timespan of each GIF file and change variations to operate in *looping* mode when activated. This particular animation, is made out of 178 still images collected from the *Burst* mode photo-snaps, which constitute one out of four animations presented in *fountain.713,* from the *Entropic Series.*

```
<audio controls>
  <source src="horse.ogg" type="audio/ogg">
  <source src="horse.mp3" type="audio/mpeg">
  Your browser does not support the audio tag.
</audio>
```

Figure 3.25. The universal attributes of the HTML audio tag. The audio tag always includes the note *'Your browser does not support the audio tag',* for an anticipated occasion that the browser is incompatible with the audio attributes. However, such occasions are very rare with the recent development in most of the browser applications.

The making procedure resulted in a number of looping animated GIF files that I integrated onto the web. In addition, I included the audio files (MP3) alongside the animations to be played automatically when a user reaches the URL. To do

so, I utilised the HTML audio tag (i.e. <audio>) and applied the *auto play* and the *loop* mode, so that the audio assets could play automatically and continuously in the hypermedia document of the artwork. Please browse the following URL to encounter *fountain.713* from the series *Entropic Iteration.*

http://mohammadnamazi.com/index-residency/fountain.713.html

Figure 3.26. *Entropic Iteration*, *fountain.713*, Mohammad Namazi

The experimental outcome of this project was exhibited in Corner College, a project gallery space in Zürich, Switzerland in October 2016. For the gallery context, I made sure that a computer device would be accessible for the visitors, enabling them to have access to the online presence of the artwork in the network. Through the hyperlinked assemblage of the webpages of the series, users could click on each artwork and move to the other.

Figure 3.27. A device was available for visitors to go online to encounter various series of *Entropic Iteration,* Installation view at *Entropic Iteration* (2016), Corner College, Zurich, Switzerland

Through the enquiry of co-relating my urban exploration/intervention with the online specific condition of the WWW, I experienced how various file formats (e.g. jpeg, gif, .mp3, html, css) can come together through multiple iterations to reassemble an initial *actual* encounter in physical space into the *virtual* state of the net/web.

Figure 3.28. Installation view at *Entropic Iteration* (2016), Corner College, Zurich, Switzerland

More importantly, the online-specific condition of these encounters stand as a reflection of my memory images at the time when spectating the actual space of the water fountains. However, my pure memory is now influenced by these online web-based encounters and formed their specific online-memory in my durée. These online encounters have now altered my initial encounter of the water fountains and the specific social relations, events and experiences occurred at the time. Please browse the following URL to encounter *fountain.713* from the series of *Entropic Iteration.*

http://mohammadnamazi.com/index-residency/fountain.702.html

Figure 3.29. *Entropic Iteration*, *fountain.702*, Mohammad Namazi

The encounter of *Entropic Iteration* is similar to the memory experiences in the two-channel video *The Third Memory* made by Pierre Huyghe in 1999. The video exhibited at the Centre Georges Pompidou, by a methodology of reshooting part of Sidney Lumet's movie *Dog Day Afternoon,* made in 1975. The feature film is based on a real bank robbery on 22nd August 1972.[60]

Figure 3.30. *The Third Memory*, 1999, Pierre Huyghe. Two-channel video.

Huyghe considers Lumet's film as readymade material for his video, however, by juxtaposing the images and reconstructions, he sets the film thirty years later, when the main character of the real event John Wojtowicz (i.e. the thief), narrates the story of the original Lumet's film (Bourriaud, 2002). After thirty years, Wojtowicz's memory appears to be influenced by the film and is not an original recollection of the real event in which he robbed the bank in 1972. Therefore, the iteration in a new setting is set alongside an enactment of a

60 The event refers to a robbery of a Brooklyn bank by John Wojtowicz and Salvatore Naturale on August 22, 1972 (The Bulletin newspaper, Aug, 23, 1972).

Wojtowicz' distorted memory, reflecting on a multi-layered sense of durée and its real event.

The iterative condition of the environment of the Internet/WWW constitute multiple forms of their initial assets. There is no end to iteration in the network duration and code-based materials (or any other assets) are under constant re-cycle, re-use, and or up-cycle. For example, Jeremy Bailey uses webcam as a means of performance, Kari Altmann, aggregates online images and presents them in a body of the endless webpages, *r-u-ins.org* and Artie Vierkant convert and iterate files into sculpture (Chan, 2014).

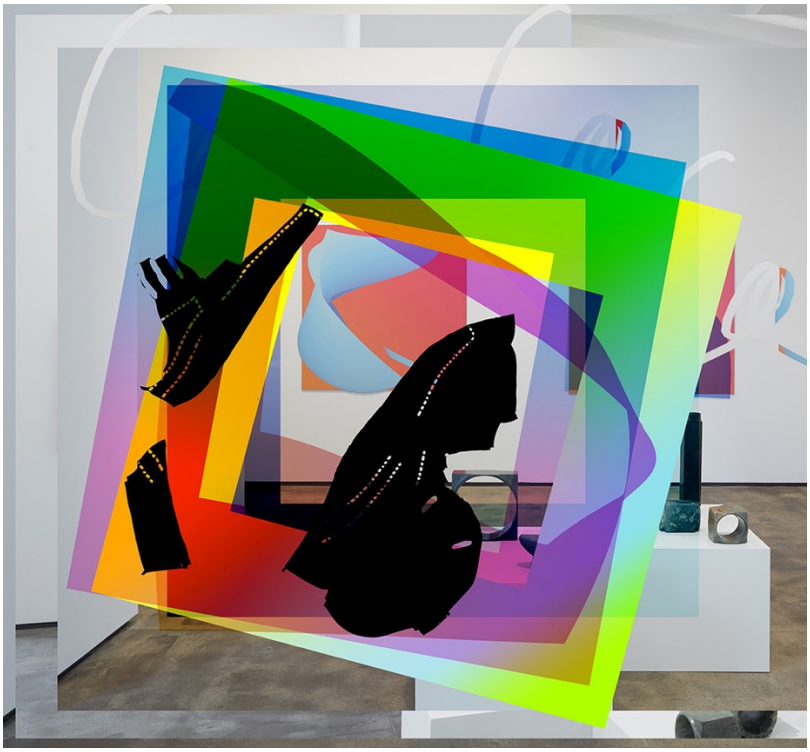

Figure 3.31. *Image Objects*, 2011, Artie Vierkant. Prints on aluminum composite panel, altered documentation images

Experiments such as *Entropic Iteration* represent the potential of the web/net environment and its materiality to make connections with actual encounters in physical space, introducing new encounters specific to online conditions. In other words, this particular project stands as an insertion of spatial encounters and its extension into the Net/Web. Thus, *Entropic Iteration* takes an oppositional approach to that of *Internet Fantasy*. In the latter, the online experience materialises and projects its effects into physical space, whereas in the former, the spatial encounter found a pathway to integrate a (virtual) presence onto the net/web realm. Web-based artworks such as *Entropic Iteration* and *Internet*

Fantasy indicate various web strategies that are inherent of a *telematic* feature, offered by Internet/Web materiality. The notion of the live event in web-based artworks as such, acts in accordance with the *aesthetics* and *context* specific to their telematic features and environment.

03.08. Telematic Event

In 1987 Simon Nora and Alain Minc coined the term 'telematics' to define and acknowledge the new technology emerging from the conjunction of computers and telecommunication systems—utilising the telephone, teletext and fax (Popper, 1993: 124). Paul Virilio describes the transition of technology in the 1980s as a point when, 'the world of finite time began', because of the phenomenon that occurred in ending the 'localized durée' (Virilio, 2000: 117). In other words, Virilio is addressing the end of our real spatiotemporal time and the arrival of the universal 'world time', which represents the sense of omnipresence in the time-experience of telecommunication systems (ibid). The term *localized durée,* used here by Virilio, is equal to spatialised time in Bergsonian thinking.

While *Standing Wave* (1920) and *Light-Space Modulator* (1922) constructed eventful situations where visitors could experience live events in real time, Roy Ascott's early telematic artwork, *The Pleasure of the Text* (1983)[61] was, 'an asynchronous story-telling project' (Stuart in Frieze, 2009) realised through the construction of a series of telematic live events that engaged with different time zones and geographical spaces, while interacting with multiple participants.

Figure 3.32. A collection of photos depicting various scenes of *The Pleasure of the Text*, organised by Roy Ascott in 1983

[61] The original title in French is *La Plissure du Texte*, called after a book of the same name written by Roland Barthes in 1973. The project is also reflective of Barthes essay, 'The Death of the Author', first published in *Aspen Magazine* (Aspen magazine: No. 5 and 6 combined, 1967).

Ascott utilised the ARTEX (Artist's Electronic Exchange Network) electronic mailbox network[62] to carry out communication with artists from other countries, aiming to achieve a collaborative text-based activity that could be distributed worldwide. The duration of events was only active for the course of twelve days from December 11th - 23rd, in 1983. Within a series of discrete events and exchanges that occurred among the artists, a number of digital documents were generated and printed as the legacy of the artwork (Ascott, 1991).

The aim was to create a body of text through a 'dispersed authorship' involving groups of artists living in eleven cities around the world. The participation of each group was through an electronic network that contributed to a gradual development of the narrative, as a text was inserted daily in the network from each terminal. The majority of these terminals were connected to 'data projectors' where the construction procedure of the text was available to the public (Popper, 1993: 124-5).

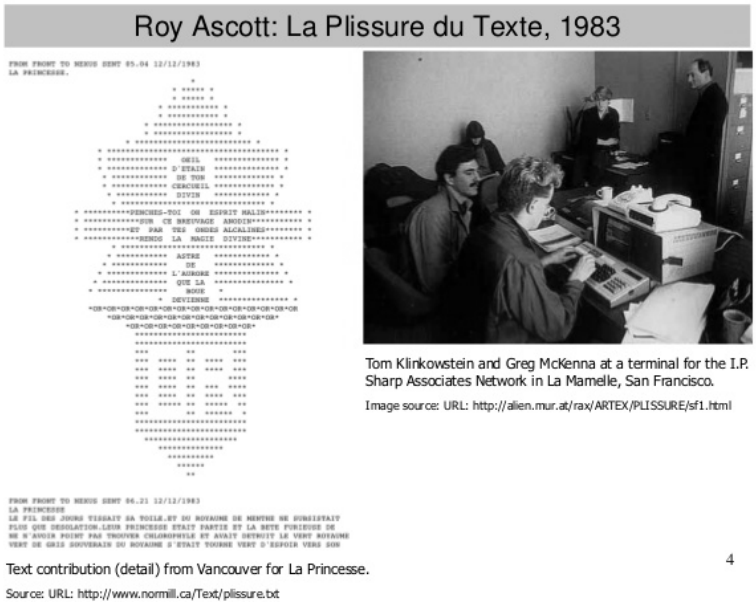

Figure 3.33. *The Pleasure of the Text*, printed material generated from the telematic correspondence, Roy Ascott, 1983

62 This group of artists had access to a "user-group" on the *I.P.Sharp Associates* (IPSA) network. ARTEX was formed with thirty members and was used as a tool for art projects for global reach. The group ended its activity in 1990.

While for Kaprow artworks as *happenings* emphasised events, participation and art's intrusion in the urban environment, for Ascott, art moves within the network of telecommunication technology. This is through the interaction of participants not with physical or face-to-face activities, but through an interruption and destruction of space-time, providing a virtual sense of simultaneous presences via telematic live events. These events occurred on specific days on which Ascott planned a remote connection with participants to insert the data provided into the database.

From another perspective, in the inner state of telematic technology, live events are equally occurring while information travels within the electronic network and once the protocols are establishing the data exchange from each terminal, i.e. *when the network is activated*. This feature of the network is not visible to our senses, yet its reality cannot be denied. From the perspective of artists and theorists such as Mario Costa, the *activation of network* is the main aesthetical notion for telematic artworks (Popper, 1993).

Throughout his practice, Ascott has challenged human-machine interaction within different scenarios and methods that employed event-based qualities in the discourse of computer and networked systems. He has intensely analysed the impact of a computer-networked society in his theory and artworks. For example, in the essay 'The Architecture of Cyberception' (1994), he illustrated this situation as, 'the sense of the individual is giving way to the sense of the interface. […] We are all interface. We are computer-mediated and computer-enhanced' (Ascott in Toy, 1995: 38).

