# Lives of Your Smartphones

This paper describes the approaches and outcomes of the author's critical digital art project, *Lives of Your Smartphones* with relevant contextualisation. The project provides a web-based participatory photo collage and displays and accumulates photographs of smartphone handsets submitted by the public. The work makes visible the materiality of digital technology, in particular smartphones and the environmental degradation associated with them concerning geological materiality, e-waste, airborne pollution and planned obsolescence. The practice of the project mobilises the notion and operation of decay to make visible the environmental degradation associated with digital technology through art-led experimental innovation of digital images and programmes. This practice of decay acts as a counternarrative of the techno-capitalism that promotes the immaterial perception of digital technology. The experimental creation involves visual practice and the programming of the temporal operation of the work. The visual practice incorporates mineral and other materially evocative images in interface making. The temporality programming involves the programming of e-waste decomposition, geological processes and simulated planned obsolescence. The paper describes the author's aesthetic approaches to lightweight image-making in

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the project for providing lowered energy consumption in relation to the contextual relevance of the reduction of the impact of the medium of computational art practice.

## Introduction

This paper describes the approaches and outcomes of the author's digital art project *Lives of Your Smartphones* (LOYS). It is a web-based participatory photo collage. It displays photographs of smartphone handsets submitted by the public. The website accumulates smartphone images as more photographs are submitted by the public. In turn, as some days pass, the submitted smartphone images visually decay through a programmed countdown function. The first version of LOYS was presented as a digital installation at arebyte Gallery in London in 2022. The work makes visible the materiality of digital technology, in particular smartphones and the environmental degradation associated with them concerning geological materiality, e-waste, airborne pollution and planned obsolescence.

The author has a strand of art practice which has been developed since 2016. It mobilises the notion and operation of decay to make

visible the environmental degradation associated with digital technology. This will be elaborated on in the next section. In particular, the paper firstly describes how the work drew attention to the geological materiality of smartphones and the environmental degradation that digital technology, such as smartphones, induces. Subsequently, the paper discusses how the work relates to its medium's environmental impact and planned obsolescence.[1]

## Making Visible the Environmental Degradation Induced by Digital Technology

The author's practice at large and LOYS develop an experimental methodology to innovate artworks that visually evoke decay and programme the temporal operation associated with decay. This may appear as a visual practice that evokes, resembles or is inspired by decay, such as material decomposition and ruination. The methodology may involve computer programming the temporal operation of waste decomposition as computational or artistic processes.

Ideologically, the methodology of this practice diverges from the perceived immateriality of digital technologies in a digital culture where they are typically branded with light, shiny devices, pristine interfaces and the ethereal metaphor of the "cloud" (Costantin 2018a; Crawford and Joler 2018). These designs erase (or render non-visible) the materiality of networked digital technology and the environmental degradation induced by it.

Despite the perceived immateriality of digital technologies, Information and Communications Technology (ICT) bears networked computing systems of hardware, software, and social and technical infrastructure. This sustains the Internet. Further, the structure induces various kinds of environmental degradation and hazards. The mining of minerals used for electric equipment, including "green" technologies for achieving net-zero goals, degrades the environment, often in countries of Global South (Pitron 2020; Pitron 2021; Pitron et al. 2021; European Union 2023; Samson and Gallardo 2023).[2] Researcher Marloes de Valk stated the world is "swimming in e-waste" (de Valk 2021); e-waste forms the fastest-growing waste stream in the world (The Design Museum, 2021). E-waste can cause pollution when disposed of in landfills and cause health hazards among locals and informal recycling workers (Gabrys 2011; Crawford 2021). A study remarked that 3.3-3.8% of global greenhouse gas emissions were estimated by the global ICT in 2020 (Marks et al. 2023).

LOYS aims to make visible the digitally induced environmental degradation relevant in these contexts with a focus on the technological

impact of smartphones, by mobilising decay in images and the artwork's operation. The visibility of decay and environmental degradation in artwork can act as a counternarrative of the progress and growth-driven narrative of techno-capitalism (Gabrys 2011; Parikka 2015) where the non-visibility of digitally induced environmental degradation can be seen prevalently.

## Drawing Attention to the Geological Materiality of Smartphones

In the exhibition of the first version of LOYS at arebyte, a ruinous landscape was presented in the work on TV monitors running websites next to a tablet that takes pictures of visitors' smartphone handsets to upload them to the artist's server.

