PROCEEDINGS OF THE 1ST INTERNATIONAL CONFERENCE

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10-12 MAY BIRMINGHAM CITY UNIVERSITY

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3D Printed Dress Towards the Ambivalent Fashion

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Abstract

This paper will firstly contextualise the relationship between fashion and technology based on the discussion of 'fashion and modernity' by fashion historian Elizabeth Wilson. It will further explain how technology developed to the computational knowledge, as we know today, and how digital technology affects our understanding of fashion. In addition to this, this paper will introduce the history of 3D printed fashion and, by examining some of the pioneering practices, the paper states 3D printed fashion as an ambivalent concept. Instead of having a solid conclusion, the question raised to current practitioners is how technological innovation responds to the ambivalent nature of digital fashion.

Key words: 3D printing; fashion; ambivalence

Fashion is an ever-changing and never-stationary notion (Loschek, 2009). The industrial revolution underpins fashion as an ambivalent concept including both daily wears for ordinary people and avant-garde designs. The former focuses on how fashion serves the fundamental clothes functions, whilst the later emphasizes on how fashion translates the conceptual newness: the innovation, novelty and even grotesque, beyond the materiality of fabric and the nature of human body. This concept, influenced by modernization, can be found through many of the contestable applications: wearable technology, smart dress and techno-fashion, to name a few. 3D printed fashion is one of them.

I. Fashion and technology

The relationship between fashion and technology has been long discussed in academia. On one hand fashion is an explicit reflection of socially innovative changes. Historically, Elizabeth Wilson firstly formulated fashion as a social concept was developed with technological inventions. She argues there is an inseparable relationship between fashion and modernity. Fashion and modernity were further discussed by a number of scholars. In the book Fashion and modernity, Evans and Breward read 'modernity' as the technical improvement, differently from 'modernism' or 'modernisation' from Mar-

shall Berman's work. Elisabeth Wilson and Joanne Entwistle further developed the concept of fashion and modernity with respect to body by stating that fashion as a social, spatial and bodily practice is influenced by technological innovation to many degrees.

Throughout the industrial revolutions, many cases showed the interwoven relations among fashion, textile and technology development. The first Industrial Revolution started from the textile industry during the late 18th century. These technological innovations laid the foundations for the computational knowledge as known today. The first form of 'computer'- Joseph Marie Jacquard's loom in 1880 to some extent - predicated the inseparable relationship of computational knowledge and creative industry over the following centuries.

With the social progression, Digital Revolution (from the late 1950s to the late 1970s) saw the transitions from mechanization to digitization. Digitalization paved the way of for the newness of fashion. Designers endeavored to make changes by adapting various technologies. As Jane Harris and Sarah Clark stated in the book, Digital Vision for Fashion and Textile-Made in Code, at the pre-developed stage of digital art (from the mid-60s' to the late-90s'), designers and artists tried to find out the 'appearance' of the computations and how it could be applied to their work. Eley Kishimoto designed the graphics for Hussein Chalayan's Painting in his 1996 Spring/ Summer collection, and Alexander McQueen designed the circuit pattern for Givenchy in the 1999-2000 Autumn/ Winter catwalk. With computers' popularization, designers sought various adoptions of technology and they were specifically interested into the transformation between digits and material, 2D and 3D, the illusory images and the real world. Philip Delamore used 3D software to engineer images for print and surface decoration. Mary Katrantzou created the fusion of 2D image and 3D object by ink-jet printing. There have always been concerns about the 2D and 3D interconversion, and technology mediates the fantasy and reality within fashion.

The question is that how does modern technology challenge the transformation between 2D digitization and a 3D real world, especially with the progression of the cutting-edge technologies?

II. 3D printed fashion

The early form of 3D printing, known as additive manufacturing, was developed during the 1980s, and 3D printing was originally used as a rapid prototyping method in product design or architecture. In 2008, when an important FDM tech-

nique expired, 3D printing then stepped into the commercial level within a relatively short time (Lipson and Kurman, 2013). No longer a laboratory experiment, 3D printing now covers several realms, including fashion, jewelry, medical and dental products, architecture, industry design and even aerospace. ScholarsRifkin, Marsh, Lipson and Kurman, 2011; 2013; 2013) defined 3D printing as a manufacturing method that is a driving force behind the Third Industrial Revolution. Although the concept of the ' Third Industrial Revolution ' is arguable, 3D printing indeed gains growing attentions these days.

In fashion, the early form of 3D printed fashion was starting from textiles design. Freedom of Creation (FOC) in 2005 created the linking structure. It could be considered as fabric or textile. It was not until the 3D-printed haute couture by Dutch designer Iris Van Herpen, 3D printing attracted the media's attention. Since fashion is a concept of trends and popularity, and is a phenomenon in which the avant-garde influences all fashion culture, real 3D printed fashion starts from Iris Van Herpen.

III. 3D fashion and its ambivalence

Ironically, those printed dresses are still not fully acceptable to the majority. Some designers are embracing the changes of the technology and getting inspired by those changes, whilst some are inherently not. For instance, FOC designed the fully flexible linking structure and print the whole garment even the fastening details back in 2005, and they brought up this concept that the future garment could be printing all by machines. However, these days, other fashion designers still manually sew the 3D printed assemblies, especially those designs that are close to the body and related to body movement.

And another aspect is the concept or the feeling those 3D fashion expressed. It seems that some 3D fashion designers tend to put 3D printing and future fashion in a situation where human being are fighting with the technological progression. But at the same time, the conflicting opinion shows up as well. Some designers turn 3D printing as a pleasant tool. Danit Peleg designed the beautiful flexible dress by using soft filament-filaflex and auxetic structure and even posts every single process of making online. These designers think 3D printing should be more accessible and fun.

Fashion is a hybrid notion, same as to digital fashion. And the conflicting and ambivalent concept could be found in many aspects of 3D printed fashion. These facts triggered the ques-

tions: what kind of attitude should we have towards 3D printing in digital fashion? It is not only questioning the design process, method and tools, such as how to design the 3D garment and how to use technology in fashion, but also challenging our opinions towards digital technology, digitalization, the progression of our society and our understanding of the future.

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