At the same time as Ascott's early telematics explorations, other artists and groups experimented with notions of telematic events. For example, the Aesthetic of Communication Group formed by Derrick de Kerckhove and Mario Costa in 1983, deployed new communication technology to, 'transform our experience of *real* space and time and to create new kinds of events that are not dependent on place' (Popper, 1993: 125).

Mario Costa suggests that telematic artworks are in *the temporal state of the network activation* where 'art, technology and science' join to enable the

exchanges of events from distant participants, users and collaborators. He writes that:

'It is *an aesthetic of events occurring in real time* […] capable of visually uniting physically distant places. In this type of event, *it is not the exchanged content that matters, but rather the network that is activated* and the functional conditions of exchange' (Costa in Popper, 1993: 126).[63]

Costa's observation on the notion of event within the telematic communication is crucially important for my practice. This is to say, the *duration* of the network and its *temporal* realisation (and its impact on the inner state of the Net/Web), are inherent and fundamental to the encounter of live events of web-based artworks. Recalling the Net_Film, *My Boyfriend Came Back from the War* (1996), made by Olia Lialina, users encounter time through the discrete events of each hypertext that introduces different durations and temporalities while moving from one page to another.

The artwork creates curiosity for the user by introducing many hyperlinks that lead from one to another, and thus constructs telematic affections in the nonlinear temporality of the non-sequential state of hypertexts until the story ends, when there is no other hyperlink to click or to follow (Green, 2004).

Additionally, in Thomson and Craighead's artwork, *A Live Portrait of Tim Berners-Lee* (2012), the exhibition of the work involved the constant activation of the network in every moment when data is transmitted by the web cameras to adjust the brightness of the pixels and to change the image (Magagnoli, 2015).

In this context, the aesthetic of online-specific artworks is a meshwork of vital and organic energy such as mental investment in addition to code, machinery, electricity and electronics (Popper, 1993). These are the attributes that alter our everyday object-oriented perception of space-time and have the potential to introduce an internalised, virtual and continuous sense of temporal encounters, similar to how Bergson identifies the quality of *durée*.

63 I have italicised some parts of the quote to stress their importance for the context of this research.

This is achieved through the forms of such online specific aesthetic, comprising of:

(1) Staging a physical presence at a distance
(2) The increase in the instantaneous and reduction of delay
(3) Engagement and interactivity
(4) The marriage of memory and real time
(5) Universal communication
(6) The discourse of online users, their interaction and participation

These forms are inherent to the Internet/WWW, their protocols and therefore its web-based artworks. Once the network is activated, we can reach a virtual sense of presence in the other location that we do not exist in physically (e.g. Skype, or *Internet Fantasy*), deconstructing the sense of time and space through interaction with another location distinct to ours. Additionally, the memory we construct of such encounters results in a mixture of our consciousness; referring to the spatial sense of time in our vicinity and the influences of the virtual space. This is similar to the encounter of *Internet Fantasy* and *Entropic Iteration* and their time experience in both the spatial sense and in network duration.

03.09. www.Event-Web.net

I am part of a generation of artists that belong to an era that Paul Virilio describes as the epoch of the *information bomb*.[64] In such conditions, the notion of event interconnects constantly with types of social engagement that are web-oriented. These web-oriented social events utilise technology to unite nations, states, and social groups around the globe (Virilio, 2000).

Consequently, in comparison to the early telematic artists, my practice is engaged with more enhanced and complex types of telematic features. This includes the Web 2.0 structure, new interactive web-strategies and smart devices, as well as various new coding languages (e.g. HTML_5, CSS animations). The construction of a *live event* has been explored by other net-artists either through making online specific *web events* (e.g. *Summer,* 2013, by Olia Lialina, or *Technography*); or by constructing actual *live events* (e.g. *The Live portraits of Tim Berners-Lee* or *Internet Fantasy*). Such event works utilise the Internet/Web as the material for their raison d'etre. Andrew Benjamin believes web-based artworks expose their live event attributes through specific notions of reaction and interface, features that are inherent in the constitutions of such works of art (Benjamin, 2005).

This phenomenon of network culture encourages Virilio to state that, 'here no longer exists; everything is now' (Virilio, 2000: 116). This now-ness that *Internet Fantasy* explores thanks to the instantaneity that is embedded in network culture, substitutes the 'matter time' (i.e. spatial time) of geographical experience (i.e. Berlin), with the electronic 'light time' (i.e. network duration) of the technology of packet switching and electronics. This substitution alters the 'truth of all *durée,* and proposes an acceleration of all reality of things, living beings, socio-cultural phenomena' (Virilio, 2000: 117-8), leading us to dismiss the significance and meanings of calendar time in all local times around the globe. *Internet Fantasy*, an event artwork on the web, no longer aims to represent the past or future, it only reflects on now-ness and simultaneity by deploying the live

[64] 'The cybernetics of the network of the networks, the product of a 'techno-sophic' illusion contemporaneous with the end of the Cold War as "end of history"' (Virilio, 2000: 107). Thus, after the *atom* bomb and the deployment for over forty years of generalised nuclear deterrence, the *information bomb* which has just exploded will very soon require the establishment of a new type of *deterrence* – in this case, *a societal* one, with "automatic circuit-breakers" put in place capable of avoiding the over-heating, if not indeed the fission, of the social cores of nations' (Virilio, 2000: 108).

and eventful nature of the web. This prioritises the means of its encounter, offering a mesh of live event and temporal virtual reality rather than a representation or replica of a spatial sense in the physical world.

Andrew Benjamin analyses the event nature of web-based artworks in their potential participatory and interactive attributes, due to simultaneously connecting people at each point in time, from multiple locations, to engage and experience the work of art in real time (Benjamin, 2005). On the other hand, the interactive aspect of web-based artworks influences its forms to be transient in nature. This situation has been described by Benjamin as, 'the interactive collective which develops through participation in the [web-based art]work over the time of its duration comes into being as, in principle, open-ended and changeable' (Benjamin, 2005: 222).

Therefore, in addition to the temporal state of network activation, Benjamin analyses the state of any web-oriented object (including web-based artworks), in relation to the *whole* network duration. In other words, taking into account their reactions to the flux of information that continues in the inner state of the Internet.

It is true that web-based artworks such as *Internet Fantasy* are inherent in the momentary experience of the live event when a series of discrete events occur in the course of the network activation. Nevertheless, their temporal state is equally affected by the *'virtual network of interaction'*. These works of art are no longer just *'reproducible'* but also their foundation and being is *'virtual'* and hence principally *'open to temporal'* interfaces and endless iteration as post-productions (Benjamin, 2005: 220). These characteristics have the potential to make links with the Bergsonian account of durée from two aspects, firstly their temporal state and secondly, the virtual nature of durée.

In relation to the latter, Henri Bergson suggested that by thinking of movement as a linear transformation of an object from A to B, crossing the space, the biggest mistake is not to include the '*virtuality* of duration' (Bergson, 1896). In other words, the qualitative alterations that each movement introduces to the move itself, impacts the space that it moves in and therefore the 'whole, which that space necessarily opens up' (Terranova, 2004: 51). For example, when a train moves from *A* to *B*, the movement is not just the big object of the train and

passengers moving from their departure location to their points of destination. The train's movement impacts the space it travels in and also transforms it. To be more specific, the movement of a train affects a range of attributes including: the chemical constitution of the atmosphere (e.g. the engine's smoke emissions) and the qualitative changes that influences the passengers and crew (e.g. their relationships between each other and the feelings they have about the place they left as well as their anticipation about reaching the new location).

This is also similar for a fragment of data that makes up one of the sound files in *Internet Fantasy*, when travelling in the network. For instance, as discussed in the previous chapter (see: 02.06) a data packet is not just in search of a destination, but it also potentially transforms the 'space' of its route and leaves a trace behind as recorded in the memory of nodes. These code-traces, memories and effects could influence and hence alter the general topology of the network (see: 01.05). In other words, the assets of *Internet Fantasy* are not just simply travelling across the network within the context of user/server settings, but also this circulation itself impacts, affects and changes its network milieu (Terranova, 2004: 51) (see: 02.06).

Recalling Deleuze's reading of Bergsonian duration, he stated that, 'duration is not merely lived experience; it is also experience enlarged or even gone beyond; it is already a condition of experience' (Deleuze, 1988: 37). The electronic existence of *Internet Fantasy* facilitates a constant accessibility from anywhere. Through its virtual existence and intrinsic mutability, *Internet Fantasy* is not only inherently iterative, but it is also so due to the *online-user's* engagement and exchange.

03.10. *Around Hospitality*

As part of the *Figure Three* programme at BALTIC39 in Newcastle,[65] I was invited to orchestrate a solo exhibition from 17th-21st February 2016 based on a submitted proposal entitled *Around Hospitality*. I approached the exhibition as a research context for presenting a range of diverse artworks, some of which were realised and some of which were still in progress.

I saw this as an opportunity to experiment with the potential of web-based artworks when exhibited in close proximity to other non-net related artworks, representing the wider aspects of my multi-disciplinary practice. I presented ten artworks consisting of a wide range of media such as video, sound, Web/Internet, prints, ceramics, LED displays and a kinetic sculpture.

Over the course of exhibition, I learnt more about the diverse nature of my practice, by drawing a connection among my varied artworks when presented one next to another. For example, when a video artwork (e.g. *Food Politics*) is presented next to a web-based artwork (e.g. *location.580*) or comparably, when a kinetic artwork (e.g. *Hanging Spring*) is exhibited next to a sound artwork (e.g. *Five Minute Conversations*).

In addition, I designated a small area in the space as the *studio* where I could engage with unrealised artworks, while also engaging with other artists and collaborators, as well as the members of public. Therefore, the studio enabled me to invite other artists to use its space for temporary experiments in relation to their practice.[66]

---

65 A Cultural Hub for contemporary art associated with Baltic Centre for Contemporary Art and the Northumbria University.

66 This has led to the production of some artworks and collaborations with other artists. For instance, I collaborated with the artist Christine Egan-Fowler in her 'conversations' project and invited the filmmaker Steven Ounanian to use the studio space to work with local actors for his new experimental short film.

Figure 3.34. Installation view at *Around Hospitality*, Baltic39, Newcastle, 2016

Figure 3.35. Installation view at *Around Hospitality*, 2016. In this photo Hanging Spring is placed in the centre of the image. Baltic39, Newcastle, 2016

Figure 3.36. Installation view of the studio space, *Around Hospitality*, Baltic39, Newcastle, 2016

In the exhibition I presented two web-based artworks, *location.580* and *location.585* from the *Technography* series. At the time the *Technography* series was operating slightly differently to its current state. For instance, the live event of the artwork was coded with an *infinite iteration count,* which resulted in their movements being set on a continuous loop.

While these web-based artworks engaged with some visitors, the form of engagement was mainly similar to the video pieces present (e.g. *On the Way to Here,* and *Food Politics*). For instance, in the case of *location.580* (see: 01.01), some visitors encountered the artwork as an offline 2D animation and therefore they were unaware of its net/web materiality and settings. This highlighted the importance and the subtleties of presenting a web-based artwork in a gallery context.