One of the objectives of LOYS was to draw attention to the materiality of mobile phones and their relation to the ground via the extraction of minerals that make up phones and their waste, as well as their related environmental impact. For this objective, the project dealt with a few techniques: experimentally prototyping materially evocative web interfaces and image-based artworks, programming temporal processes associated with e-waste decomposition, and participatory image modification.

### Evoking Materiality, Method 1: Prototyping with Decay

There were two main methods for creating materially evocative images of LOYS. The first approach was to morph the images of smartphone handsets into decaying stones, through AI-based image synthesis based on style transfer. This method has been realised through the artwork's online participation system, currently consisting of JavaScript and PHP, where visitors to the exhibition were able to upload the photographs of their smartphone handsets to the project's server using a tablet and its webcam. Subsequently, the device images were further processed through cropping of images with the handset shapes either automatically or semi-manually where appropriate.

In the exhibition at arebyte, the cropped images were then transferred to and displayed on the artwork where the device images were superimposed onto the landscape image. After the upload, the device was made "alive" with a countdown timer of its lifetime, which is set to 4.7 "virtual years" in the artwork's environment; this amounts to 4.7 days in our clock time. The duration corresponds with the reported average lifetime of smartphones, which is 4.7 years (Crawford and Joler 2018). After the countdown, the device becomes *dead*, designating the obsolescence or non-functioning stage. Soon after this,
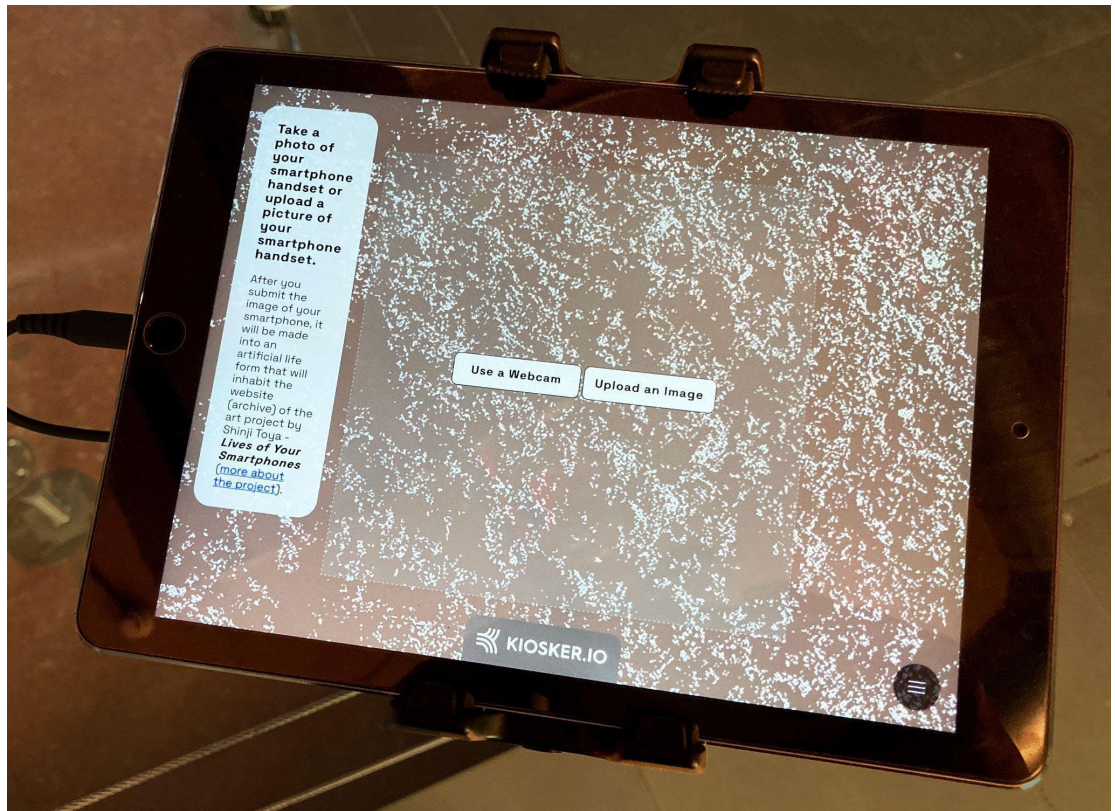
the dead device starts *decaying* with the image transforming with a coarse, muddy texture, which is made with the AI style transfer. The last stage of the devices' transformation is *fossilised* and made with a texture transfer of metallic surfaces. However, some of the decaying images will not reach the stage of fossilisation in a human lifetime, as the decaying process sometimes persists for millions of days (e.g. thousands of years).

