Master of Arts thesis abstract

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The philosophy of hacking has been inspired me ever since I read the autobiographical novel La'mant by Marguerite Duras in my childhood, which may seem to have no connections whatsoever with hacking in a technical sense. However, her way of writing and the story she portraits in her book was unusually beautiful and outrageous. I recognised the story as a hack of love.

In this thesis, a comparison of the fashion phenomenon before and after the internet will be discussed for a better understanding of fashion discourse within the information age. On the one hand, fashion itself holds no subversive power, the commodification and incorporation of a subculture usually begin with the fashion style that represented the subculture got adopted by popular culture, subsequently, the whole content of the subculture is isolated from its original meaning. On the other hand, the internet has created a rip in fashion history by breaking the traditional local fashion autonomy and forcing it to adapt to a global platform, where more opportunities are generated, along with risks of losing the original cultural meaning and brand longevity.

The practical goal of the thesis is to study the hacker subculture, therefore extract its style, philosophy, and methodology to inspire an innovative way of thinking and doing fashion design. I designed a fashion collection based on the hacker wardrobe items to express my admiration towards the hacker subculture. Code and math have been used on generating the prints, as well as designing the clothing construction. The pattern-making and tailoring process is partially computer-aided, reinforced a streamlined production process. Meanwhile, the spirit of hacking serves as the underlying philosophy of the design and production process.

Ideologically, the thesis raised a question mark on the fashion industry which placed in a technological industrialised society context. The question mark may be the answer towards a new way of considering fashion either as a passion or as a career. More broadly, the hacking spirit may inspire a new way of life.

Preface

With my insubordinate nature, I have developed a value that is unstable, even depressed, constantly in demand of revolution internally and externally. My interest in computer languages and my rebellious nature make me feel that I have been a part of the hacker subculture. The ideology of hacking serves as an underlying philosophy of my identity and therefore reflects on my design aesthetics and approaches as a fashion designer. The idea of this thesis is to express the art of hacking in a fashion context. My viewpoint is more of inside the hacker community than as a fashion activist. During the process of the thesis, I did exactly what most hackers do: play. The time that I can lie down on a couch, reading about number theory and coding, is the necessary session for me to relax and rebuild my inner peace. One of the reasons that mathematics and programming attracted me is the answers are often absolute and definite, the simple truth of existence made possible by complicated demonstration and proving. The truth is what a

hacker attends to define out of the representation of information.

Good versus evil? Sometimes is evil versus evil. The fighter would become the dominator one day, just as the new school hackers would find themselves in conflict with the old schoolers who become corporate. The essence of hacking is the fight. When I grew up in China, I witnessed people doing cheap labor and earn minimum wage, while people engaging in outlaw businesses and made a fortune. That makes me think about the nature of rules, that who made the regulations of society and how people respond to the social and legal systems. Throughout the thesis, the philosophy of hacking brought out my intuitive nature, the realisation of the book and the fashion collection operate as a process of understanding and expressing myself, as well as saluting to the hacker spirit, that is, the forever enthusiasm towards freedom.

The way of writing this thesis aims to adopt the "hacker style", that is, the content is either with a deeper meaning or intensively meaningless. There appears to be more questions than answers throughout the process of the thesis, most of them are still open for request. Some of the answers for these questions are absolutely simple, the others are hardly possible to make sense. 15,000 words are far less enough to

close the case, however, hopefully, some unsettling spirits

can be inspired.

Acknowledgement

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#1. Introduction

1.1 Objectives

In the theoretical part, I would like to interpret the essence of the hacker subculture. The definition, history, discourse,

subculture, and style of hackers will be discussed. Additionally, a special phenomenon in China that relates to the hacker subculture will be introduced. The hacker subculture has its externally and philosophically connection to fashion culture, therefore, a unique perspective on fashion industry from the hacker point of view will be offered. The research of the hacker subculture in the theoretical part along with my personal experience inside the subculture has assigned me a foreground of the topic.

Throughout the productive part of the thesis, I designed a fashion collection based on the hacker wardrobe items, which is a straightforward approach to build the connection between fashion and the hacker subculture. Meanwhile, the ideology of hacking serves as the underlying philosophy of my design process.

The broad research objective for this thesis is to bring the hacker subculture into fashion context, with the aim of questioning the fashion phenomenon and repositioning fashion culture within the modern society, in the meantime, to praise the hacker ethics and advocate the awareness of information freedom. Just as the founders of streetwear brand FRANK151 Mike Malbon and Steve Malbon put : "I felt that we were in a

position to help a culture that we loved grow further[1, p. 323]".

In this thesis, my research questions are:

1. What is the essence of the hacker subculture traditionally and contemporarily?

2. What is fashion from a hacker's perspective?

3. How can I demonstrate the hacker subculture visually in fashion design?

The thesis will be realised in both theoretical components and practical components, which consists of a book of thoughts and a fashion collection salute to the hacker community and subculture.

1.2 Methods

The research topic was first explored by reading books and taking part in happenings associated with the hacker community, activities, and ideology, which provided me a broad understanding of the hacker subculture's history and perspectives. Furthermore, the methods and philosophy of hacking are immersed in many layers of the design practice.

The following step was to understand and demonstrate the interrelation between the hacker subculture and fashion, which was undertaken by studying hackers' external styles as well as philosophical styles, which represent their values and ethics. Furthermore, the phenomenon of fashion industry in the post-internet era has been discussed based on both theoretical research and personal observations.

In the productive part, I explored several means to apply the hacker's language and philosophy to fashion design. Visual research of programming art, like ASCII art and visual cryptography was conducted to integrate elements from the hacker subculture into fashion design. Other than visual expression, I also intended to automatise the production process of the fashion collection by utilising computers and

machines. Furthermore, mathematical models such as analytical surfaces have been applied to the clothing structure design, which enables future development of an algorithm-based design system. Moreover, vector illustration has been used to replace hand-drawing to ensure accuracy and sustainability, in the meantime, to make the output files directly applicable to machines such as blade-laser cutters.

1.3 Structure

The thesis begins with a theoretical approach in Chapter 2, which includes the study and discussion of the hacker subculture. In Chapter 3, I explore and illustrate the bridge between the hacker subculture and fashion. Then continues with the practical section in Chapter 4, offering a personal design perspective on how I interpret the hacker subculture and reflect it on my aesthetics and philosophy on fashion design. The thesis concludes with Chapter 5 and 6, with an overall discussion of the topic and outcome.

#2. Hackers

2.1 Definition

I am very much afraid of definitions, and yet one is almost forced to make them. One must take care, too, not to be inhibited by them.

Hackers can be categorised into three groups. By the word's traditional meaning, a hacker is an inquisitive type who deals with computer systems, either in hardware or computer code. The aim of such tinkering maybe for fun or for the challenge, for example, a hacker may attend to find weak points or overlooked uses of a webpage to pull a prank. Such behaviours may be considered illegal but generally without evil intentions[2]. Note that the law is not an obstacle, instead, it gives the edge for hackers to exploit and redefine their autonomy within conventional thinking and methodologies[3]. A notion of grey-hat has been given to such type of hacker. Another notion of black-hat has been used to describe a cracker, who breaks the computer system for personal profit in defiance of the law[2]. Additionally, there is a white-hat hacker, who is usually paid by companies to reverse-engineer malicious malware and protect cyber security.

Hacking itself is considered an art form by hackers, with the computer as the instrument[3]. From the 1950s, early MIT hackers already showed interest in reducing the numbers of punch cards for IBM 704. Such activity set a starting point for the enthusiasm of "bumming code", which technically refers to the process of rewriting the code in a more concise way so

that it takes fewer memory spaces, in order to achieve "an artistic mastery over the computer"[3, p.2]. Essentially, a piece of elegant code is comparable with a beautiful poem, that is, the content is narrated in a counterintuitive manner that possessed a strong expressive power. According to Mckenzie Wark:

> *Whatever code we hack, be it programming language, poetic language, math or music, curves or colourings... hackers create the possibility of new things entering the world.*
>
> *[14, pp.14-15]*

Knowledge of code is the roots of the hacker subculture, which makes hackers become powerful rapidly within a digitalised world. In the hackers' scene, being extra proficient in programming language and knowing how to control the computer systems are mandatary for being qualified as a hacker[4]. However, hacker's desire to master the code and hardware is not intending to demystify the art of hacking, instead, they want to "achieve a greater appreciation of them."[3, p.2]

Hackers are largely defined by what they are set in opposition to, such as "authority figures, bureaucracy of college classes, and discrimination"[3, p.2][4]. Thus, ideologically, the force of resistance makes hackers hacker. The common values of the hacker community set the rules for Hacker Ethic, which has been described by Jon Erickson:

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The appreciation of logic as an art form and the promotion of the free flow of information, surmounting conventional boundaries and restrictions for the simple goal of better understanding of the world.

[3, pp.2-3]

Common techniques for testing, exploiting, or breaking into a system are: zero-days, unmatched software, malware, social engineering, password weakness, eavesdropping, data leaks, misconfiguration, denial of service, insider collaboration, user error, physical access, and privilege escalation[5, p. 13]. Some techniques are aimed at system weakness whereas some are target at human elements, according to "Juhan"[6, p.139]: "If you try to make your systems foolproof, there is always one more fool who is more inventive than you." Each of the techniques is like Lego brick for hackers to play around according to the situation during a hacking mission. However, in reality, apart from the testing, exploiting, or breaking the system, a more crucial and challenging step is track covering, that is, all the footprints need to be deleted or seamlessly integrated into the system, which can even guarantee future access[5].