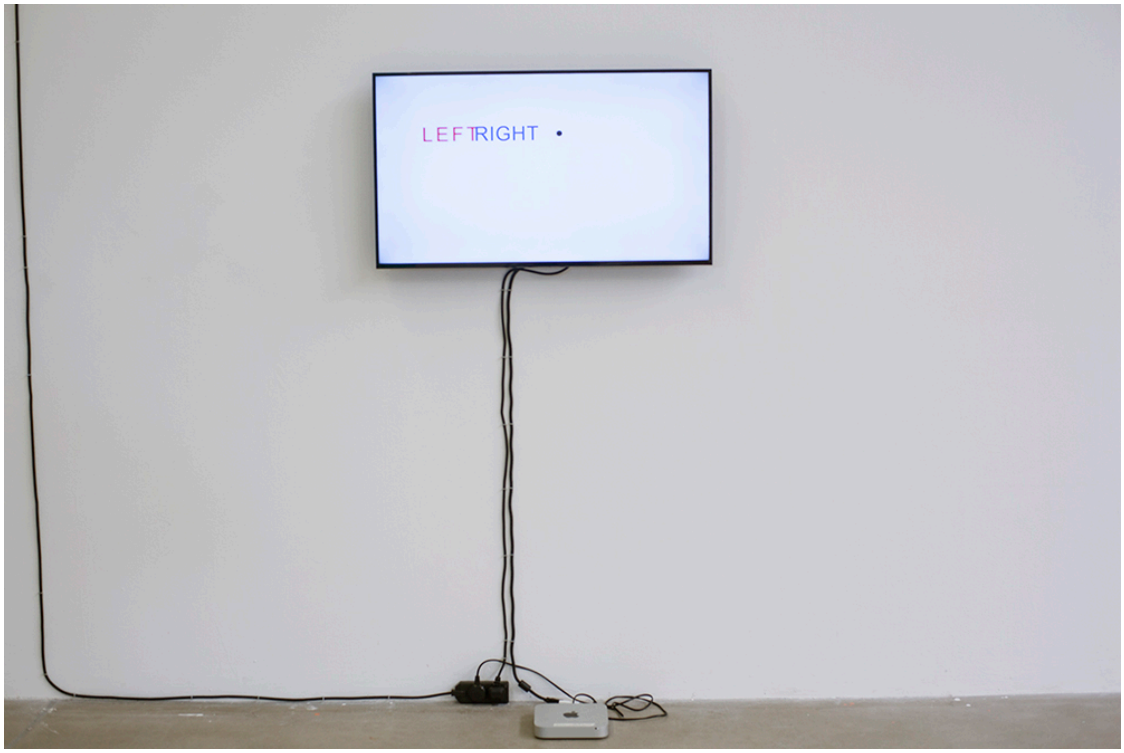

Figure 3.37. *Location.580*, installation view at *Around Hospitality*, Baltic39, Newcastle, 2016


Figure 3.38. *Food Politics*, approx. 59 min video, presented at *Around Hospitality*, Baltic39, Newcastle, 2016

By contrast, the other time-based artwork *Hanging Spring,* appeared to create an active level of engagement with the visitors. Figure 3.39 shows gallery visitors engaging with the artwork once it was activated. The kinetic installation comprised of an Arduino (a single board microcontroller),[67] a DC vibration motor, a metal spring and multiple plates of Plexiglas in various colours. The Arduino was programmed to trigger the motor continuously for 30 seconds of movement and 45 seconds of pause. The motor's attributes of movement were specifically programmed to create vibrating patterns and oscillations in the flexible and elastic condition of the metal spring where each spin of the motor ranged from 0º to 270º.

Figure 3.39. Screenshot from video documentation of *Around Hospitality* made by Baltic Centre for Contemporary Art in 2016. Here visitors are captured while being engaged with the encounter of live events in Hanging Spring.

67 Arduino uses languages based on *Processing* and other open-source software such as C++, which is a general multi-functional programming language (see: https://www.arduino.cc/en/Guide/Introduction).

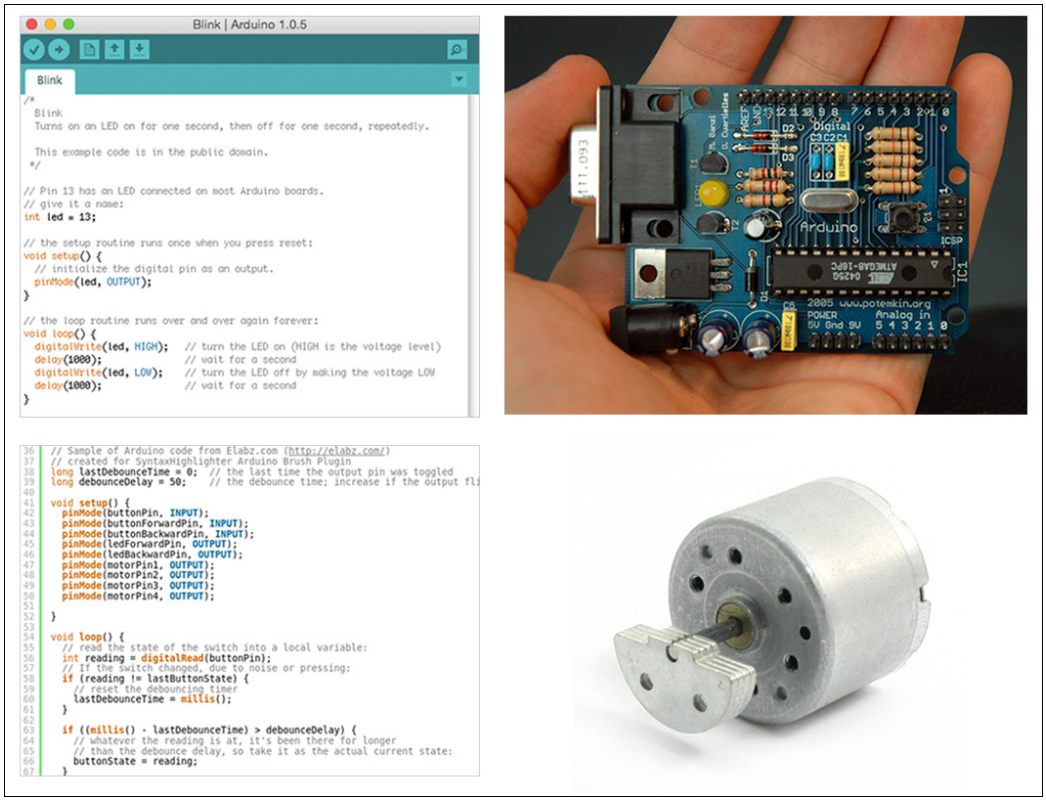

Figure 3.40. Arduino application interface (top left). An early Arduino board RS-232, (top right) Sample of Arduino codes (bottom left). An example of a vibrator DC motor (right bottom).

The installation of *Hanging Spring* connected the ceiling of the gallery space to the ground, covering a height of four meters. Therefore, when the motor was activated, the live events in *Hanging Spring* played out via a range of rhythmic oscillations vibrating the whole body of the spring, as well as a gentle rhythmic noise due to the spring's vibration.

The plates of Plexiglas on the ground were reflective and thus participants could encounter the artwork through another perspective that involved a coloured visualisation of the surroundings and a slight deformation of the oscillations. This feature added to the experiential aspects of the encounter by introducing a different 'surreal' version of the actual piece in the physical gallery space.

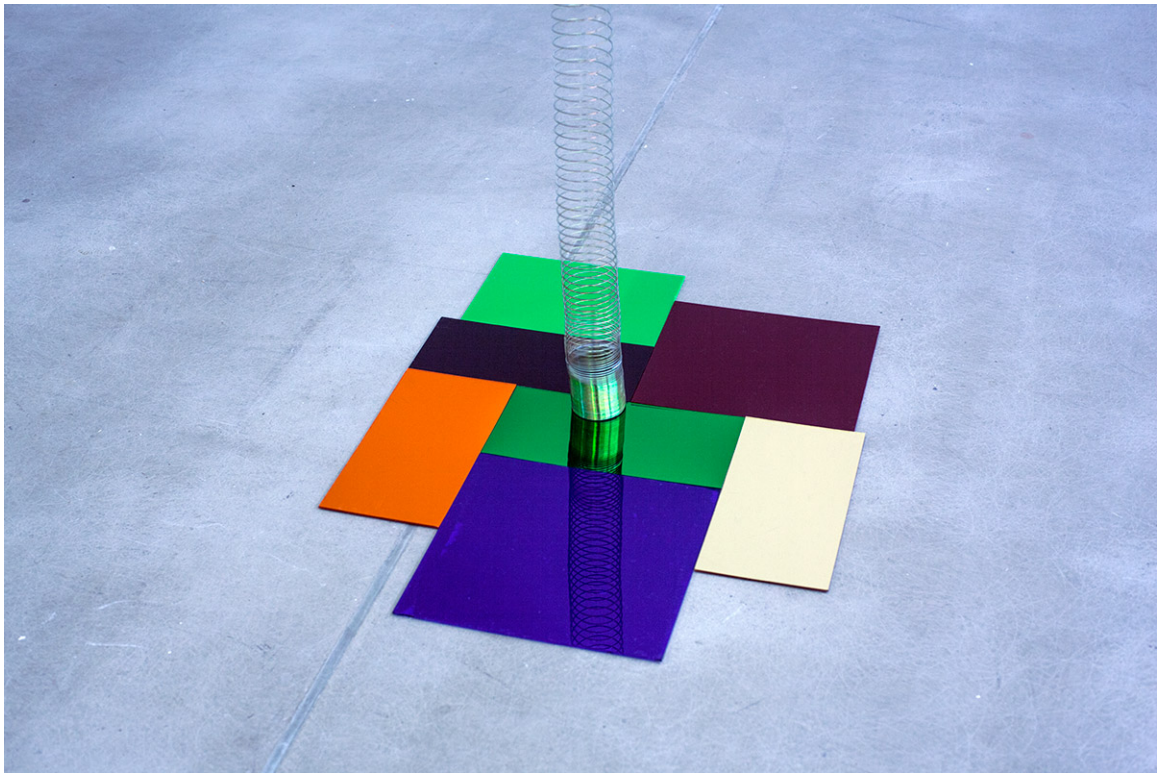

Figure 3.41. *Hanging Spring* (detail), installation view at *Around Hospitality*, Baltic39, Newcastle, 2016

Comparing the experiential aspect of *location.580* and *Hanging Spring*, indicated that the encounter of web-based artwork in the gallery setting is confusing and difficult for participants when viewing the artwork on a screen not associated with internet usage and without an ability to get online. The web asserts were being encountered out of the context of their network duration, or in other words, in the temporal user/server setting. As a result, the *pure* encounter of *Technography* is only inherent in the virtual duration of the network and its specific online-usership. When exterior to it, the time experience of the work alters, departing from its analogous quality with durée (see: chapter 2).

In April 2016 I visited the exhibition *Electronic Superhighway* (2016) at the Whitechapel Gallery where many net/web-based artworks were presented next to one another. Although the exhibition was informative and it was nostalgic to see old tech equipment, the encounter with the web-based artworks was not reflective of their authentic network experiential aspects, as they were largely exhibited out of the user/server settings. This condition produced an effect similar to the dislocation of *location.580,* when the appropriate settings for experiencing 'live' artworks had not been fully considered.

In comparison *Hanging Spring* served the appropriate context for the act of encountering the work, which led to an active engagement. The artwork presented similarities with my encounter with Naum Gabo's *Standing Wave* (1920) at Tate in 2017 (see: 03.03). This is owing to both the artworks engagement with their participants through their temporal moments of activation and within the duration that the work is realised. Thus, both artworks provide a framework for their events to be encountered *live*, leading to an experience of a felt duration.

This is the context that describes the capability of time-based artworks such as *Standing Wave* and *Hanging Spring* to precipitate time-experiences similar to durée in the Bergsonian account. This is under the condition that web-based artworks such as *Technography* and *Internet Fantasy* are presented in their appropriate context (i.e. in the duration of the network). When this occurs they are more capable of triggering time-experiences that are analogous to a Bergsonian durée. This is due to the non-spatial, virtual, nonlinear and heterogeneous quality of net/web materiality.

Conclusion

The process of making online-specific artworks involves an engagement with types of materiality and experience that intertwine *spatial encounter* with *network duration* and vice versa. In this practice-based research, I have described the way in which the exchange between physical and virtual entities (as they are brought into proximity through online-specific artworks) alters perception and an experience of (linear) time.

Encountering artworks that engage with the *materiality* and *duration* of the network entails coming into contact with specific experiential features that cannot take place outside of the network. Therefore, these features should be recognised as integral to *online-specific* artworks and unparalleled in offline art practices.

The Contextual Review in this research provides an overview of some key terms in the field: Internet Art, net.art, software art, browser-based art, web and network art that were developed by other writers and theoreticians (see page: 16). However, my research proposed how the term *online-specific* can reflect a more cohesive and appropriate terminology to address the practices I am interested in. As explained throughout this research, the particularity of my online-specific artwork stems from their temporal manifestation in the network duration as well as the way in which it is realised and establishes a particular form of interaction with users.