The duration of the decay before the fossilisation process in the work is randomly assigned from different ranges of countdown durations that correspond with how long various e-waste components may take to decompose in landfills. For instance, a battery may take one hundred to one million years to decompose, or a glass part may persist for two million years for decomposition (E.R.I. 2015; Hydropac 2019).

The temporal programming of decay and obsolescence relates to the project's aim of drawing attention to the materiality of smartphones that derives from geological materials. The temporality of the work aims to make sensible the enormous disparity between the accelerated temporality of obsolescence and the exceedingly slow temporality of material decay and geological processes.

Minerals in digital devices,[3] such as rare earth elements, took billions of years to be composed through geological processes (Crawford and Joler 2018). When the devices go into a landfill, as seen above, it takes millions of years for the materials to go back into the earth's ecological cycle (Costantin 2018b). This type of geological time (e.g. known

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Fig. 4, 5, 6, and 7. Screenshot images showing different stages of a participant's device.

as deep time) and its slow temporality are immensely unmatched by the temporality of accelerating, programmed obsolescence and consumption (Ploeger 2021) which is often strategically promoted by Big Tech for their economic gain and advantage. The notion of *planned* obsolescence will be discussed further in a later section of the paper.

### Evoking Materiality, Method 2: Landscape

The second method of the work for making materially evocative images is that the artwork shows a semi-abstract, non-existent ruinous landscape on-screen, on which participants' handset images inhabit and decay. The background image is made with a photograph of a ruin marble specimen from the collections of Natural History Museum, London.[4] The materiality of rocks and their geological formation allude to the mineral-based materials of smartphones. The site stages a speculatively depicted landscape with a future waste stream of smartphones.

As of 2022, there were 8.58 billion mobile phones with subscriptions in the world (Richter 2023). In 2018, 1.9 billion mobile phones were projected to be sold globally (The Restart Project 2023). In the UK, only up to 20% of electronics are recycled (Community Repair Network 2024). Where smartphones are not recycled, there could be a vast waste stream in the future.

As Parikka puts it, stones provide readability and possibilities of speculation as a screen to project imagination (Parikka 2015). This relationship between speculation, landscape and rocks (i.e. device-waste) in the work opens up a space of ambiguity, providing a landscape of waste-stream that is neither precisely depicted fictionally nor existent in reality.

## Planned Obsolescence

LOYS deals with planned obsolescence, i.e. an artificially defined lifetime of technology. An early idea of planned obsolescence was articulated with the metaphors of life and death of products (London 1932), which framed new products as being alive and obsolete
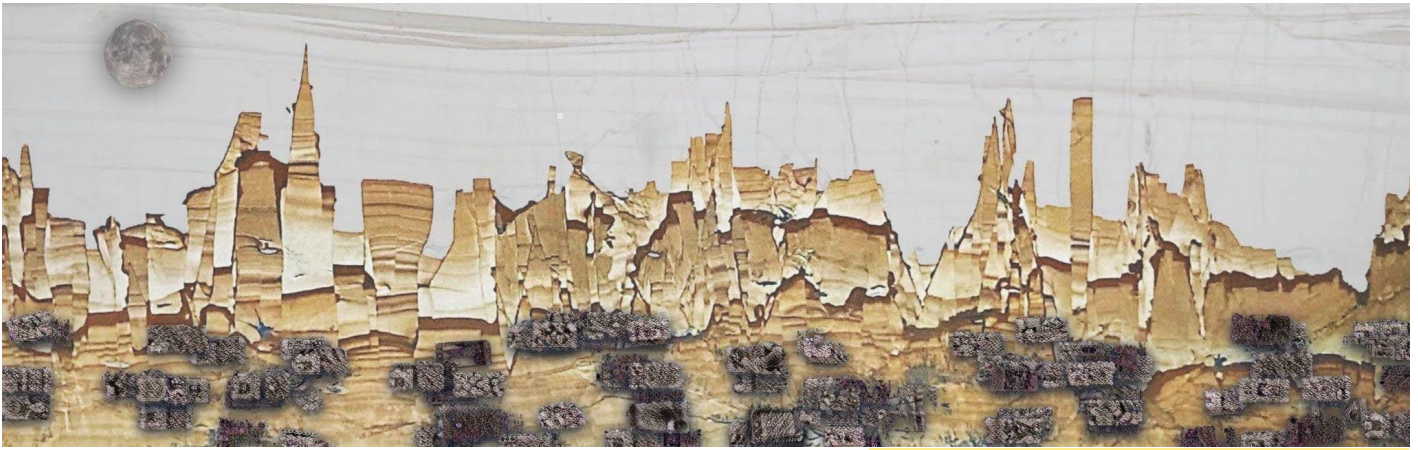
products as "dead". The metaphors were mobilised to accelerate consumption to combat the great depression (Formafantasma 2019). The mindset still echoes planned obsolescence today to attribute values to new products and devalue obsolescence. Yet this process generates waste of electric and digital products.