2.2 History

The hacker subculture can be understood fully only when it is situated in its historical context. A selection of phenomena and events which have happened in different ages within the hacker community will be illustrated in this chapter.

In the 1950s and 60s, hackers were existing inside universities and corporations due to the high-maintenance of computer hardwares[4].

> *When we were hacking around in the mid-'60s at Harvard, it was not the engineering students who were the hackers. It was the liberal arts majors whose only computer time available was if they gummed up the locks and snuck into the building late at night because they weren't allowed to sign up for the stuff... The whole group of midnight programmers there were people who didn't have any real functional use for what they were doing at all. So we called ourselves "hackers".*
>
> *[7, p.45]*

After the release of Altair 8800 microcomputer, in the mid-1970s, Bill Gates started a company named Microsoft in New Mexico focused on developing the Beginner's All-purpose Symbolic Instruction Code(BASIC), which was originally designed in 1964 by Thomas Kurtz and John Kemeny. The purpose

of BASIC is to emphasise the ease of use of computers, that is, user-friendly interfaces for users without a mathematical background. However, apart from the convenience provided by BASIC, a gap between end-user and raw data has been created, therefore reinforced the power of software companies. In the meantime, a hacker club called Homebrew Computer Club(HBCC) in San Francisco got a leaked copy of the initial version of BASIC developed by Microsoft, they reviewed and bummed the code and distributed the "home-brewed" version of the software freely to the community[8]. Between Gates and HBCC, the tension of information ownership has been expressed where the hackers meet intellectual property owners, marking a key point of information commodification and devaluation[9]. Furthermore, HBCC is considered the birthplace of the personal computing revolution[8], that is, a forum and platform for making computers and software accessible for everyone, financially and technically. Several club members including John Draper(aka Captain Crunch), Steve Jobs and Steve Wozniak turning out to be high-profiles hackers and computer enthusiasts.

Steve ———

2/17/75

AMATEUR COMPUTER USERS GROUP
HOMEBREW COMPUTER CLUB . . . you name it.

Are you building your own computer? Terminal? T V Typewriter?
I/O device? or some other digital black-magic box?

Or are you buying time on a time-sharing service?

If so, you might like to come to a gathering of people with like-minded
interests. Exchange information, swap ideas, talk shop, help work on
a project, whatever . . .

We are getting together Wednesday nite, March 5th, 7 pm at the home
of Gordon French 614 18th Ave., Menlo Park (near Marsh Road).

If you can't make it this time, drop us a card for the next meeting.

Hope you can come. See ya there, *Fred Moore*
There will be other Altair builders There.

Figure 1: Invitation to First Homebrew Computer Club meeting

During the late 1980s, Kevin Mitnick appears on the most
wanted FBI list. By mastering the skills of "social
engineering", Kevin posed as cops, telephone linemen, and bank
executives to trick system admins or end-users into doing
something stupid to their own computers and systems in order
for him to get crucial information[10].

It was a trophy hunt. Hacking today is about stealing credit cards, but I was interested in the hack itself; it was like the high you get from climbing Mr. Everest. It was also a bit obsessive-compulsive. Hacking was the only entertainment that would occupy my mind--like a huge video game, but with real consequences. I could have evaded the FBI a lot longer if I had been able to control my passion for hacking.

[10]

The proud hacker got arrested after being tracked down by security expert Tsutomu Shimomura in 1990s, which lead to the most publicised hacker trials in the hacker history.

In the early 1990s, a college kid in Helsinki named Linus Torvalds wrote the initial version of an operating system called Linux which joined the movement of Free and Open-source Software(F/OSS), running on the marketplace parallel with proprietary operating systems(OSs) such as Microsoft Windows Operating Systems (Windows OS) and Macintosh Operating System(Mac OS)[4][8]. Subsequently, the success of Linux has provoked the conflict between the F/OSS movement and corporate world[11], which referring back to the vintage conflict between early hackers who only craved for the fun of it and those who intended to politicise hacking.

Throughout the history, hackers of many types have been pushing several social boundaries regarding technology, legal

and social ideology at the same time[9]. From the early university rebels to "Captain Crunch" to Kevin Mitnick. Modern hackers such as Linus Torvalds, Adrian Lamo, and Kevin Poulsen have continued the hacking legacy[3].

2.3 Discourse

Language serves as a bridge between our personal experience and the representations of experience in a social and historical context. Hence, the languages we are using to describe our point of view are never neutral, for which subjectivity forms the mode of discourse[12]. Discourse defines different groups of people who hold certain beliefs, values in common. Therefore, certain types of discourse communities are being formed outside the mainstream cultural values, which leads to subcultures.

> *Each society has its regime of truth, its 'general politics' of truth: that is the types of discourse it harbours and causes to function as true: the mechanisms and instances which enable one to distinguish true from false statements, the way in which each is sanctioned; the techniques and procedures which are*

valorised for obtaining truth: the status of those who are charged with saying

what counts as true.

The discourse of a hacker is built upon challenging the representation, that is, they have an intense desire for hidden knowledge[8][14]. The category of hacker's ideology that this thesis concerns is: with an aim at freedom at its natural and complete form. The means of approaching this "freedom" can be accomplished and defined by each individual, for instance, hacking the nature out of technology, or hacking the end out of infinity, or hacking abstraction out of existence, or hacking the harmony out of rebellion, the list goes on.

The hacker subculture discourse has been seriously challenged by its own components in the last decades. The hacker community was first formed with a group of elite technologically advanced people that emerged with the invention of the computer system in the 1950s[4]. Thus, technology can be considered as the root of the hacker subculture. However, hackers' ideology found itself at the juxtaposition between anti-technology and pro-technology. The first generation of hackers in the 1950s used hacking to demonstrate autonomy and they totally nailed it, that was

absolutely fun. However, despite the remaining underground hacker subculture, hacking for autonomy has become a vintage concept in the modern society, where hacking has been industrialised and technology has took on the corporate culture, that led to a series of unnatural symptoms of the society[15][16].

Nevertheless, some modern hackers may still be fighting for their autonomy inside the industrial-technological era by promoting open-source or building small scale technology companies, provoking the discussion and redefinition on "bourgeois, individual authorship and copyright law"[11, p. 112], which will be discussed in the next chapter. The hacker subculture discourse has been challenged heavily by the modern industrialised technology, yet the revolution continues, the fight for freedom never ends.

There is a great emphasis of respect and dignity in the hacker subculture's discourse. On the one hand, the hacker community is primarily in opposition to the institution of law set by government and corporate, mainly due to the fight over information liberty (see Chapter 2.4). On the other hand, the virtual territorial law which defined by code and independent software writers are highly praised and respected by hackers[17]. According to Albert Lin, hackers and pirates, the

two largest components of computer underground who share certain values including free distribution of information, "a certain fraction of pirates later go on to become hackers, and most hackers seem to have once been pirates themselves"[18].

> *Some pirates copy software and they'll copy everything and put it in their collection, but if they find something that they do like and decide it's a good one, they'll go out and buy it because the producer deserves the money.*
>
> *[7]*

2.4 Subculture

2.4.1 Economics

Like many subcultures, the hacker subculture does not own any means of commodity production, which has explained by Mckenzie Wark:

> *...the hack, in and of itself, is always distinct from its appropriation for commodity production. Production takes place on the basis of a prior hack that gives to production its formal, social, repeatable and reproducible form. Every production is a hack formalised and repeated on the basis of its representation as property. To produce is to repeat; to hack, to differentiate.*
>
> *[14, p.83]*

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Despite the irrelevancy with commodity production, the hacker subculture still has an active and strong influence on economy. On the one hand, hackers could get rich easily by breaking codes, cracking cryptosystems, or remote controlling computers and etc. On the other hand, the IT security industry counts on the hacker's capability to innovate greater troubles and reinvent themselves to be more dynamic, therefore secure the demand for cyber defence[4].

> *Information is the most easily reproducible object ever captured in the abstraction of property… hacker class become indispensable to an economy that is itself more and more dispensable—an economy of property and scarcity.*
>
> *[14, pp.26-27]*

2.4.2 Bricolage

Bricolage as an activity is an old concept, that has been discussed first intensively by French anthropologist Claude Lévi-Strauss[19]. A definition of bricolage, according to Panagiotis, is an incidental act where the bricoleur deals

with a finite set to accomplish an unselfconscious intention[19].

In the hacker subculture, the phenomenon of bricolage started with hardware disassembling and assembling in the early 1960s when computers started to become available for private users[4]. By taking the system apart, the hardware bricoleur could witness the working principle and therefore apply the knowledge to create new systems[20]. The open-source movement came to the game in the late 1990s, which brought the culture of bricolage to its peak by removing the restrictions placed by intellectual property, which rekindles the hackers' enthusiasm for software bricolage, for instance, tinkering with source code to study it, alter it, and distribute it. Nevertheless, the old-fashioned concept of bricolage and distribution was overthrown by the logic of "software", which is composed merely by a series of 0s and 1s.