In this research, I have outlined evidence to indicate how the nature of the encounter in online-specific artworks (e.g. *Technography, Internet Fantasy, Entropic Iteration*) can introduce a sense of *lived duration* in the course of the artwork as *live event*. Through this practice-based research, I am persuaded that such works of art have the potential to produce *experiential time perceptions* analogous to a Bergsonian definition of *durée*. Additionally, online-specific artworks are capable of giving rise to specific forms of memory related to online interactions that are able to merge with the durée.

I have demonstrated how these time-experiential qualities, although associated with the Web, have similarities with other non-web artworks realised in physical

time and space. I analysed the mutual characteristics that are shared between the experiences of these on and offline artworks that produce *lived duration* through the encounter of the artwork as *live event*. The impact of the live event has been shown to be perceptible whether the event is actual, as in the rapid movement of the wire producing an apparent curved shape in *Standing Wave,* or conceptual as in the (probably) non-exist light activation in *Lampada Annuale*.

The exploration of online-specificity as understood through telematic materiality, and web-based encounters and as defined by *time* as *durée,* takes a heterogeneous form residing in the inner-self of the human conscious, which is a non-spatial realm. Due to the *live* nature of the encounter in durée, comprising of *successions without mutual externality* (Bergson, 1886), each moment of encounter operates as a *live event* for the conscious mind.

In this state, the flux of memories (either *pure memory* or *memory images*) are inherent as part of our *inner continuity,* precipitating feelings, sensations and reminiscences. However, they also have the potential to offer novel experiences, due to the possible bond that can be made between the past and the present– when *pure memory* (i.e. the *pure past*) is enabled to introduce its *virtual effects* as it merges into the present moment.

Live events have the potential to disengage participants from their spatial sense of time due to their immersion into the realisation process. In such eventful circumstances, memory images have more potential to interlink with pure memories. This is due to the time-based nature of such works of art and their capacity to precipitate a connection with the *live* aspect of the *event*. This transpires as a result of the sense of a *felt duration* that is shared between such artworks and the inner self.

To make art within the context of a live event is to:

(1) Highlight the actual lived duration of the temporal experience(s)
(2) Realise art in participatory, collaborative and interactive settings

Considering the specificities of *realising* net/web art, despite the fact that some features are not perceivable, they still constitute the foundation of the artwork and hence, are inseparable. This is to say, even though we might not experience

some of the inner procedures in the ecosystem of the network, they form the milieu of online-specific artworks and therefore do have an impact on the way in which they are made, shown and experienced. In a Deleuzian description of durée, these constituent parts account for the *material thing* of the artwork.

These material qualities, whether perceivable or not, provide an account for two essential points in online-specific artworks:

(1) The way in which they inhabit the temporal milieu of network duration

(2) Their capacity to engage in a multi-faceted way and their specific time experience when interacting with online users.

As presented in the practice, the experimentations between online and offline provided some insights into the possibilities of interacting and exchanging between these two environments. For instance, the web strategies that I instigated to orchestrate a participatory sound event proved to be effective in the case of *Internet Fantasy*, by connecting participants in a distant location and varied chronological time to mine.

In the case of *Entropic Iteration,* the attempt to migrate my spatial encounters offline onto the Web introduced new time experiential aspects to my work. Every time I retrieve the artwork, the time experience of the *live event* meshes with my *pure memory,* when new experiences may emerge, an encounter in durée that is formed through online memory images. This is to say, the network duration can cause new memory experiences due to being attached to the global network of durations. *Entropic Iteration* symbolises the potential of the network duration to offer a new time-experience in relation to our *pure memory* when memory-images are merged in the network duration and are potentially available for endless iteration and global distribution.

The case of *Technography* proved to be different. By taking part in the *Around Hospitality* exhibition, I realised that online-specific artworks such as this are complicated when presented in a spatial gallery context removed from devices that are capable of being online, resulting in inadequate presentation of the work and a lack of meaningful encounter. This is not only as it does not prompt the person encountering the work to perceive it within the right context and the fact

that they are unable to engage as users, but also since it means that the specific set of procedures that takes place when requesting information online does not occur and therefore some of the conceptual relevance of the work is removed.[68] The account of online-specificity in *Internet Fantasy* appeared to be divergent to *Technography*. This is because it uses specific web strategies to register a more active engagement with the realm of in-between–a state that occurs while participants are engaging with the network duration and are simultaneously interacting with one another in the spatial dimension of the gallery hall.

While conceptualising the inner state of human experience, to compare it with the inner state of the network ecosystem, I explored many features of a Bergsonian account of durée with the concept of network duration. These two kinds of duration share multiple features with one another.

For instance, both are realised in a virtual realm, both are comprised of successions and the nature of movement in both is nonlinear. On the other hand, in the network there is the possibility of simultaneous encounters, a feature unfamiliar to Bergsonian pure duration, yet similar to characteristic of durée when the consciousness unwittingly spatialises the experiences of surroundings and projects them within the durée. Bergson analysed that most cases of the encounter of *inner continuity* falls in this category of durée when we *symbolise space* in *duration* (see: 02.03).

As I analysed in chapter two, according to Bergson and Terranova, the human *inner continuity* and the *inner state* of the network both reflect a heterogeneous quality where diverse memories and assets can reside and flow nonlinearly in their durations.

My research suggests that online users lose track of their spatial sense of linear time. This is due to integrating in a diverse environment and dislocating/disorienting their consciousness. The heterogeneous quality of data transit in the network duration (i.e. virtual and nonlinear) and the multiplicities of devices in the network (in which, for example, multiple screens can be viewed at once and where the same information can be sent to anywhere in the world

[68] The displacement of *Technography* demonstrated a similarity with the case in *Five Minute Conversations* when I attempted to migrate the artwork onto the web. Experiments as such, testify to the specificity of the network as well as its limitations in representations (see: appendix).

that is connected) in contrast to homogeneous physical space, establishes an encounter of time experience that is effected by the network materiality and its milieu.

The temporalisation of the art object/experience and the temporal dimensions of a live event in the context of the Internet/WWW unfolds new experiences of time and alters their lifespan in electronic space. Within a lifestyle that is increasingly reliant on the digital online world, it is now indisputable that physical cultures have been significantly influenced by the digital realm of network duration.

Today, we significantly rely on web daily activities and network duration is becoming intertwined with people's lives. Oliver Lerone Schultz analyses this condition as a 'hybrid phenomenon', which is integral with the informational flux within telecommunications media (DCRL, 2014). Almost all of physical reality has an online representation as a virtual experience/existence within the online-specific condition of the network (for example, online banking, online education, online libraries, online news, online galleries, etc.). It is now evident that a share of our memories and sensations are generated as a result of our participation in the network duration.

Considering the continuous progressions and growth of internet/web technologies, as well as their integration into day-to-day activities, we are moving towards a more enhanced, elaborated and effective connection with the duration of the network. Hito Steyerl describes this growing *interlinking* phenomenon as if the Internet/WWW is *moving offline,* indicating that its *becoming more like an offline space-time encounter* (Magagnoli, 2015).

Living with online experiences, activities and artworks gradually effects our impression of offline experiences by intermeshing the two realities of our encounters: the memory images of spatial experiences with our online memories through internet/web materiality. Therefore, the *pure memory* of my generation is manifested and enmeshed with both online and offline memory images forming a new type of *memory reality* as a result of experiencing these two diverse environments.

Even though the *online encounter* of web-based artworks offers a specific time experience, the conscious mind has the potential to mix these *encounters* with other familiar senses of time. Therefore, new forms of temporalities and time-experiences are produced as a result of these mixtures that are in contrast to the linear sense of the time of physical experiences (Viires, 2009). With this in mind, *online specificity* obtains its significance in dynamic forms of communication that reside within society today. While users experience online specificities in web-based artworks, they also construct a web of communication as the participants of the network, forming new temporal qualities when sharing, uploading, exchanging, sending, cutting, pasting and re-blogging them.

My research highlighted these common activities among online users, in addition to researching their implementations when engaging with online-specific artworks. Due to the specific nature of participation within the network, which includes aspects of virtual conditions, nonlinear movements, heterogeneity, live-ness, and temporal connections, the space of the Internet suggests an alternative form of encounter for online-specific artworks.

How we sense the notion of time as durée has been discussed by Henri Bergson and the many scholars who have analysed and developed his theory. However, there has been insignificant research into such a theory when exercised within the environment of the Internet, which is a fundamental aspect of our life today.

My research suggests that interacting with online-specific artworks engage users with an alternative notion of time and space that is particular to the Internet and its network duration. By conceptualising the Bergsonian account of durée within online-specific artworks, my practice-based research, introduces new relations to their time-experience and the act of encountering art associated to the Internet's materiality. This has been presented in the research by conceptualising the Bergsonian account of the *inner experience* of time (where succession occurs without mutual externality) and its representation, reflections, and commonalities with the *inner continuity* (i.e. duration) of the network, comprising of virtual properties, in addition to physical elements such as packet-switching, routers, cables and wires.

In the future, this research can potentially contribute to the context of Digital Humanities. By means of exploration and experimentation in *practice and*

theory, this research provided some analyses into online-specific artworks and their potential relations to the Bergsonian account of durée. Recent research carried out by Rob Kitchin and Martin Dodge in Code/Space (2011), provides a new perspective on how the dyadic integration of various software applications (including the www) has provided a new conception of space (and time) in today's lifestyle. This can be a subject for a future stage of this research project, to follow the scholarly analysis of Kitchin & Dodge, which demonstrates the significance of a lifestyle integrated, impacted and modified by the utilisation of *network related* encounters (Kitchin and Dodge, 2011).

In an environment that is inherently inventive, iterative and alternating, the experience of online-specific artworks suggests an endless and open-ended path. Such conditions and materiality provide suitable settings for participants to directly engage with the artworks in the temporal duration of the network. This is to say, reality in online-specific artworks is inherent in the encounter of their live-ness, their accessibility and their proximity to day-to-day activities. Such works of art are attached to the heterogeneous networks flowing in virtual non-spatial realms, while they maintain the capacity to be materialised into physical spaces through various means of network strategy.

Bibliography

Ascott, R. (1994) *The Architecture of cyberception.* Massachusetts: MIT Press.

Barthes, R. (1977) 'The death of the author' in *Image-Music-Text.* New York: Noonday Press.

Baumgartel, T. (2005) *[net.art 2.0]: new materials towards net art.* Nurnberg: Verlag Fur Moderne Kunst.

Benjamin, A. ed. (2005) *Walter Benjamin and art.* London: Continuum.

Bergson, H. (1910) *Time and free will, an essay on the immediate data of consciousness.* Translated from French by F. L. Pogson, Edinburgh: Riverside Press.

Bergson, H. (1911) *Creative evolution.* Translated from French by Arthur Mitchell. New York: Henry Holt and Company.

Berners-Lee, T with Fischetti, M, (1999) *Weaving the Web – The original design and ultimate destiny of the World Wide Web by its inventor.* New York: HarperCollins.

Bessis, N. Dobre, C. ed. (2014) *Big data and internet of things: a roadmap for smart environments.* Cham: Springer International Publishing.

Bishop, C. ed. (2006) *Participation, documents of contemporary art.* London: Co-published by Whitechapel Gallery and The MIT Press.

Bishop, C. (2012) *Artificial hells: participatory art and the politics of spectatorship.* London and New York: Verso Books.

Bosama, J. (2011) *Nettitudes: let's talk net art.* Rotterdam: NAi Publishers and Amsterdam.

Bourriaud, N. (1998) *Relational aesthetics.* Translated from French by Simon Pleasance & Fronza. Paris: Les presses du réel.

Bourriaud, N. (2002) *Postproduction: culture as screenplay: how art reprograms the world.* Translated from French by Jeanine Herman. New York: Lukas & Sternberg.

Bourriaud, N. (2009) *The radicant.* Translated from French by James Gussen and Lili Porten. New York: Sternberg Press.

Brett, G. (1968) *Kinetic art, the language of movement*. London: Studio-Vista Ltd.