Obsolescence can also appear through the termination of maintenance and update of (often proprietary) software. Digital obsolescence and digital dysfunctionality (i.e. at times called *software rot*) (Wiktionary 2025) can lead to generating physical e-waste, as the obsolescence generates disused devices (Gabrys 2011). In this sense, the work critically responds to the immaterial perception of software obsolescence.

LOYS mobilises the temporality of obsolescence to caricature (grotesquely depict) the short "life" of devices that generate waste and the slow and lingering death of decaying devices. The presentation of the accelerating temporality of obsolescence is another strategy to make visible the non-visible environmental degradation associated with software obsolescence.

**Smaller Data, Aesthetics and Decay**

The aesthetics of LOYS are in part inspired by sustainable web design. The work renders images lightweight through methods such as dither, low-resolution pixel art, and PNG with transparency. A lower file size on the web potentially reduces the energy consumption for displaying an image (Abbing 2021), therefore, can correspondingly reduce carbon emissions associated with the image-display. Pixelated aesthetics are used to show participants' decaying handset images as cropped low-resolution PNG images with transparency to reduce their sizes significantly. The appearance of the pixelation resonates with the aesthetic language of decay. It indirectly draws attention to the carbon-induced impact on the atmosphere in association with smartphones and digital technology. The predicted annual consump-

tion of 1.9 billion mobiles mentioned above would have produced approximately 104,500,000 tonnes of carbon emissions.[5]

Nascently, creative practitioners are exploring how ecological computing methodologies shape aesthetics via reducing the medium's environmental impact (Mansoux et al. 2023). This emphasises that seemingly immaterial code and pixels provide a related material impact (Hui 2015), therefore, a computational artwork can be self-reflexively reshaped with related environmental awareness. Relevantly, Greenwood proposes a mode of environmentally-mindful web-prototyping with the Japanese-derived aesthetics of wabi-sabi for humble, imperfect approaches with impermanence in mind (Koren 2015; Greenwood 2024). This echoes with the approaches of LOYS: deliberately fragmented images and the transiency associated with the abovementioned decay methods.

## Ending Remarks

LOYS makes visible the environmental degradation associated with digital technology and smartphones. It does so via mobilising the notion and operation of decay. The work refers to and programmes the temporality of e-waste decomposition in landfills. The work indirectly refers to mining, e-waste pollution, and carbon-based pollution that relate to smartphones and digital technology at large. The notion and temporality of planned obsolescence were activated in the work to contrast its temporality with slow geological temporality. The experimental prototyping of the work is relevant in the wider context of developing artistic and computing aesthetics with reduced environmental impact of the medium; the artwork deals with the relational associations between methods, aesthetics and the environmental impact.

## Notes

**1.** This paper focuses on the aforementioned descriptions of the project rather than thoroughly elaborating on the author's positionality.

**2.** Furthermore, corporate extraction of geological resources can displace indigenous people, and therefore, provide neocolonial arrangements (Parikka 2015).

**3.** Other materials used in mobile phones include but are not limited to Tungsten, Rhodium, Iridium, Tantalum, Graphite, Magnesium, Lithium, Indium, Silicon Cobalt, Beryllium, Gallium, Copper, Platinum, Titanium, Aluminium and Gold. An extended list of materials used in mobile phones can be found in the 'Periodic table of mobile phone elements' online at: https://www.compoundchem.com/2019advent/day16/ (Brunning and Compound Interest 2019).

**4.** A ruin marble is a sedimented limestone with patterns that mimic and evoke architectural ruin.

**5.** The Restart Project estimated 55 kilograms of carbon emissions for the production of an average mobile phone (The Restart Project 2023). This figure is used to calculate the estimated carbon emissions associated with the consumption of 1.9 billion mobile phones mentioned in the text.

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