The hacker subculture advocates that information should not be restricted or regulated, however, information itself is inadequate as it merely offers a representation of things[14]. According to Mckenzie Wark:

> *...information and the capacity to grasp it must be free also, so that **all classes may have the potential to hack for themselves and their kind a new way of life.***

That is, information is the hackers' power, the power to be free from merely consuming and producing information. The hackers are the bricoleur of information, they do not own or ruled by the representation of information, instead, they own the liberty to learn and understand the information and extract their free and open future from the information.

2.4.3 Secrecy

In the technological world, where our conversations and financial transactions are taking place digitally, it is the hackers subculture which has been continuously fighting for everyday people's right of secrecy. That is, the hackers' habit of concealing identity is not necessarily because of masking outlaw behaviour, but of advocating community and civic secrecy.

Secrecy provides information values, not only as economic worth, but also as the power to justify and to be free[4]. However, secrecy is a relative concept in the hacker

subculture rather than absolute, that is, information need to be shared and distributed in order to retain the power of secrecy[4]. Otherwise, an absolute secrecy would frozen the flow of information and make it merely a representation of things, whilst the essential purpose of information is to become the means of coordinating a movement[15].

In general, the Internet enables universal secrecy by providing a virtual platform on which participants can be known without the necessity of being recognised, which promotes a medium of secrecy and resistance. True and free statements can be spread through online venues anonymously. On such online platform, channels are built for information acquiring, sharing, and distributing; financial transactions; etc, which has produced more free space for the hacker community to operate beyond the corporate mentality. Subsequently, with the popularisation of internet, a series of wars over who has the right to write the encryption code are known as "crypto wars" marked the initial awakening of the culture of secrecy[7]. For example, Diffie-Hellman key exchange(D-H) method, which based on techniques from number theory developed by Whitfield Diffie, Martin Hellman, and Ralph Merkle in 1976, was the one of the earliest applications that reinforced secret communication between two people over a public channel with possible adversary monitoring[21]. The

foundation of D-H method is public-key exchange, also known as asymmetrical cryptography.

Note that our everyday interactions of the internet are mainly dealing with the "visible layer" of the World Wide Web (WWW) that have been indexed in common search engines. Whilst an enormous percentage of the network is composed of what known as "dark web", where special routers and software are needed to get access. Needless to say, the dark web has been intensively used for criminal and malicious activities. However, it also enables plenty of ethical movements.

2.4.4 Openness

Openness, on the contrary, is the attitude of hackers dealing with information inside the subculture. As MIT hacker Richard Stallman[2, p236] states, "We shared programs to whoever wanted to use them, they were human knowledge." Hacking was understood and treated as a community project inside the subculture[2]. Therefore, to constrain a limited right to use and explore code is ridiculous idea for the hacker community,

since 'code' in the computer world is equivalent to 'speech' in physical world. According to Steven Levy's book Hackers: "To a hacker, a closed door is an insult, and a locked door is an outrage[20, p.78]".

The conflict over secrecy and openness between the corporate and the hacker community arrived at a turning point in 1998, when the 105th U.S. Congress passed the Digital Millennium Copyright Act(DMCA). That is, the government found itself like a clay pigeon against the hackers' technological capability and ideology, therefore they turn to law enforcement. However, the fight did not stop. In the late 90s, the entertainment industry grew alarmed over the fact that the copyrighted content in a DVD could be easily ripped off by teenagers who would read the DVD on a computer, duplicate the content, then distribute it. Therefore, the entertainment executives added a decryption-activation feature to the player's software, which is known as Digital Rights Management(DRM)[2]. In 1999, 15 year old Jon Lech Johansen wrote the open source software DeCSS, that could strip DRM from DVDs for Linux users[2], which, again, gave rise to a great disturbance in the corporate dictatorship. The fight over secrecy and openness reached another turning point when the mass media came to its mature form at the beginning of 21st century, which acted as a sponge between the hacker subculture and the corporate, where

both parties needed to define their new autonomy in this world with over-flooded information.

2.4.5 Resistance

A subculture itself needs to retain a strong force of resistance during the incorporation and commodification. Note that the techniques and process of incorporation and commodification are often posed to be intriguing and even beguiling. If a subculture welcome the bureaucracy and capitulate to the treatment of neutralising and dismantling, it is destined to vanish down the road[4]. Commodification usually serves as an approach to restrict the use of certain information thus makes the scarcity marketable. However, the hacker subculture has survived alongside the incorporation and commodification by positioning itself in a subversive standpoint against the corporate culture rather than confrontational[4][11].

The hacker subculture's resistance for incorporation performed as an actual hack towards the incorporation. For example, any

material forms related to the hacker subculture that undergoes commodification would be exploited by the hackers themselves alongside the corporate culture, examples include cassette recorder and pirate TV[4], which operate as the reverse engineering of cassette player and broadcast television station, with the additional function that break the scarcity of information.

The resistance of the hacker subculture has constituted itself a force of incorporation. An almost naive kind of romanticised heroism makes the hacker subculture replete with the values of boy culture and youth culture, manifested by hostility toward authority and constant statements of the hackers' philosophy[4]. Due to the resonance in subculture ideology and the powerful technological capability, many other subcultures have been dragged into the hacker flux at some point and evolved to become a more radical form of resistance. For example, youth culture, which has been practiced with teen fashion, punk music, piercing and smoking cigarettes, has been updated to an online version, where teenagers can learn independently how to master the skills of resisting and interrupting societal authority. One of the reasons that computers have been welcomely adopted by youth culture is that computers enable teenagers to make fun of the adult world using the technology that their parents are unable to

understand or navigate[4]. However, as people start to rely more and more on online communication, youth culture is converting to digital culture, where young people would rather spend their leisure time facing the screen than "showing off one's gems in the real world — breaking necks with that ultra hard-to-find pair of sneakers[1, p.302]".

2.4.6 Technology

The hacker subculture's narrative is dominated by technology. Technology evolves with the subculture through history, and keeps the subculture differentiated from the mainstream culture and other subcultures. Furthermore, hackers' capability of creating and innovating technology is what distinguishes the hacker subculture from gamer culture, cyberpunks, and other technological cultures[9]. The ability to redefine and recontextualise itself within the virtue of technology demonstrates the hacker subculture's autonomy within mainstream culture. Nevertheless, although hackers may always identify with technology, they may not necessarily vote for it. Indeed, doubts about the impact and future of the

industrial and technological advanced world has been brought up by people with a hacker mindset[15][16].

2.5 Style

Refers to Thomas[4], the style of a subculture is a semiotic reinterpretation of the subculture context that differs from the mainstream culture.

Unlike most of other subculture styles, which have generated identifiable physical components such as fashion, music, literature, graffiti, etc. The hacker subculture, however, almost skipped the material dominant presence and developed a postmodern version of style which is electronic-based[4]. The philosophy of an electronic sense of style is parallel with the material based style. One of the basic functions of fashion is to communicate and express, this has been made clear by other subcultures' fashion expressions. For the hacker subculture, a physical style could become a liability since they should only able to communicate about and through digital platforms which is more fluid and rapid system.

Besides, what makes a hacker ultracool is his technical skills and cleverness, the power of a hacker is produced by the intelligence and capabilities in the computer worlds rather than outer appearance.

There is no such thing as an objective point of view in the mass-media representation. "Phrack", a classic example of early communication venue created for the hacker community sharing and distributing information. Contradictory to the common news channel, the "Phrack World News" platform focused on how the news is being reported by mainstream media rather than the actual details of the news events[4]. Essentially, exploring the authentic news is not of hackers' interests, what interests hacker is to extract the authenticity out of representation, that is, to express "the nature of nature"[14] rather than the representation of nature. Substantially, from a hacker's standpoint, the representation is always a disguise, which is an inevitable result of information processing. That is, the hacker abstracts the "essence" through the exploring of "inauthenticity".

A style of modesty could be placed here as the final touch of the hacker subculture. One of the early 80s MIT hackers Brewster Kahle[2, p.236] recalls: "Signing code was thought of arrogant." Therefore, the low bar of being arrogant set the

tone for the style of hackers' code as well as attitude and fashion. While fashion is all the time seeking for difference and extravaganza, the hacker community would rather prefer an undistinguishable style in order to retain modesty and anonymity. This explains the reason that most clothing pieces in the hacker wardrobe are best selling garments of all time, e.g. jeans, hoodie and white T-shirt. Furthermore, the style of moderation can partly explain why fashion has always been a farfetched concept in the hacker subculture, that is, hackers need to be known without being recognised[4], which is an intellectually oriented anti-fashion statement. Last but not least, being moderate in appearance functions as an easy way to fit into society outside of the cyber world.

2.6 China

A media boom has occurred in China within the reform era started from the late 1970s[22], where the information channels are dominated by radio, newspaper, and television. These media platforms enable Chinese citizens to access information outside of the regional, social and cultural

boundaries, however, the possibilities of distributing and exchanging information are limited[23]. Subsequently, the limitation soon solved with the internet technology, which has been bring out in China in the mid-1990s[23]. Meanwhile, the Chinese government started to develop censorship capabilities and law enforcement to place sophisticated filtering regimes and overwhelming restrictions on information channels, the Chinese "innernet" therefore came into being.