Brett, G. (2000) *Force fields: phases of the kinetic*. London: Hayward Gallery.

Broeckmann, A. (2016) *Machine art in the twentieth century*. Cambridge, MA: The MIT Press.

Buchloh, B.D.H; Heywood, R.E; Rodenbeck, J. F. (1999) *Experiments in the everyday: Allan Kaprow and Robert Watts, events, objects, documents.* New York: Columbia University, Miriam and Ira D. Wallach Art Gallery.

Burgmann, V. (2016) *Globalization and labour in the twenty-first century*. New York: Routledge.

Burnham, J. (1968), Beyond modern sculpture: *the effects of science and technology on the sculpture of this century*. New York: George Braziller

Castells, M. (2000) *The rise of the network society*. Malden: Blackwell Publishers Print.

Cerf, C; Fall, K. R; Stevens, R.W. (2012) *TCP/IP illustrated. Vol. 1, The protocols.* Upper Saddle River: Addison-Wesley.

Causey, A. (1998) *Sculpture since 1945.* Oxford: Oxford University Press.

Chan, J. (2013) *You are here*, *art after the internet.* edited by Omar Kholeif. London: Cornerhouse and SPACE.

Cook, S. ed. (2016) *Information* (*documents of contemporary art*). Whitechapel Gallery, London: Whitechapel and The MIT Press.

Corby, T. ed. (2006) *Network art: practices and positions.* London: Routledge, Taylor & Francis Ltd.

Cornell, L. & Halter, E. eds. (2015) *Mass effect: art and the internet in the twenty-first century*. Cambridge, Massachusetts, London: The MIT Press.

Cilliers, P. (1998) *Complexity and postmodernism: understanding complex systems.* London: Routledge.

Clarke, B. and Hansen, M. (2009) *Emergence and embodiment: new essays on second-order systems theory*. Durham [N.C.]: Duke University Press.

Creedy, J. (1970) *The social context of art*. London: Tavistock Publications.

Einstein, A. (1920) *Relativity, the special and general theory*. Translated by Robert W. Lawson. New York: Henry Holt.

Frieling, R. & Daniels, D. eds. (2004) *Medien kunst netz = Media art net*. Trans: Brian Currid, Gloria Custance, Rebecca van Dyck, Tom Morrison, Michael Robinson, Jennifer Taylor-Gaida. Wien; London: Springer.

Gabo, N. (1920) *Manifesto of realism*. Moscow: Gustav Klucis exhibition's poster.

Galloway, A. (2004) *Protocol: how control exists after decentralization*. Cambridge, Mass: MIT Press.

Gehl, R. (2011) *The archive and the processor: the internal logic of web 2.0. new media and society*. Chicago: SAGE Publishing.

Geng, H. ed. (2017) *Internet of things and data analytics*. Hoboken,; New Jersey: John Wiley & Sons, Inc.

Godfrey, M. (2012) *Alighiero Boetti – Game Plan*. London: Tate Publishing.

Governor, J. & Hinchcliffe, D. & Nickull, D. (2009) *Web 2.0 architectures: what entrepreneurs and information architects need to know*. Sebastopol: O'Reilly Media.

Gray, C. & Malins, J. (2004) *Visualizing research: a guide to the research process in art and design*. Hampshire: Ashgate Publishing.

Green, R. (2004) *Internet art*. London: Thames & Hudson Ltd.

Hammer, M. (2000) *Constructing modernity: the art and career of Naum Gabo*. New Haven & London: Published by Yale University Press.

Hulten, K. G. and Hunter, S. (1965) *Two kinetic sculptors: Nicolas Schoffer and Jean Tinguely*. New York: October House Inc.

Hultén, P. (1975) *Jean Tinguely: 'Méta' / K.G. Pontus Hultén*. Translated from German by Mary Whittall, London: Thames and Hudson.

Ippolito, J. (2002) 'Ten Myths of Internet Art', *Leonardo journal,* vol. 35, no 5, pp. 485-487. Cambridge: The MIT Press.

Ippolito, J. & Rinehart, R. (2014) *Re-collection: art, new media, and social memory*. U.S.: MIT Press.

Kaprow, A, and eds. Rosen, B and Unterdöfer, M. (2007) *Allan Kaprow: 18/6: 18 happenings in 6 parts.* Göttingen: Steidl.

Kelly, A. (2008) *Caught in the act: the viewer as performer*. Ottawa: National Gallery of Canada.

Kitchin, R. and Dodge, M. (2011) *Code/Space: software and everyday life.* London: Massachusetts Institute of Technology.

Lee, P. (2004) *Chronophobia, on time in the art of the 1960s*. Massachusetts: The MIT Press.

Lee, H. and Liebenau, J. (2000) 'Time and the Internet at the Turn of the Millennium', *Time & Society*, 9(1), pp. 43–56.

Lippard, L. (1973) *Six years: the dematerialization of the art object from 1966 to 1972.* London: Studio Vista.

Loeffler, C., & Ascott, R. (1991). Chronology and Working Survey of Select Telecommunications Activity. *Leonardo, 24*(2), 236-240.

Lunenfeld, P. (2000) *Snap to grid, a user's guide to digital arts, media, and cultures*. Cambridge, Mass.: MIT Press.

Magagnoli, P. (2015), *Documents of Utopia, The Politics of Experimental Documentary*, London; New York: Wallflower Press.

Malina, F. (1974) *Kinetic art: theory and practice.* Leonardo, New York: Dover Publications.

Massumi, B. (1998) 'Sensing the Virtual, Building the Insensible' in *Architectural Design,* 68, no. 5/6, p.16-25.

McLuhan, M. & Quentin, F. (1967) *The medium is the massage: an inventory of effects.* New York; London; Toronto: Bantam books.

Medosch A. (2016) *New tendencies: art at the threshold of the information revolution (1961 - 1978).* Massachusetts: MIT Press.

Moholy-Nagy, L. & Kemény, L. (1912) *Dynamic constructive system of forces.* Berlin: Der Sturm.

Monk, P. (2003) *The split of the unconscious: 24-hour psycho.* In: Groom, A. ed. (2013) *Time.* London: Co-published by Whitechapel Gallery and The MIT Press, pp. 131-132.

Moure, G. (2009) *Marcel Duchamp, works, writings and interviews*. New York: Distributed Art Publishers.

Pakesch, P. (2005) *Moving parts, forms of the kinetic*. Koln: Walther Konig.

Panayiota, T. (2009) 'Reconceptualising 'time' and 'space' in the era of electronic media and communications', *Journal of Media and Communication,* Vol.1 (July 2009): 11-32. London School of Economics and Political Science and Swansea University, United Kingdom.

Paul, C. (2015) *Digital art.* London: Thames & Hudson Ltd.

Popper, F. (1968) *The origin and development of kinetic art.* New York: New York Graphic Society.

Popper, F. (1975) *Art: action and participation.* New York: Studio Vista Books and New York University Press.

Rantanen, T. (2005) *The media and globalisation.* London: Sage.

Respini, E. ed. (2018) *Art in the age of the internet: 1989 to today.* Boston, Massachusetts: The Institute of Contemporary Art,; New Haven, CT: Yale University Press.

Schwarz, A. (1997) *The complete works of Marcel Duchamp. Vol. 2.* London: Thames & Hudson.

Sebesta, R.W. (2015) *Programming the World Wide Web.* Boston: Pearson.

Shanken, E. (2009) *Art and electronic media*. London: Phaidon Press.

Shanken, E. A. ed. (2001) *From cybernetics to telematics: the art, pedagogy, and theory of Roy Ascott,* forthcoming in Roy Ascott, *Telematic embrace: visionary theories of art, technology, and consciousness.* Berkeley: University of California Press.

Sheldon, T. (2001) *McGraw-Hill Encyclopedia of Networking & Telecommunications.* Berkeley, Calif.: Osborne.

Sillars, L. ed. (2009) *Joyous machines: Michael Landy and Jean Tinguely*. Liverpool: Tate Liverpool.

Stallabrass, J. (2003) *Internet art: the online clash of culture and commerce*. London: Tate Publications.

Stott, T. (2015) *Play and participation in contemporary arts practices.* New York: Routledge.

Tinguely, J. (1959) *Static, static, static!.* London: Institute of Contemporary Arts.

Tribe, M. & Jana, R. (2006) *New media art*. Cologne: Taschen.

Usselmann, R. (2003) 'The dilemma of media art: cybernetic serendipity at the ICA London', *Leonardo journal*, Vol. 36, No. 5, pp. 389-396. Massachusetts: The MIT Press.

Virilio, P. (2000) *The Information Bomb,* Translated Chris Turner. Verso UK: London, US: New York.

Vise, D. (2008) *The Google story: for Google's 10th birthday*. New York: Delta.

Weibel, P. & Druckrey, T. (2001) *Net_condition, art and global media.* Cambridge, MA & London, UK: MIT Press.

Wilson, S. (2002) *Information arts*: *intersections of art, science, and technology.* United States of America: MIT Press.

Wright, R. (2013) *Toward a lexicon of usership.* Eindhoven: Van Abbemuseum.

Webography

Antoine, J. (1966) *An interview with Marcel Duchamp*. Published web only by: The Art Newspaper. [Internet]. Available from: <http://old.theartnewspaper.com/articles/An-interview-with-Marcel-Duchamp/29278> [Accessed: 11 April 2017].

Ascott, R. (1983) *La plissure du texte.* [Internet]. Available from: <http://alien.mur.at/rax/ARTEX/PLISSURE/plissure.html> [Accessed: 2 May 2017].

Baldes, P. (2007) *Hypertemporality animations.* [Internet]. Available from: < http://rhizome.org/editorial/2007/apr/25/peter-baldes-hypertemporality-animations/> [Accessed: 2 May 2017].

Bennett, C. G. (2008) *Substantive thoughts? the early work of Alighiero Boetti.* Source: October, Vol. 124, Postwar Italian Art (Spring), pp. 75-97, Published by: The MIT Press Stable. [Internet]. Available from: <http://www.jstor.org/stable/40368501> [Accessed: 10 December 2016].

Cisco. (1999) *Internet protocols.* [Internet]. Available from: <https://www.cisco.com/cpress/cc/td/cpress/fund/ith2nd/it2430.htm> [Accessed: 2 May 2017].

Critical Practice. (2016) *Transacting; a market of values.* [Internet]. Available from: <http://www.criticalpracticechelsea.org/wiki/index.php?title=TransActing_Programme> [Accessed: 2 May 2017].

DCRL, Digital Culture Research Lab. (2014) *DCRL Questions: Oliver Lerone Schultz.* [Internet]. Available from: <http://collect.lerone.net/181515/4200692> [Accessed: 3 May 2017].

Dullaart, C. (2011) *Sleeping internet.* [Internet]. Available from: <http://thesleepinginternet.com/> [Accessed: 2 May 2017].

Hogan, M. and Shepherd, T. (2015) *Information ownership and materiality in an age of big data surveillance.* Journal of Information Policy, Vol.5, pp. 6-31 Published by: Penn State University Press Stable. [Internet]. Available from: <http://www.jstor.org/stable/10.5325/jinfopoli.5.2015.0006> [Accessed: 09 March 2017].

IBM Newsroom (2011) *IBM STUDY: Digital Era Transforming CMO's Agenda, Revealing Gap In Readiness* [Internet]. Available from: <https://www 03.ibm.com/press/us/en/pressrelease/35633.wss#release> [Accessed: 4 April 2016].

Kuo, M. (2008) *Open score by Robert Rauschenberg, 9 evenings: theatre and engineering by Billy Klüver, Julie Martin and Barbro Schultz Lundestam*. Source: TDR (1988-), Vol. 52, No. 4 (Winter), pp. 194-196 Published by: The MIT Press Stable. [Internet]. Available from: <http://www.jstor.org/stable/25145563> [Accessed: 11 December 2016].

Kurve, A., Kotobi, K. & Kesidis, G. (2013) *Complex adaptive systems modeling.* [Internet] Available from:<https://casmodeling.springeropen.com/articles/10.1186/2194-3206-1-12> [Accessed: 26 April 2013].

Lambert, N. (2009) *Computer Art Thesis*. [Internet] Available from: <http://computer-arts-society.com/static/cas/computerartsthesis/> [Accessed: 29 September 2016].