Technical methods of content-filtering in China mainly include blocking webpages and filtering keywords from the router level[23]. Technically, routers are configured to block or monitor Uniform Resource Locators (URLs) through proxy servers[23]. Proxy servers are acting as the gateway and data watchdog between the internet content provider (ICPs) and their final destinations: personal Internet Protocol (IP) address. For example, URLs that include subversive or politically sensitive keywords will be denied access by the proxy server and feed the request with error messages. For instance, if we type "包子主席" which means "steamed bun president" in the Chinese main search engine Baidu, it will display a message that no results match with this search. "Steamed bun" has become sensitive keywords due to the comments made by Chinese people, that the Chinese president not only likes to eat it but also looks like one. Apart from

the filtering and blocking functions of routers, human cyber police act as the additional force to guard "internet harmony". Government "Departyment" is masked in almost all its forms.

A new form of "coded language" emerged in China in recent years. Young people are tempted to push the boundaries of the internet and social freedom without being noticed by the government[24]. The crave for freedom is like an undercurrent below the hypersensitive and upsetting political atmosphere, formed by rebels from different regions of the country, who try to hold free discussions and raise awareness of human rights and information freedom. One example of coded language is to reconstruct the Chinese sensitive words, such as "freedamn" and "harmany", which are reassembled words made up randomly by people while chatting in social media to bypass the censoring technique[24].

Another obstruction for the government to practise content-filtering is the increasing number of English and other foreign languages speakers among the young Chinese generation. Foreign languages can be used as coded languages for free communication in many circumstances. Nevertheless, the situation may change soon as several international companies such as American Cisco Systems and Juniper Networks are

assisting the Chinese government in developing more

sophisticated filtering schemes[23].

#3. Fashion

In this chapter, I will first discuss the connection between fashion and the hacker subculture, followed by a study of the hacker's wardrobe pieces and their meanings and representations. Furthermore，the position of fashion industry

in the age of internet will be examined and discussed from a hacker point of view.

3.1 Representation

A beautiful definition of fashion has been made by Matthew Moneypenny[25, p.187]: "This industry is known for creating unrealistic images of beautiful people doing beautiful things in beautiful clothes that very few people can afford." Fashion is seemingly the force to liberate people out of the mediocre existence, therefore, the untold stories need to be unveiled in every new season to offer a stiff dose of excitement and hope. However, consumers get less and less excited as they have been witnessing the stories and inventory accumulate and lost their meaning as soon as the story has been told. From a critical point of view, "convincing everyone the emperor is wearing fancy new clothes[3, p.452]" is the nature of fashion, whilst knowing by heart that he's naked and broadcasting the fact in an elegant and classy way is the nature of hacking.

The "difference" is what makes fashion marketable, "that might be a reason why fashion has to change constantly: to wake us up from our numbness."[26, p.113] Clothing is the media of fashion, fashion is what makes clothing visible[26]. For example, when big brands and designers bring out some underground subcultural cool stuff to the market, it is the difference that catches our attention. However, all the "difference" comes with a life span since it has been detached from their cultural soil, a means of dismissal is in order when the difference is no longer different. If the very concept of "difference" is exposed, the only measurements are marketability and attention-catching capabilities[27]. That is probably a turning point, where the compromise of popular preference overrides the conquest of personal individuality.

A radical new wave

↓

Commodified style

↓

Fashion

↓

Mass-marketed for popular consumption

[4]

3.2 Inversion

Fashion itself holds no subversive power, the fashion styles that are generated from the subcultural content operate merely as an expression in material forms, which is easy to influence and therefore manipulate by corporate culture. The commodification and incorporation of a subculture usually begins with the fashion style that represented the subculture got adopted by popular culture, subsequently the whole content of the subculture would be isolated from its original meaning. The hacker subculture, on the contrary, is less constrained by material production, therefore is more resistant to corporate

force[14]. In general, fashion tends to bring subculture's discourse to an end by deluging it with mainstream compromise and turn it into a self-referential monologue. Compare to commodification, ideological incorporation hold a more subtle force while a stronger impact on normalising the subversion of a subculture. If commodification serves as a power to isolate and mislead the subcultural meaning, incorporation would be a force to contaminate and deform the essence of a subculture[4].

Commodification of the hacker subculture by fashion itself is out of its ability, because fashion has only become a powerful force of commodification and incorporation since the introduction of internet, which is, an element that belongs to the hacker subculture. The information has indeed become free in the context of fashion after the incorporation with the internet, in fact, this wild "freedom" is the devil who has exposed the secrecy of subcultural discourse, and the discourse of fashion itself.

The internet has created a rip in fashion history by breaking the traditional local fashion autonomy and forcing it to adapt to a global platform, where more opportunities are generated, along with risks of losing the original cultural meaning and brand longevity. The "classical fashion" has become a vintage

concept, like in many other cases in the modern industrial technological society, people often found themselves forced to accept the new mode of consumption instead of having the freedom to choose[15]. For example, when the fast fashion system was first introduced by brands like Zara, Benetton, and Primark, consumers were thrilled to find trendy items on sale in local stores with a surprisingly reasonable price. Subsequently, many brands like Uniqlo and & Other Stories are forced to take on the fast fashion strategies by combining "quick response production capabilities with enhanced product design capabilities[28, p.1]", otherwise, they are facing a high risk of being dumped from the market.

There are safe and easy recipes for success on the internet all the time, however, laying a new ground and doing genuine innovations are risky business, "authenticity has to be fought for and its scars worn with pride"[1, p.80], said Ben Drury. After all, retaining dignity and truthfulness within the accelerated fashion industry need some serious boldness.

In this chapter, a comparison of the fashion phenomenon before and after the internet/mass-media/web/blog will be introduced and analysed for a better understanding of fashion discourse within the information age.

3.2.1 Pre-internet

We'd drive over two hours down to cross the border into Buffalo, NY just to buy gear and hunt down what you shouldn't get back home. Now, anyone can go online and find a retailer to purchase these 'limited' items.... The internet has too much information for consumers to handle, and creates confusion about what they actually like, and what they should like. It has taken away some of the mystique and the underground factor of streetwear.

[1, pp.39-49]

One reason that streetwear products are originally limited is that they are not mass-produced for mass-market, instead, they are sincere designs that embodied the original innovation based on the understanding of certain subcultural meanings. Kenta's two hours travel guaranteed that the designs are only shared with like-minded people, the products are not the main point here. "It's about self-expression and the desire to belong to a movement or a cause: something bigger than life. Not bigger than your wallet,[1, p.109]" said Erik Brunetti, the founder of streetwear brand FUCT. The very "limited" whatever has lost its meaning in this profit-supreme society. If the products is not about lifestyle, it is "over useless shit"[1, p.112].

Although a magazine can be opened at any page, it is still premised on the idea of a linear organisation of its content from page one to page 'x', with a sequence of sections generally shared by all magazines... With blogs, there is no beginning and no end, only a moment in one's encounter with a text... The centre can always be decentred.

[29. p.156]

Pre-internet fashion media are more actual and tangible, they lead to a "linear engagement" rather than "scattered attention" like nowadays, which ensure a deeper level of communication and a longer attention span.

In the pre-internet era around mid-century, fashion was mainly developed by and only served local culture, communities, and economies. Fashion weeks only existed in Paris, Milan, London and New York[27], known as the "Big Four". The first International Fashion Issue of Vogue, made possible by jet travel, published on March 15, 1953, which marked a new point on fashion globalisation by reporting on fashion collections among five countries[30]. Subsequently, after the popular introduction of the internet, local communities are weakening as they become increasingly count on global-scale networks and mass media communications[1][15].

The Internet acts as an accelerator for the fashion industry concerning the efficiency of production and communication. As

Kaczynski points out, a peculiar phenomenon of modern society is the eagerness for "progress" which hasn't been a desirable concept before the 17th century[15]. As a result, underground fashion cultures are becoming extinct due to the fast circulation of information, that is, they do not have the proper time to grow organically[1, p.117]. Nevertheless, underground culture may bloom within the scope of the internet itself.

The career arcs in the fashion industry arrived at a turning point when the internet came into play in the 90s to speed the fashion circle up. Take the fashion model as an example, 50s supermodels like Dorian Leigh and Suzie Parker were both to remain active for over ten years. Whilst today a successful model's career in high fashion would last three to five years[27]. Apparently, new faces need to be brought out for media stimulation[27].

3.2.2 Post-internet

What online did for Tommy was to allow him to be heard and to be seen. But for every Tommy Ton there are a million crappy photographers with crappy ideas about what they think is good or bad. The industry's still a meritocracy.

[25, p.186]

One post-internet fashion phenomena is personal-run fashion blogs. A significant difference between fashion blogs and traditional media such as fashion magazines is blogs are more engaged with everyday fashion, which offers a peer-to-peer platform[29]. One thing for certain in the post-internet era is that any media starting to grow popular will be soon incorporated and commodified, which can be treated as an opportunity, but at the same time it would create a rip-off in the cultural discourse. On the topic of fashion blogs, for example, a section entitled 'Style Hunter' in the British Magazine Grazia, which apparently absorbed characteristics from the street-style blog Face Hunter[1]. Accordingly, the corporate owned media is invading the underground grassroots media by referencing and mimicking their ideas and styles, which would not only put the grassroots media out of business, but also incorporate the underground culture.

Till now, personal-run fashion blogs have largely incorporated by corporate fashion[29]. According to Erik Brunetti: "Internet blogs are very similar to soap operas. Somewhat entertaining, but always dramatically deficient and cheap"[1, p.112]. Evidently, internet acts as a weapon that is crucial for the success of incorporation and commodification, that is, by adapting to a post-internet era, fashion gained its power of cultural aggression and domination.

In the industrialised modern society, fashion has been used as a tool to lure people's desire of possessing them, while the easiest way to feed the desire is obey to the system[15]. An interesting point raised by Elizabeth Wissinger is that the fashion industry is making their profit from getting people engaged with mass media where personal leisure time is sacrificed[27]. Simultaneously, while advertisements are polluting the eyes of customers, they also shattering the future of fashion industry: "attention spans have been overwhelmed, pathways of suggestion have proliferated and the volatility of markets has reached a rapid boil"[27, p.133]. Within the age of information mass-consumption, we don't know where to look at, we don't know what we actually see. "Only the loudest can be heard above the cacophony. As a general rule, corporate-owned media has an easier time gaining volume"[8, p.226], pointed out by Kevin F. Steinmetz. Under

such circumstances, information scarcity no longer exists, therefore, subculture based fashion such as streetwear is step by step neutralised by the mass media and a global-scale network.

Fast fashion is definitely one of the most paradoxical and iconic creatures of the digital age. "Thanks to the internet, trends now last fifteen minutes.[1, p.295]" On the one hand, the quick-response capability of fast fashion brands made an impact on the high-fashion world by providing consumers with desirable latest season products at a reasonable price, which can be seen as an anti-bureaucracy phenomenon. On the other hand, a relatively generous percentage of 74% of clothes bought are dumped to landfill[31]. Consider the possibility that those unwanted fast-fashion products could be shipped to developing countries, where they can be given to poor people for free or sold by some wheeler-dealers, consequently resulting in a disequilibrium for price and quantity transacted in local fashion business[31].

The development of programming algorithm "perceptual hash" integrates the visual database of fashion products on the internet, which enables consumers search for identical or look-alike products by inserting a picture of any fashion merchandise to a search engine with the algorithm built in.

Additionally, consumers could filter the products and dealers depending on the quality, price, and other criteria. In this scenario, fashion culture is reduced to the fundamental production with a deep-set interrelation to global trade and piracy culture. The algorithm has already been put into use in the Google search engine and has been introduced to the Alibaba website for clothing shopping in China.

3.3 Interpretation

3.3.1 Media

One of the characters shared by fashion and the hacker subculture is that they are both high drama. It is a common idea to associate hacking with "electronic vandalism, espionage, dyed hair, and body piercings"[3, p.1], such impressions can trace back to early media interpretations of hackers.

David Lightman, the protagonist in the thriller film WarGames(1983) was one of the earliest and classiest popular media representations of hackers[4]. Young, heroic,

technologically advanced, dressed in T-shirt, hoodie, and jeans. The film was inspired by an actual hacking event to the North American Defence Command (NORAD) attributed to Kevin Mitnick.

The Hollywood film Hackers(1995) cannot be missed if we are talking about hacker fashion. Basically, three types of hacker fashion have been mentioned and marked in the film, which are everyday, elite and fantastic[4]. First, the "everyday" hacker fashion has been demonstrated by several characters in the films are dressed in normal hacker wardrobe pieces such as hoodies, T-shirt, and jeans, with the aesthetics of underground streetwear. Second, the "elite" style has been manifested by two protagonists: Kate, aka Acid Burn and Dade, aka Zero Cool, who dressed in slick faux leather, look like futuristic punk[4]. Last, the fantasy of cyborg has been brought out in the last scene when Dade wearing an eyepiece and merging with the data from his hack[4].

Hacker style has been manifested and demonstrated in the characters' technology capability, way of communication, and, ultimately, fashion. The fashion demonstration in the film can be seen as a standard model of culture incorporation. A form of representation — an exaggerated and techno-fetishistic style has been extracted from the hacker subculture, which

would exert a subtle influence on the real underground hacker subculture — a subculture that should not have any representation come out to be commodity forms at all[4]. The created representation twisted the original subculture discourse, isolated the subculture itself from the viewers and fans.

3.3.2 Real-life

As Thompson[2, p.234] portrayed in the book Coders, a hacker is concentrated on writing world-changing software as much as possible, "while living as cheaply as possible." This description may not be universally true, yet definitely, the hacker subculture has its exclusive values set on the concept of "luxury" lifestyle. For instance, at the time when a hacker tries to figure out how the code will work, despite the room temperature, it certainly does not matter if he is in an underwear or an Ermenegildo Zegna bespoke suit. In the fashion scene, there are mainly two groups of people who is "having it" and who is "getting it". If we put hackers in, they will be the third group who is "not giving a shit"[1, p.295].

"Comfortable" is probably the most demanding factor when hackers are shopping for clothes, which includes both psychological comfort and physical comfort. The hackers' style needs to be analysed inside the subculture context, it ought to be a combination of activities, attitudes, and interests that binds the hacker community together. To put it in another way, simply dressing like a hacker does not make the person a hacker. Just like Nat Thomson put: "you can be wearing head-to-toe Neighborhood and be still be a total douchebag[1, p. 293]." correspondingly, the hacker wardrobe items are not the byproducts of the subculture, instead, they are just adopted by hackers, that is, the items cannot define the hacker subculture by themselves. This leads to a character of hacker's wardrobe items that is they are identity-less, in the sense that each piece of garment is so commonly used which made them become invisible, hence enable hackers to hide in the crowd.

The psychological comfort would be accomplished by being anonymous as well as being recognised inside the hacker community[4]. When a design starts to show people what they have been unseen instead of what they see, it's starts to build a discourse that could be perceived as "fashion".

The other practical standard for the hacker's fashion choice is physical comfort. That is, clothes which are suitable for long hours of sitting in front of a computer, or walking and posing at hackathon or hacker conference such as DEF CON. Therefore, skin-friendly and durable materials, e.g., cotton jersey and denim which are made of natural fibres, have become popular choices among hackers. However, even though fashion may seldom cross hackers' mind when they choose their outfits, the outcome might be surprisingly slick and inspiring. For example, the looks in figure 2, a group of hackers at the first DEF CON in Las Vegas in June 1993, with mix-matched styles, kinky colours, retro graphic features, and gamer gears; plus the accidentally futuristic background settings, which put together an ultra-cool cyberpunk fashion poster.

Figure 2. DEF CON 1 group picture(1993)

Figure 3. DEF CON 1 group picture(1993)

Figure 4. DEF CON 3 group picture(1995)

3.3.3 Wardrobe

The wardrobe pieces that I include in the selection are among the most symbolic items that represent hacker styles, both offscreen and onscreen. Which include a hoodie, a white T-shirt, a denim jacket, a sweatshirt, and a pair of jeans. Most of these clothes are everyday and universal wardrobe items popular in both mass market and high fashion brands, which guarantees hackers' preference for psychological and physical comfort. In this chapter, I will go through the definition and background of each piece of clothes that belongs to my selection of hackers' wardrobe, in order to understand the relation and ties between these garments and the hacker aesthetics. The hacker wardrobe serves as the main system for me to hack using the language of fashion.

A typical hoodie is a comfort-fit zip-front or pullover sweatshirt made of cotton jersey, with a head-covering with drawstring closure. First invented by the predecessor of sportswear brand Champion. The hoodie is the most iconic piece that represents hackers' fashion style, which provides an ideal shield for anonymity, that confronts not only human observers but also surveillance cameras. A signature owner of the hoodie is the founder of Facebook, Mark Zuckerberg, who has been appeared in public and high-profile business meetings

dressed in a hoodie, which has been commented as an attempt to reset rules and redefine success[32]. Another iconic owner of hoodie related to the hacker subculture is Ted Kaczynski, known as the Unabomber, the author of a 35,000-word manifesto entitled "Industrial Society and Its Future[15]", written under the pseudonym FC (Freedom Club).

A white T-shirt is a pure blank canvas that possesses a rebellious soul. It constructed with two pieces of white cotton jersey joined by the seams on shoulders and sides, short sleeves, and ribbed collar. The character of a white T-shirt is highly provocative and conflict, with no statement made, it is questioning the very existence of itself. A white T-shirt has been electrified by rock n' roll figures like Kurt Cobain and John Lennon. Furthermore, it is undoubtedly one of the most popular choices for hackers when attending hackathon and hacker conferences, sometimes with the logo of their favourite hackers or software, etc. Other than wearing a white T-shirt, "doing your own online T-shirt line is the new garage band"[1, p.295].

A denim jacket is composed of a shirt collar, two shoulder yokes on the front and backside, under them diagonal pleated seams – four on the front and two on the back. Set-in sleeves and button closures at the end of the cuffs. Two flat pockets

with buttons are positioned at the chest, centre front flaps are closed with six to seven buttons. The details are featured with a double stitch on almost every seam. The denim jacket has been a conformist choice among geeks as well as fashion icons[32]. Martin Margiela, known for his enthusiasm of twisting the reality of existing basic garments and relocating the styles into modern womenswear, introduced a denim coat for his SS 1991 collection, which was made of a denim trucker jacket and jeans sewn together.