Le Parc, J. (1968) *GRAV*. [Internet]. Available from: <http://www.julioleparc.org/g.r.a.v.html> [Accessed: 11 April 2017].

Leegte, J. R. (2000) *Scrollbar composition.* [Internet]. Available from: < http://carrollfletcheronscreen.com/2016/07/31/jan-robert-leegte/> [Accessed: 2 May 2017].

Lialina, O. (1996) *My boyfriend came back from the war*. [Internet]. Available from: <http://www.teleportacia.org/war/> [Accessed: 2 May 2017].

MOMA Online (2017) *Alighiero Boetti – Game Plan.* [Internet]. Available from: <https://www.moma.org/interactives/exhibitions/2012/boetti/#imgs-large/Boetti_Lampada-annuale_1966.png> [Accessed: 2 May 2017].

Namazi, M. (2017) *Technography.* [Internet]. Available from: < http://www.mohammadnamazi.com/technography/technography.html> [Accessed: 2 May 2017].

O'Doherty, B. ed. (1967) *Aspen 5+6* . Roaring Fork Press, NYC: [Internet]. Available from: <http://www.ubu.com/aspen/aspen5and6/index.html> [Accessed: 23 October 2018].

Office for National Statistics. (2016) *UK labour market: October 2016.* [Internet]. Available from: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/> [Accessed: 11 April 2017].

O'Reilly, T. (2009) *What is web 2.0.* published by O'Reilly Media, E-book. [Internet]. Available from: <http://www.oreilly.com/pub/a/web2/archive/what-is-web-20.html> [Accessed: 3 May 2017].

Quaranta, D. (2011) *Healing the media.* Constant Dullaart exhibition, Fabio Paris Art Gallery, [Internet]. Available from: <http://domenicoquaranta.com/public/CATALOGUES/2012_04_DULLAART_ENG.pdf> [Accessed: 2 May 2017].

Rhizome, Org. (2017) *Net art anthology*. [Internet]. Available from: <https://anthology.rhizome.org/> [Accessed: 2 May 2017].

Schwab, M. (2003) *Early computer art and the meaning of information experiments in art and technology.* [Internet]. Available from: http://www.seriate.net/Early_Computer_Art.pdf> [Accessed: 5 May 2017].

SFMOMA. (2008) *Art of participation: 1950 to now.* [Internet]. Available from: <http://www.sfmoma.org/exhib_events/exhibitions/306> [Accessed: 11 April 2017].

Stalbaum, B. (1998) 'Aesthetic conditions in art on the network: beyond representation to the relative speeds of hypertextual and conceptual implementations', Vol: 4, N: 2, *Switch journal* [Internet]. Available from: <http://switch.sjsu.edu/archive/web/v4n2/brett/index.html> [Accessed: 11.09.2019].

Stuart, K (2009) *Interview with Roy Ascott*. London: Frieze Publishing [Internet]. Available from: <https://frieze.com/article/roy-ascott> [Accessed: 15 October 2018].

Tate Modern Online (2017) *Alighiero Boetti – Game Plan.* [Internet]. Available from:< http://www.tate.org.uk/whats-on/tate-modern/exhibition/alighiero-boetti-game-plan> [Accessed: 2 May 2017].

Taylor & Francis. (April, 1968) *Experiments in art and technology*. International Institute for Conservation of Historic and Artistic Works, Vol. 8, No. 2, p. 12, Published by: Taylor & Francis, Ltd. [Internet]. Available from: <http://www.jstor.org/stable/3178972> [Accessed: 11 December 2016].

Thompson & Craighead. (2012) *A Live Portrait of Tim Berners-Lee* [Internet]. Available from: <https://www.scienceandmediamuseum.org.uk/what-was-on/open-source> [Accessed: 10 May 2016].

Toy, M. Ed. (1995), *Architects in Cyberspace*, Architectural Design, London. [Internet]. Available from: <https://monoskop.org/images/2/2d/AD_118_Architects_in_Cyberspace_1996.pdf> [accessed: 2 April 2018].

Transart Triennale (2016) *Internet fantasy in what way?*. [Internet] Available from:<http://www.transarttriennale.org/participants/> [Accessed: 2 May 2017].

Usselmann, R. (2003) *The dilemma of media art: cybernetic serendipity at the ICA London*. Source: Leonardo, Vol. 36, No. 5, pp. 389-396. Published by: The MIT Press. [Internet]. Available from: <http://www.jstor.org/stable/1577522> [Accessed: 28 February 2017].

Viires, P. (2009) *In Search of the Lost Aura*. Massachusetts Institute of Technology: [Internet]. Available from: <http://web.mit.edu/commforum/legacy/mit6/papers/Viires.pdf > [Accessed: 19 September 2018].

Wright, S. (2007) *Users and Usership of Art: Challenging Expert Culture*. [Internet]. Available from: <http://transform.eipcp.net/correspondence/1180961069> [Accessed: 13 April 2018].

Wu, T. (2003) *Network neutrality, broadband discrimination, journal on telecom and high tech law*. Retrieved 23 Apr 2014, [Internet]. Available from: <http://www.jthtl.org/content/articles/V2I1/JTHTLv2i1_Wu.PDF> [Accessed: 11 April 2017].

Zanni, C. (2004) *Ebay landscape*. [Internet]. Available from: <https://vimeo.com/95398340> [Accessed: 2 May 2017].

Glossary of the Images

Chapter 1.

Figure 1.1; page 17. HTML document, location.405, *Technography* series, 2016, Mohammad Namazi. Available at: www.mohammadnamazi.com/

Figure 1.2; page 18. CSS document, location.405, *Technography* series, 2016, Mohammad Namazi. Available at: www.mohammadnamazi.com/technography/location.405.html

Figure 1.3; page 21. Screenshots from location.405, *Technography*, 2016, Mohammad Namazi. Available at: www.mohammadnamazi.com

Figure 1.4; page 23. Screenshots from location.406, *Technography*, 2016, Mohammad Namazi. Available at: www.mohammadnamazi.com/technography/location..406.html

Figure 1.5; page 25. Screenshots from Location.580, *Technography*, 2016, Mohammad Namazi. Available at: www.mohammadnamazi.com/technography/location.580.html

Figure 1.6; page 25. Screenshots from Location.641, *Technography*, 2016, Mohammad Namazi. Available at: www.mohammadnamazi.com/technography/location.641.html

Figure 1.7; page 27. Visualisation of the network of networks and their connectivity. Mohammad Namazi.

Figure 1.8; page 28. Centralised, decentralised and distributed network models by Paul Baran (1964), part of a RAND Institute study to create a robust and nonlinear military communication network. Source: Encyclopaedia of Telecommunication, Sheldon, 2001

Figure 1.9; page 29. Screenshot of Skype application page for text/data exchange. Here I am sharing some of the *Technography* series with another user.

Figure 1.10; page 31. Screenshot from *_readme.html*, net.art, 1996, Heath Bunting.

Figure 1.11; page 32. Screenshot of a glitch in the network on 2018-07-05 at 11.18.43.

Figure 1.12; page 33. Where datagram fit into the TCP/IP protocol scheme. Source: Encyclopaedia of Telecommunication, Sheldon, 2001

Figure 1.13; page 34. TCP in relation to UDP, IP, and applications. Source: Encyclopaedia of Telecommunication, Sheldon, 2001

Chapter 2.

Figure 2.4; page 64. Screenshot from Google Maps indicating a journey from Tehran to Zürich to London.

Figure 2.5; page 67. Naum Gabo, *Standing Wave,* 1920. Available at: www.tate.org.uk/art/artworks/gabo-kinetic-construction-standing-wave-t00827

Figure 2.6; page 68. An illustration of the network representing how packets should travel through heterogeneous pathways in the network.

Figure 2.7; page 70. *Location.580*, installation view at the exhibition *Around Hospitality, Baltic 39*, 2016. Mohammad Namazi

Figure 2.8; page 75. *My Boyfriend Came Back from the War*, 1996, Olia Lialina. Available at: *Lialina Online:* www.teleportacia.org/war/

Figure 2.9; page 76. *My Boyfriend Came Back from the War*, 1996, Olia Lialina. Rhizome Net Art Anthology, Photo: Franz Wamhof. Available at: www.rhizome.org/editorial/2016/nov/10/my-boyfriend-came-back-from-the-war/

Figure 2.10; page 81. *A Live Portrait of Tim Berners-Lee* (2012), Thomson & Craighead. This image is a screenshot from the video where artists discussing this work. Available at: www.scienceandmediamuseum.org.uk/what-was-on/open-source

Figure 2.11; page 83. Screenshots from *Technography location.640*, 2015. Mohammad Namazi

Figure 2.12; page 84. *My Boyfriend Came Back from the War*, 1996, Olia Lialina. Available at: *Lialina Online:* www.teleportacia.org/war/

Figure 2.13; page 84. *My Boyfriend Came Back from the War*, 1996, Olia Lialina. Available at: *Lialina Online:* http://www.teleportacia.org/war/

Figure 2.14; page 90. Photo representing a moment in the encounter of *location.630*, HTML5, CSS, 2016, Mohammad Namazi. Available at: www.mohammadnamazi.com/technography/location.630.html

Figure 2.15; page 94. Participants are using their portable devices to engage with *Internet Fantasy,* creating various sound arrangements that are sourced from the web, Transart Triennale, Berlin, 2016. Mohammad Namazi

Chapter 3.

Figure 3.17; page 124. *Lampada Annuale,* 1966, Alighiero Boetti. Available at: *MoMA Online:* www.moma.org/multimedia/audio/318/3798

Figure 3.18; page 126. Detail from a screenshot showing the audio-play icons in *Internet Fantasy* on a screen device.

Figure 3.19; page 127. Allan Kaprow, *18 Happenings in 6 Parts,* 1959, Reuben Gallery, New York

Figure 3.20; page 130. Telephone cable pole, London, 2018. Mohammad Namazi.

Figure 3.21; page 131. Bottle-Rack (original 1914, lost), Marcel Duchamp. Photograph is by Man Ray Collection, The Museum of Modern Art, New York.

Figure 3.22; page 132 Jan Robert Leegte, *Scrollbar Composition, 2000*. Available at: *Carroll / Fletcher Onscreen Online:* http://carrollfletcheronscreen.com/2016/07/31/jan-robert-leegte/

Figure 3.23; page 134. *Sleeping Internet,* 2011, Constant Dullaart. An iteration of the functioning Google home page

Figure 3.24; page 137. Screenshot from the interface of Adobe Photoshop CC when making GIF animations. In the right hand side of the image resembles how each photograph is inserted in each layer. The bottom of the page shows the *Timeline* of the animation.

Figure 3.25; page 137. The universal attributes of the HTML audio tag. The audio tag always includes the note *'Your browser does not support the audio tag',* for an anticipated occasion that the browser is incompatible with the audio attributes. However, such occasions are very rare with the recent development in most of the browser applications.