A biker jacket is usually made with leather or faux leather in black colour, with a diagonal off-centre zipper connected to a lapel collar fixed by four snap-buttons, multiple zipped pockets and one little key-pocket with snap-buttons, long sleeves with zipped cuffs, often with a belted hem. The connection between the hacker community and the biker jacket is more on a fictional level than in everyday use. Sex pistols' Sid Vicious has contributed to the mystique of the biker jacket. Moreover, the biker jacket's cool factor and interrelation to the hacker subculture has been elevated in several cyberpunk scenes: Dade in the Hackers, Trinity in the Matrix, Rick Deckard from Blade Runner 2049, and Motoko Kusanagi in Ghost in the Shell.

A sweatshirt is a loose-fit piece of casual clothing with ribbed collar, cuffs, and hem, long sleeves with either raglan or set-in style, usually made of cotton jersey. This particular piece of garment fits anyone from ultra-cool heavy-metal stars to nerdy geeks in almost every circumstances.

The classic model of a pair of jeans is Levi Strauss & Co.'s 501, the contemporary version of it features belt loops on the waist, a leather logo pad on the right backside and a back yoke underneath, followed by two back pockets with arcuate stitching. On the front a small watch pocket inside the right front pocket, a zip fly with button closure on top.

#4. Execution

Hacking is in general a work of passion, you got to really love and be devoted to code languages and computer systems to put up with the agony of long hours of trying[5]. The same rules apply to fashion design, the appreciation of clothes, beauty, and philosophical expression are the fuel for me to go through sleepless nights of sketching, draping, and sewing. The design and production of the fashion collection took two

months all together, I have been utilising computers and machines to automatise the process(Figure 5).

A selection of hacker wardrobe pieces set a contemporary and masculine undertone for my collection design, whilst the drapes and details portrait an extreme classical and feminine side of the story. To contrast is to emphasise, to provoke, to disguise. Other than reappropriating the basic wardrobe pieces to create new designs, I also intend to alternate the typical ways of designing and making a collection.
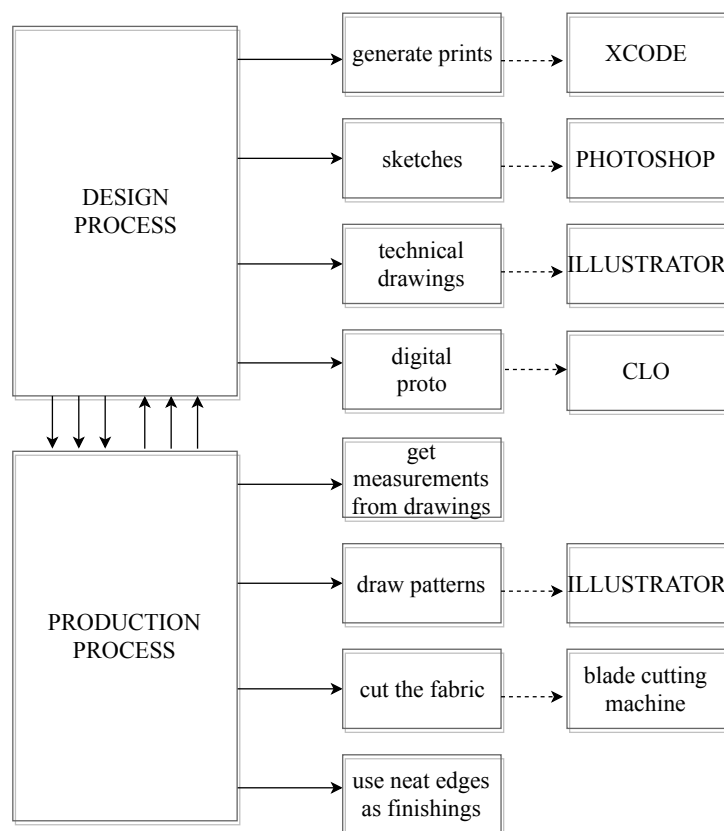

Figure 5: Design and production process illustrated

4.1 Init

In this chapter, I will introduce the two systems of inspiration: the hacker subculture and the Chinese culture. The philosophy of the hacker subculture and wardrobe pieces will operate as the base and inspiration for my further design and means of production, while the Chinese culture serves as a system to hack and to deconstruct. Afterwards, the deconstructed parts will be embedded into the first system of the hacker subculture, consequently accomplish an ideology incorporation.

Considering the garment structure design, massive volumes of fabrics cut out of the simplest geometric shapes has been built on the basic garment structure. I intended to express the tension, the heaviness, and the strength that unleashed out of a restricted entity, an exploded bomb turning infinity into its original and natural form.

4.1.1 Hackers

The classical pieces from the hacker wardrobe operate as a bridge for my design to communicate with the hacker subculture and adopt a basic language of clothing which is largely relevant for our times. Likewise, every piece in the collection took on a redesign manner; there is always a classical piece of garment and my ideas are expressed on top of it. This manner is inspired by a streetwear brand Stüssy, who did lots of designs based on Agnès B and Comme de Garçon[1].

"Design" was made professionalised out of the need for a capitalistic mode of production, that aims at increasing output, for that, designers need to be separated from unreliable self-manufactured production mode and put a focus on the precise outcome and commercial need[19]. Nevertheless, bricolage is one of the means to free design out of constrained intentions and requirements. By utilising resources that were already at hand, the results of bricolage design could stand for itself but at the same time free at what it may stand for, that is, the result is not precise and absolute, instead, it is metaphorical and fluid. The design execution of my fashion collection will take on the culture of bricolage in the hacker subculture in both traditional

(material-based) and modern (information-based) meanings. The results of the design are unpredictable where the designer's freedom will be emphasised. Therefore, intensions will be released and freed from the design outcomes and will be emphasised on the procedure of manufacture. Moreover, inspiration and logic ought to be intertwined in the production flow rather than be isolated on the visual expression.

The hacking methodology will be adapted to the fashion design process to alter the traditional ways of developing a collection. Referring to Grimes, the hacking methodology includes information gathering, gaining initial foothold access, guaranteeing future easier success, reconnaissance, movement, intended action execution, and covering tracks[5]. For example, hackers usually running fast tests instead of planning. I will apply the method of fast-prototyping in the research stage for the fashion collection and skip the phase of sketching in the beginning of the design process. Moreover, hackers often practice movement after they gained initial access, I would apply this method by keep designing and making adjustment at the same time while making the clothes, which would lead to spontaneous results. Compared to traditional fashion design process, the hacking style holds a more counterintuitive manner.

4.1.2 China

The second system, China, which is somehow opposed to the hacker subculture ideology as explained in Chapter 2.6, will be demonstrated as an inspiration and hacked with respect and good intentions. A circle-shaped pattern (Figure. 6) usually composed of flowers, animals, and texts has been widely used on traditional Chinese costumes from Tang to Qing dynasty. The use of figures in the pattern is according to the wear's social status, which can be understood as a symbol of hierarchy. The patterns are often hand-embroidered on silk fabrics.

A method of incorporation has been applied here in order to keep the beautiful layout of the pattern and colours, in the meantime electrifying and reappropriating the historical obsolescence. I encoded the pattern (Figure. 8) with the quotes from the book A Hacker Manifesto by Mackenzie Wark, with the aim of integrating the hacking philosophy into the sophisticated structure of Chinese hierarchy. The technique of constructing an image with texts is called ASCII art, which will be explained in chapter 4.3.1. In the next chapter,

detailed methods of how to geometrically break a circle shape

will be explained.

Figure 7: Traditional Chinese circle-shaped pattern encoded with the hacker manifesto

Figure 8: Traditional Chinese circle-shaped pattern encoded with the hacker manifesto(zoomed in)

4.2 Ellipse

It is the hackers' hobby to build up a solution that is different, possibly from mathematical tools[7]. The shape of the "Chinese hierarchy pattern" is an ellipse, therefore, in this chapter, I will demonstrate the method I used in deconstructing the shape of an ellipse and building the structure on and of the garments. The methods I applied came from intuition during sketching, which has in some way linked to my previous knowledge of analytical surfaces.

4.2.1 Spiral

A two dimensional spiral is a curve generate from and revolves around a fixed origin. Two type of spiral shape are relevant in my design process, which are Archimedean spiral and logarithmic spiral. An Archimedean spiral(Figure 9) is a curve for which the radial distance r from a fixed origin increases or decreases progressively with angular position θ. An Archimedean spiral can be described by the equation $r = a\theta$[33]. Additionally, a logarithmic spiral(Figure 10) is

defined by the polar equation $r = ae^{b\theta}$. Where the radial distance r moving away from a fixed origin by a factor of the golden ratio for every 90 degrees of rotation.

The first method to apply a spiral structure on clothing construction design is to tweak the flat pattern of a garment. For example, to set one fixed point on each of the side seam line of the garment, mark them as F1 and F2. Next, generate two spiral curves S1 and S2 from the fixed origin F1 and F2, with same directions but different angular position θ. Consequently, if S1 is logarithmic spiral while S2 is Archimedean spiral, the shape would probably be closed at the intersection point of two spiral curves(Figure 11); however, if we choose S1 and S2 to be the same type of spiral, it is necessary to join the two curves with a tangent line of curve S1(Figure 12). Therefore, extra volume and weight would be added to one side of the garment that creates an asymmetrical construction. The second method is to apply Archimedean spiral on multiple pieces of patterns that construct the same garments(Figure 13). For example, choose a garment such as denim jacket with multiple pattern pieces on the front side. Align all the pattern pieces horizontally, set fixed origin on the two side lines of each pattern piece. Then generate spiral curves with the values of θ set to be inverse for the two sides of each pattern piece. The elegant choice of r and θ

could produce a sinusoidal wave on the hem edge of the garment. This method has been applied on making a denim jacket, a hoodie dress, a sweatshirt cape, and a leather bicker jacket.

Moreover, I used an Archimedean spiral curve as the cutting line to segment an ellipse surface, to form a twisted strip in the shape of a sinusoidal conoid to construct non-pleated raffles(Figure 14). This method has been applied on making a pair of jeans.
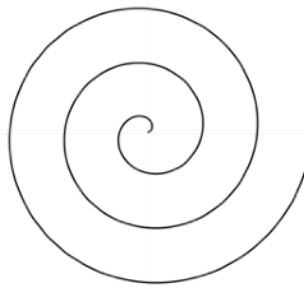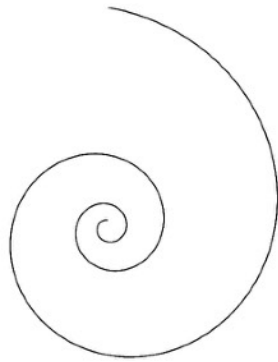
Figure 9: Archimedean spiral
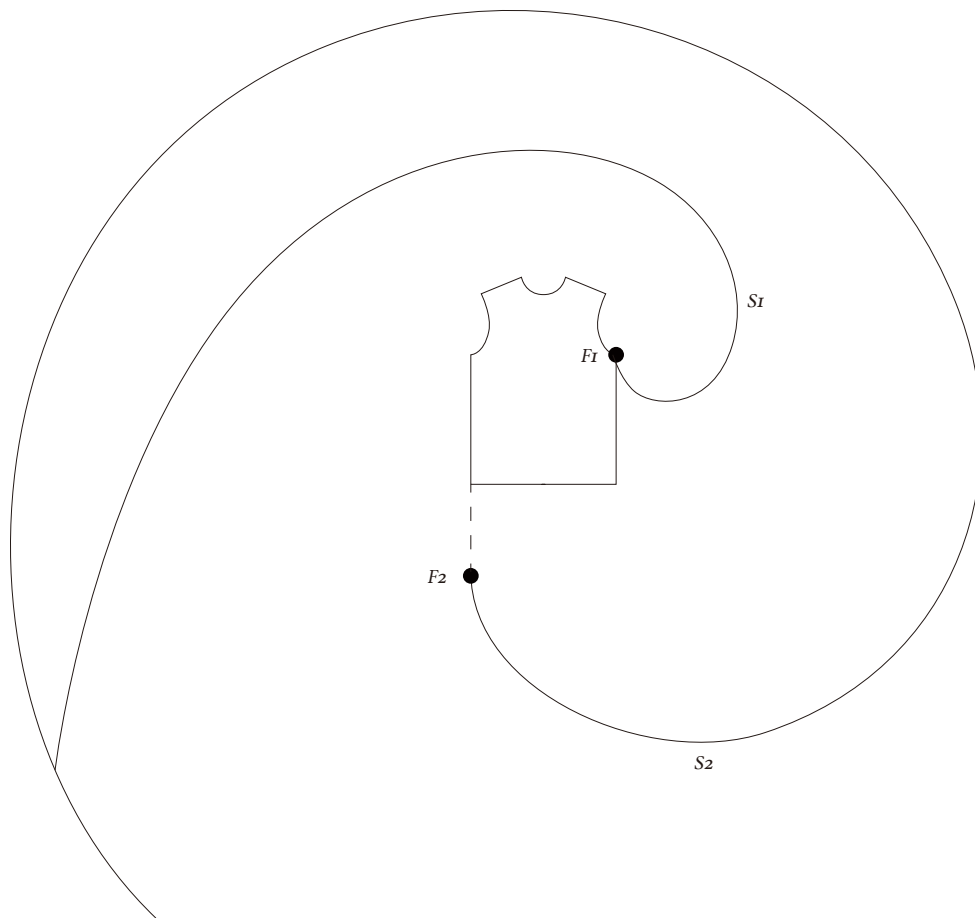
Figure 10: logarithmic spiral

Figure II: The first method to apply a spiral structure on clothing construction design(A)
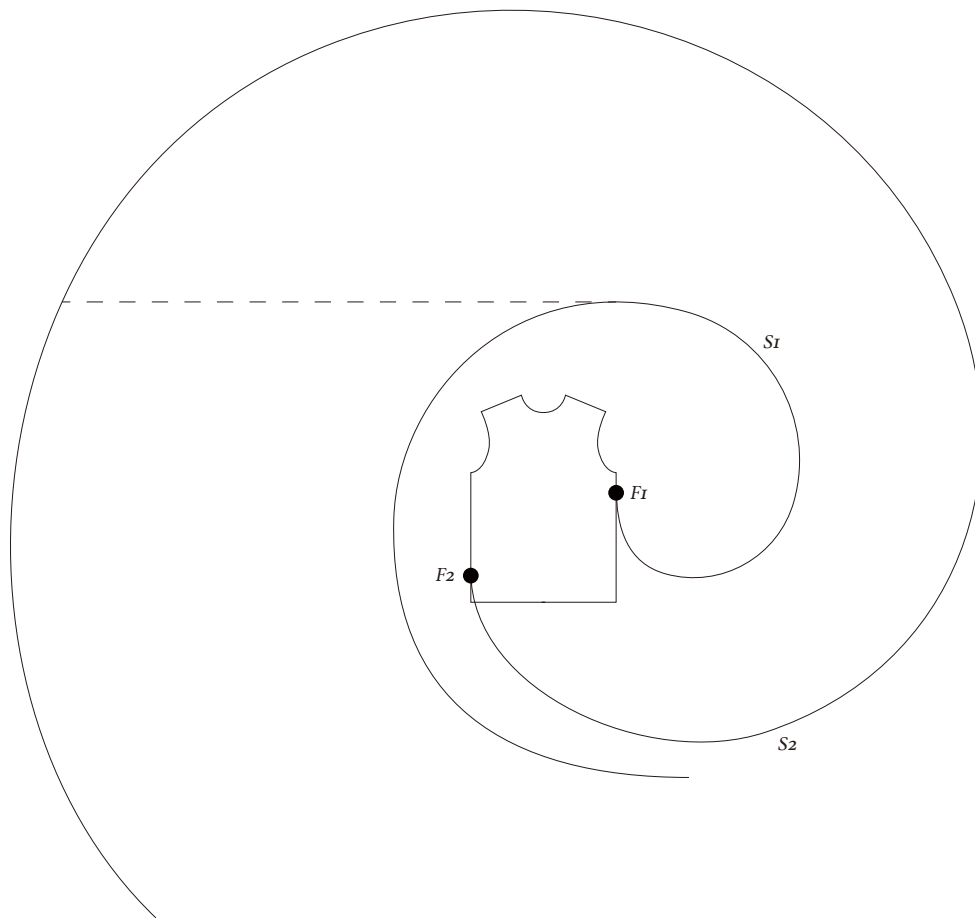
Figure 12: The first method to apply a spiral structure on clothing construction design(B)
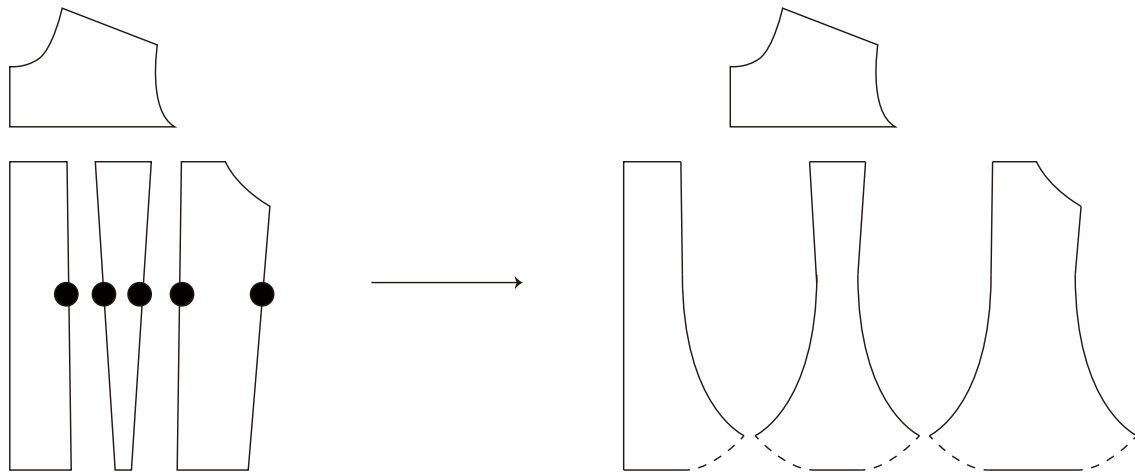
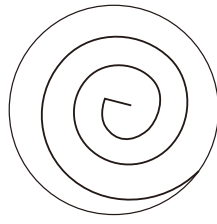*Figure 13: The second method to apply a spiral structure on clothing construction design*

Figure 14: Use an Archimedean spiral curve as the cutting line to segment an ellipse surface

4.2.2 Helix

A helix is a curve formed on the surface of a rotating cylinder or cone when the point of contact moves axially at a constant speed[33]. The elliptic helicoid in Figure 15 is defined by the following equations:

x=x(u, v)=av cos u,

y=y(u, v)=bv sin u,

z=z(u)=cu,

where a, b are constants[34].