Figure 3.26; page 138. *Entropic Iteration*, *fountain.713*, Mohammad Namazi

Figure 3.27; page 139. A device was available for visitors to go online to encounter various series of *Entropic Iteration,* Installation view at *Entropic Iteration* (2016), Corner College, Zurich, Switzerland. Mohammad Namazi

Figure 3.28; page 140. Installation view at Entropic Iteration (2016), Corner College, Zurich, Switzerland. Mohammad Namazi

Figure 3.29; page 141. *Entropic Iteration*, *fountain.702*, Mohammad Namazi

Figure 3.30; page 141. *The Third Memory*, 1999, Pierre Huyghe. Two-channel video. Available at: *Guggenheim Online;* https://www.guggenheim.org/artwork/10460

Figure 3.31; page 142. *Image Objects*, 2011, Artie Vierkant. Prints on aluminum composite panel, altered documentation images

Figure 3.32; page 144. *The Pleasure of the Text,* 1983, Roy Ascott. Available at: *ISEA 2011 Istanbul Online:* https://isea2011.sabanciuniv.edu/paper/reading-la-plissure-du-texte-backwards

Figure 3.33; page 145. *The Pleasure of the Text,* 1983, Roy Ascott. Available at: *ISEA 2011 Istanbul Online:* https://isea2011.sabanciuniv.edu/paper/reading-la-plissure-du-texte-backwards

Figure 3.34; page 153. Installation view at Around Hospitality, Baltic39, Newcastle, 2016. Mohammad Namazi

Figure 3.35; page 153. Installation view at Around Hospitality, 2016. In this photo Hanging Spring is placed in the centre of the image. Baltic39, Newcastle, 2016. Mohammad Namazi

Figure 3.36; page 154. Installation view of the studio space, Around Hospitality, Baltic39, Newcastle, 2016. Mohammad Namazi

Figure 3.37; page 155. Location.580, installation view at Around Hospitality, Baltic39, Newcastle, 2016. Mohammad Namazi

Figure 3.38; page 155. Food Politics, approx. 59 min video, presented at Around Hospitality, Baltic39, Newcastle, 2016. Mohammad Namazi

Figure 3.39; page 156. Screenshot from video documentation of Around Hospitality made by Baltic Centre for Contemporary Art in 2016. Here visitors are captured while being engaged with the encounter of live events in Hanging Spring. Mohammad Namazi

Figure 3.40; page 157. Arduino application interface (top left). An early Arduino board RS-232, (top right)
Sample of Arduino codes (bottom left). An example of a vibrator DC motor (right bottom). Mohammad Namazi

Figure 3.41; page 158. Hanging Spring (detail), installation view at Around Hospitality, Baltic39, Newcastle, 2016. Mohammad Namazi

Visit at Getty Special Collection Archive

800 views of airports / Fischli & Weiss

955,000: an exhibition / Lippard, Lucy R. ID: 91B16462

A Caterpillar anthology : a selection of poetry and prose from Caterpillar magazine. Box 74, f2

Art 1963 – a new vocabulary : October 25 – November 7, 1962 : a catalogue and guide to the exhibit : [galley proofs]

Carolee Schneemann papers, Schneemann, Carolee, 1939, Box 74

Catalogue of the Festival of Expanded Cinema : Institute of Contemporary Arts, London : 4 – 11 January 1976, Box 74, f6

Dwan Gallery publications and ephemera. Dwan Gallery (New York, N.Y.) Flat file folder 1

E.A.T. news. Experiment in Art and Technology (Organisations) v. [1-2] [1967-68]

Expanded cinema, Youngblood, Gene, 1942, Box 74

Experiment in Art and Technology records, Box 17, Box 22, Box 5, (projects and publications)

Harald Szeemann papers. Szeemann, Harald, creator. Box 1237

High performance magazine records. High performance. Box 203, Box 8.

Jean Brown papers, Brown, Jean, 1911 – 1994. Box 182, Box 6.

Jean Tinguely, Hanover Gallery. Tinguely, Jean, 1925 – 1991.

Le Parc : Denise Rene, Paris : November – December 1966. Le Parc, Julio, 1928-

Long Beach Museum of Art Video Archive. Box 175, Box 31.

Lucy Lippard. 2006.M.7 Box 175.

Sixpack. Carolee Schneemann, Jean Brown Collection, Box 74, f4, ID: 950001

Stichting Festival Arnhem presenteert. Sektie Beeldende Kunst. Box 74, f8.

The satellite art project. 2006.M.7 Box 31.

Time and space concepts, II : in event art : a symposium, Box 74, f9.

Unmuzzled ox. Box 74, f5.

Women artist filmmakers. Box 74, f7.

Hole in space – documentation of installation, Box 74, f7.

Metamatic drawing. Tinguely, Jean, 1925 – 1991, artist. 1 Box.

ELAC, Centre d'Echanges de Perrache, Niveau 4, 69002 Lyon. Box 74, f10.

Exhibitions

Internet Fantasy in What Way?, Transart Triennale, group exhibition and performance, Berlin, Germany

Entropic Iteration, Solo exhibition at Corner College project space, Zurich, Switzerland

The Shift, 'Conceptual Yard Sale', group exhibition at Flat Time House, London, UK

Around Hospitality, Solo exhibition at BALTIC 39, Contemporary Art Project Space, Newcastle, UK

All of this is Temporary, group exhibition at Richmix, London, UK

Outside the White Cube, video screening from the series Around Food, Metro Manila, Philippines

Kinesis & Stasis, Five Minute Conversations, sound installation, Barbican Art Centre, Auditorium Foyer, London, UK

Action Space Inflatable event, participatory sound performance, Rootstein Hopkins, London, curated by Mo Throp

TransActing: A Market of Values, Parade ground in front of Tate Britain, Curated by Critical Practice

Riotous Cities, Internet online project, in association with Open Work projects, Curated by Vanessa Saraceno

Taste After Bourdieu, Banqueting Suite, Millbank, London

Process Practice Play, 1st year PhD exhibition, Triangle Space, London, Curated by Vanessa Saraceno

Artist Talks

Entropic Iteration, Artist talk at Corner College project space, Zurich, Switzerland

Kinesis & Stasis, Temporal Representation, Barbican Art Centre, Auditorium Foyer, London, UK

UAL Research Centre, Temporal Art Wroks and their Possibilities, Chaired by Dr Russell Bestley, London, UK

EduEDA - The Educational Encyclopedia of Digital Arts, interview and profile, University of Florence, Italy

Jadid Online, The Language of Humanity, Online audio and visual interview, London, UK

What is Research in Art Practice? Keynote speaker: Wayne Clements, Banqueting Suite, Millbank, London, UK

Appendices

<u>One Day in the Street</u>

Works of art deploying participatory features began to form critical discourse from the early 1960s. This is evident in the practice of the group GRAV that emerged in 1960 in Paris and remained active until 1968. GRAV joined a wave of movements seeking autonomy from art through a closer relationship between the artist and society. They believed in anonymous and impersonal art. In their manifesto from 1967, GRAV stated:

'Through provocation, through the modification of the conditions of environment, by visual aggression, by a direct appeal to active participation, by playing a game, or by creating an unexpected situation, to exert a direct influence on the public's behaviour and to replace the work of art or the theatrical performance with a situation in evolution inviting the spectator's participation' (GRAV in Bishop, 88, 2012).

The uniqueness of the group is that its starting point was sociological rather than visual. They rejected the egoism and self-indulgence associated with Art Informel and Abstract Expressionist painters. Indeed, a utilitarian approach to art was emphasised in contrast to a functionless authentic art. This ideology encouraged them to publish 'Assez de Mystifications!' (Enough Mystifications!) in 1963 (Bishop, 2012). For example, *'One Day in the Street'* – an event organised by GRAV in April 19, 1966 in Paris, critiqued the segregation between art and life. Clare Bishop reads GRAV's *One Day in the Street* as:

… [it] was carnivalesque: a single, exceptional day of ludic events designed to enliven social interaction and create a more physically engaged relationship to public space. GRAV looked to the amusement park, which they perceived to be a place where time is in motion, rather than accumulated (as in museums) (Bishop, 91, 2012).

The overall aesthetics of the work deconstructed the hierarchical expectations imposed by art in a museum context and created temporal situations in public space where people from different backgrounds became involved (Le Parc, 1968). GRAV utilised a similar approach to Kaprow in developing potential methods to engage the spectators in a real-time production process. Within the framework of an event (e.g. *One Day in the Street*) passers-by were invited to take part and collaborate in the realisation process of a temporary series of activities in the urban space. Various participatory methodologies (such as having people walk on uneven blocks of wood and/or experience a distorted world by wearing elaborate distorting spectacles) were employed to engage participants with momentary experiences– aiming to educate and familiarise passers-by with alternative accessible forms of art (Popper, 1975).

Figure 1. One Day in the Street, GRAV, 1968

GRAV used a series of time-based and kinetic sculptures in events that emphasised *'polysensorial environments'* –as a means to encourage the public to rethink and transform the '*conventional experience of time*' (Bishop, 88, 2012). This was to ground new understandings in relation to temporal and participatory encounters as the main features of their work. It is these qualities and goals in GRAV's practice that highlights their experimentations as forward thinking in applying the event as a framework for socially oriented artworks.

Codes – Trouvés

In the same vision that Jean Tinguely used readymade and found materials to construct works such as *Homage to New York* (1960) or *Study for an End of the World* (1962), I utilised a combination of readymade and hand-written codes to make some of my web-based artworks. As Tinguely looked for his material within the discarded objects in public spaces or garbage collection factories, I explore for my material in the forums and websites that codes are shared and discussed. In such places, online-users are exchanging their codes, knowledge and experiences with one another.

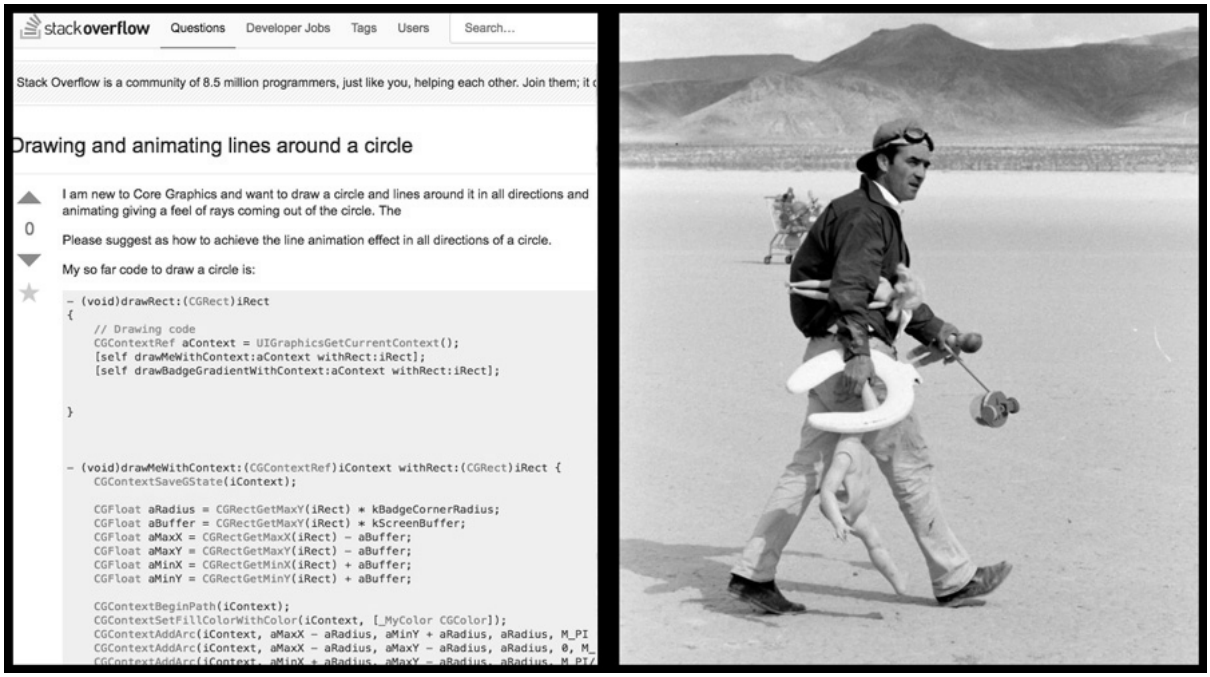

Figure 2. Image on the right: screenshot from Stackoverflow website. Image on the left: Jean Tinguely, searching for found objects in Nevada desert to create Study for an End of the World, No.2 (1962)

Tinguely's desire to engage with attributes of live events is significantly apparent in his *Manifesto for Statics* in 1959.

'…Be static! Be movement! Believe in movement's static quality. Believe in change! Do not hold anything fast. Change! […] Everything around us change. Believe in movement's static quality…' (Tinguely in Hulten, 114, 1975).

The manifesto was an attempt to highlight the temporal aspect of our existence. And due to this point, it can still be relevant to this day when the internet/www is dominating representations of other dimensions of our temporal living

experience. Tinguely expanded the notion of readymade by combining it with time and motion to discover value through his temporal artwork. Tinguely understood that the trash and leftover objects are attached to certain memories and nostalgia due to their figurative shapes. They have the potential to provoke feelings and memories for ex-users, in contrast to pure abstract forms in art that people have no memory of or attachments to. In other words, by provoking such feelings, a Bergsonian notion of duration as *inner continuity* and flux triggers the participant's sense of time by bringing past into present.

The series of *Meta-matics* drawing machines, made by Tinguely (from 1955 to 1959), can reflect exquisitely on the temporal conscious experience of participation. These series of artworks required elements of public participation in order to be completed (Sillars, 15, 2009). In this aspect, they are similar to online-specific artworks, requiring some elements of participation and active engagement e.g. the *Technography* series.

During my visit to Tinguely Museum in Basel in October 2016, I not only observed a number of Tinguely's time-based kinetic artworks in real time, but I also had a chance to experiment with one of his *Meta-matics* drawing machines. The work involved a participation in which every step was systematically designed. First I had to attach a blank sheet of white paper to the metal board and secondly to choose a marker – as well as its colour – and finally to press the foot pedal to engage its motor.

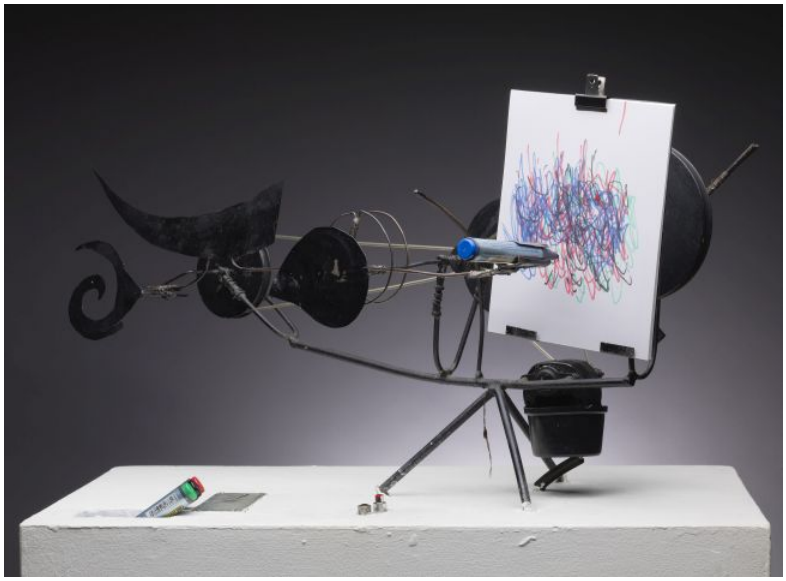

Figure 3. Meta-matics, nr 8. drawing machine, Jean Tinguely, 1959

The moment the motor engages, the skeleton and clamp holding the marker burst into action and a whole series of theatrical movements began. This continued until I cut the power off by releasing the foot pedal. However, I could stop the motor to change the marker with different colours and continue with the drawing. This allowed me to construct a composition and arrangement of my own harmonic choice of colours. When the pre-set timer ended the artwork stopped moving and the drawing was complete. To engage with a live experience of collaboration between myself and the machine, and to go though the process of making the drawing, I obtained a sense of the short timeframe of the making process. However the live experience of the artwork transformed my temporal conscious experience of this procedure into a durational experience – a Bergsonian understanding of inner continuity and flux that remains with me until this day.

The result of my drawing experience with *Meta-matics* is shown below.

Tinguely uses the machine systems metaphorically to address the implications for a society that increasingly relies on machines in their daily lives (Sillars, 2009). By reducing the creation of an artwork to a collaboration between human and machine, Tinguely freed the production of art from its traditional sense and promoted the experience of a live event within its participatory temporal engagements (Sillars, 2009).

Figure 4. Meta-matics drawing, ink on paper, Jena Tinguely and Mohammad Namazi, 2016

Five Minute Conversations

In July 2015, I presented *Five Minute Conversations* as part of a one-day event titled *Transacting; A Market of Values,* curated by Critical Practice at Chelsea College of Art (Critical Practice, 2016). The artwork functioned as an investigational platform where dialogical method and sound performance mediated the production process and included the following two phases:

(1) dialogue with the participants
(2) a sound performance composed by the participants

These two phases transpired within the physical installation of *Five Minute Conversations* at the parade ground in Chelsea College of Art. After the event, I utilised the documented material of phases (1) and (2), to generate an online-specific artwork by exploring post-production and an alternative time-experience that the web can offer as a result of the migration.

The project strove to reduce the role of the artist as *maker,* and instead proposed for artists as *collaborator, co-worker,* and *system-orienteer*. By direct engagement with the participants, through means of dialogue and sound interaction, I investigated how *work* can emerge by the *iteration of data* from an informal dialogue to a sound performance, and then, from the actual event to the www. This dynamic and transformational *process* emancipated various aspects of *Five Minute Conversations*, both within the spatial off-line, and the non-spatial online realm.

The material for *Five Minute Conversations* at the event included the content of the conversations, computer applications for post-production, and a Monotron: a simple synthesiser that generates a wide range of sound frequencies. By spatialising the time of the artwork to *five minutes*, a live-event was constructed to emphasis the transient nature of the artwork. I conversed with seven people at the site, documented the dialogues, making hand-written notes and digitised the highlights. Then, once the participant began performing with a synthesiser, the generated script was read-out by computer application.

This process enabled me to examine how a combination of informal dialogues and sound documents could lead to other forms of representation of the

generated material at the art event.[69] While I conversed with a participant, the following stages were applied:

(1) Taking hand written notes to generate a script
(2) Reviewing the notes with participant for finalising the script
(3) Digitalising the highlights through typing the script in *TextEdit* application
(4) Deploying iTunes application to transform the text into audio files
(5) Playing the audio files once the participant performs with the *Monotron*
(6) Documenting the generated sound for future reference

Figure 5. *Five Minute Conversations*, Transacting; A Market of Values, 2015

The digitalisation of the script of each dialogue would occur promptly post-conversation. Then, once the participant began performing with the Monotron device, simultaneously, the digitalised script was read out through computer speech application. Thus, while participants began engaging and producing sound with the synthesiser, they could listen and perform to their own statements, that we generated in the conversation. This phase was engaging for the passer-by, who observed participants' performance with the synthesiser. Yet they were oblivious that the computer generated speech were the statements of the performer.

The notion of *iteration* and its procedure is prominent throughout the realisations of *Five Minute Conversations*. For instance, in the physical live-event, the process of transferring *the verbal dialogue into text*, and then *into its*

[69] The freedom of expression that *Five Minute Conversations* provided, celebrated the right of individuals to take part in an artwork, sharing their opinion about the role of art in our complex societies. At the same time, the conversations also touched on the geopolitical, social and economic aspects.

digital format, and then *into its sound version,* emphasises the iteration of data in each phase.

The next iteration phase is produced when the generated-data of the live-event is transferred to the web. This procedure occurred through post-production of the documentation of the event (e.g. sound recordings, digitalisation, photography, coding) in order to migrate to the online-space, leading to transformation and new experiences with the space-time of the web.

Figure 6. Monotron, basic synthesiser

The iteration of data in *Five Minute Conversations,* can be also demonstrated through the various modifications of the data-formats. For example, from the initial dialogue phase: the iteration of verbal dialogues ⟶ hand-written texts ⟶ digitalised texts as RTF files ⟶ audio files as MPEG-4 ⟶ re-iterated back into the space and superimposed with the generated Monotron sounds ⟶ recorded again as MPEG-4 files ⟶ coded as HTML files ⟶ iterated into the web.

Due to the dissimilarities of the materiality of the web to the Event location, the experience of the web-based version of *Five Minute Conversations* is divergent from its off-line live-event format. This is due to the internet/web materiality that is inherent in virtuality of a non-spatial realm when information can reside among other data in the network duration and be realised within the nonlinear state of a hyper-text asset.

This condition of electronic media establishes how the duration and temporal dimensions of the physical *artwork-event* can unite with the WWW, to introduce other experiences and extensions of the physical event (Rantanen, 2005). The

transition and migration from off-line to on-line (i.e. from physical to virtual environment) both aspires and limits due to the inherent limitations of HTML coding language and its syntaxes in multiple locations, by many users simultaneously. During this procedure, I deployed the documentation of the live-event as the readymade material for a new artwork on the web. The link to the Web-based version of *Five Minute Conversations* is available at the following URL: 'http://mohammadnamazi.com/Sub-Pages/work.no.598.archive.html'.

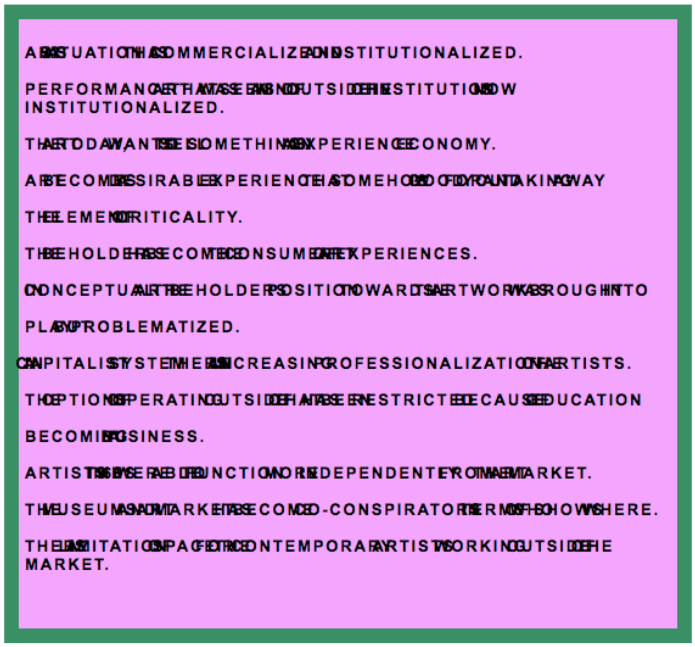

Figure 7. Fragments of Web version of *Five Minute Conversations*, screenshot from animated text

By iterating the project online, the process of post-production, programming and HTML documents introduced new attributes designed to (1), host, enfold and encompass various data-formats (e.g. JPEG/image, MP3/sound, AVI/video, HTML/code, CSS/code) in the virtual space of web-pages and (2), through the juxtaposition of data; codes interfere with the documents and introduce new inter-relations and correspondences between the live-event and its reproduction. This is inherent to the nonlinearity of time in the Internet environment and the capability of moving forwards and backwards in time, (i.e. discrete events can be reachable spontaneously), where simultaneous interactions are possible. Furthermore, re-processing data into the online space, enables the *localised durée,* experienced at the event to extend into the *globalised network durée* of the internet. Thus, it is capable of introducing new experiences, participations and durations; inherent to the virtual space of the web.

Acknowledgements

I would like to thank my supervisory team, Prof. Neil Cummings, Prof. Stephen Scrivener and Dr. Edwina fitzPatrick, for their invaluable and generous support with the construction of this research.

The influences that each of my supervisors had on me provided the momentum to continue and to challenge the difficulties encountered. Prof. Steven Scrivener has been a great influence on my engagement with theory and text. Prof. Neil Cummings visionary thinking on practice gave me new insights into how practice and theory could be incorporated. While Dr. Edwina fitzPatrick's mentoring on the overall features of the research raised my awareness regarding some detailed aspects of my enquiries that otherwise would have remained outside of the scope of the project. Together they provided excellent support and made it possible for this research to get through many challenges and reach its final phase. I thank University of the Arts London and Prof. Malcolm Quinn for providing support and advice, and the research staff at Chelsea College of Arts for their continuous support during my time as a student.

I value all the assistance that I received from curators and art organisers for the case studies presented in the thesis. This includes the curatorial team at BALTIC Centre for Contemporary Art in Newcastle, the Index Collective in Zurich and Transart Triennale in Berlin.

I truly thank my parents for their significant support from a geographical distance. Also, great thanks to all my friends who through their care and support helped with either technical matters or with mentoring, reading and critical feedback on my writing – especially Dr. Mohammad Tabarra, who provided significant support from the early stages of this research. Many thanks also to Amy McDonnell and Catherine Long for their incredible editorial assistance and a special thanks to Karen Di Franco for her extensive help and support on the overall aspects of my research project.

A final thanks must also be made to dear Dr. Paul Ryan, who was the first person to encourage me to carry out this research, which otherwise I might not have begun.