The coordinate u define the tangents' slope angle. Ellipses E is formed of lines u's projections on the plane xOy, which I used as the base form to construct the helical stripe(Figure 16).

An elliptic helicoid could extend and form a right sinusoidal conoid(Figure 17), which is a continuous twisted strip that could be used to construct raffles that possess powerful tension against the force of gravity. The amplitude of the sinusoid is commanded by the inner circle's circumference of ellipses E. Which structure has been applied on a white T-shirt dress(Figure 18), a pair of jeans, a satin T-shirt dress, a hoodie dress(Figure 19) and a biker jacket(Figure 20).
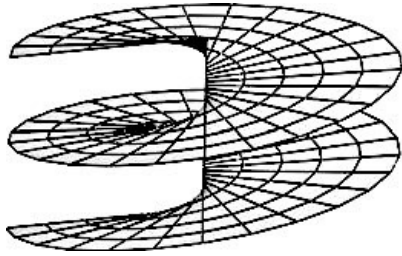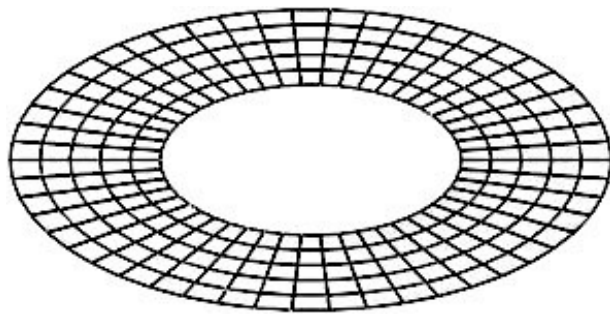
Figure 15: An elliptic helicoid

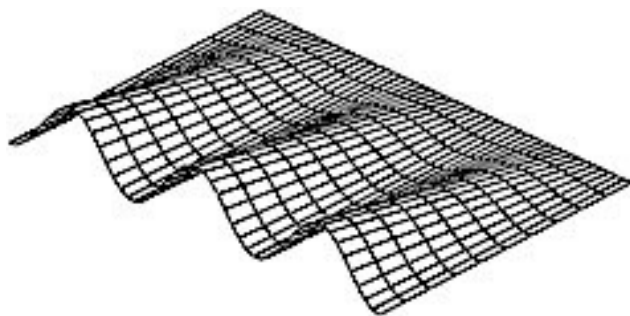*Figure 16: Ellipses E*

Figure 17: A right sinusoidal conoid

Figure 18: A prototype of drape constructed with elliptic helicoid on a white T-shirt

Figure 19: A hoodie dress with ruffled open back

Figure 20: A biker jacket with ruffled open back

4.3 Vector

Information, like land or capital, becomes a form of property monopolised by a class, a class of vectoralists, so named because they control the vectors along which information is abstracted... A vector may be any means by which anything moves... the vectoral class relies on a form of property subject to constant hacks that create qualitatively new forms of production and devalue the old means of production.

<div align="right">

[14, p.24, p.148, p.150]

</div>

Vector acts as a media, for the hackers to virtualise the world towards an infinite nature whilst for the commodity producer actualises towards either object or subject[14]. On the one hand, the order of virtualising and actualising are highly dynamic, a piece of source code for creating object or subject may be developed by the hackers, which draws the attention of the commodity producer who could turn the potential to actuality. On the other hand, according to Mckenzie Wark: the hackers possess the technological capabilities of vectoralising information, "information becomes something separate from the material conditions of its production and circulation"[14, p.150], that is, the hackers may extract the vector out of its commodity form and set it

free, on the account of that commodity producer seldom own the power to extract and produce vectors but merely own the means of producing commodity out of vectoral information.

A vector, by technical definition, is a physical quantity that is specified in terms of both its magnitude and its direction[33], but no predetermined position. I will discuss three methods I applied in the design process and production phase related to vectoralised information in this chapter.

4.3.1 ASCII

ASCII is an abbreviation for American Standard Code for Information Exchange, ASCII formatting could be used for text storage and visual display on computers[35]. ASCII was originally designed for teletypes, for which the format is "text only" and boldly condensed. The technique I used to encode the Chinese traditional circle-shaped pattern is under the section of ASCII art, which is diagrams or pictures generated or drawn with the printable characters in the ASCII character table(Figure 21). Furthermore, a spirit of bricolage

has reflected on this format of art as it is an act where the artist deals with a finite set to achieve an approximate result. Many ASCII artworks are full of humour and wisdom, a demo of ASCII art in Figure 22 is a one hundred US dollar note graphic composed with the characters from the ASCII character table.

Dec	Char	Dec	Char	Dec	Char	Dec	Char
0	NUL (null)	32	SPACE	64	@	96	`
1	SOH (start of heading)	33	!	65	A	97	a
2	STX (start of text)	34	"	66	B	98	b
3	ETX (end of text)	35	#	67	C	99	c
4	EOT (end of transmission)	36	$	68	D	100	d
5	ENQ (enquiry)	37	%	69	E	101	e
6	ACK (acknowledge)	38	&	70	F	102	f
7	BEL (bell)	39	'	71	G	103	g
8	BS (backspace)	40	(	72	H	104	h
9	TAB (horizontal tab)	41	)	73	I	105	i
10	LF (NL line feed, new line)	42	*	74	J	106	j
11	VT (vertical tab)	43	+	75	K	107	k
12	FF (NP form feed, new page)	44	,	76	L	108	l
13	CR (carriage return)	45	-	77	M	109	m
14	SO (shift out)	46	.	78	N	110	n
15	SI (shift in)	47	/	79	O	111	o

16	DLE (data link escape)	48	0	80	P	112	p
17	DC1 (device control 1)	49	1	81	Q	113	q
18	DC2 (device control 2)	50	2	82	R	114	r
19	DC3 (device control 3)	51	3	83	S	115	s
20	DC4 (device control 4)	52	4	84	T	116	t
21	NAK (negative acknowledge)	53	5	85	U	117	u
22	SYN (synchronous idle)	54	6	86	V	118	v
23	ETB (end of trans. block)	55	7	87	W	119	w
24	CAN (cancel)	56	8	88	X	120	x
25	EM (end of medium)	57	9	89	Y	121	y
26	SUB (substitute)	58	:	90	Z	122	z
27	ESC (escape)	59	;	91	[	123	{
28	FS (file separator)	60	<	92	\	124		
29	GS (group separator)	61	=	93	]	125	}
30	RS (record separator)	62	>	94	^	126	~
31	US (unit separator)	63	?	95	_	127	DEL

Figure 21: ASCII table of the 128 characters

```
||==================================================================||
||//$\\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/$\\||
||(100)================| FEDERAL RESERVE NOTE |================(100)||
||\\$//        ~        '-----========--------'                \\$//||
||<< /        /$\              // ____ \\                    \ >>||
||>>|  12    //L\\            // ///..) \\        L38036133B  12 |<<||
||<<|        \\ //           || <||  >\  ||                     |>>||
||>>|         \$/            || $$ --/  ||        One Hundred    |<<||
||<<|     L38036133B         *\\  |\_/  //* series               |>>||
||>>|  12                    *\\/___\_//*   1989                 |<<||
||<<\     Treasurer      _____/Franklin_____    Secretary 12 />>||
||//$\              ~|UNITED STATES OF AMERICA|~              /$\\||
||(100)==================  ONE HUNDRED DOLLARS ================(100)||
||\\$//\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\\$//||
||==================================================================||
```

Figure 22: A demo of ASCII art

4.3.2 SVG

Scalable Vector Graphics (SVG) is a type of file to describe paths, shapes, fills and colours, usually written with Extensible Markup Language (XML). Due to the XML-based quality, the file size of SVG can be compressed using lossless data compression algorithms, which result in a smaller memory size demand. Moreover, unlike bitmap files, SVG files can be scalable without the loss of resolution. Furthermore, several programming languages such as Javascript could be embedded in the XML to generate vector graphics, so that the file can be indexed and searched.

SVG format becomes accessible in design when the process is data-driven, for example, the pattern manipulating methods based on geometry as I described in Chapter 4.2 would be suitable for practice. In the pattern making process, instead of using traditional pattern drawing methods with pen and paper, I begin my process with putting the measurements such as length and angle of an original hacker wardrobe garment's pattern into vector graphic tool, e.g., Adobe Illustrator. Accordingly, a vector graphic which is similar to a flat drawing of the garment will be created. Then I continue with the fun part where I give command such as rotate, scale, duplicate, and shear to the paths in order to create

interesting drapes and volumes. The next step is to disassemble the illustrated garment into composed parts that connected with seams or closures. After I get the SVG format file of the patterns, I place them tightly in Adobe Illustrator(Figure 23). The exported file of finished patterns can be recognised by blade or laser cutting machines. I cut most of my materials with a blade cutter, which reduced manual work, enhanced accuracy and maximised the usage of given materials. Furthermore, the machine-cut fabric pieces already have clean edges, no need to do further finishing, therefore reduced time for sewing, reinforced a streamlined production process.
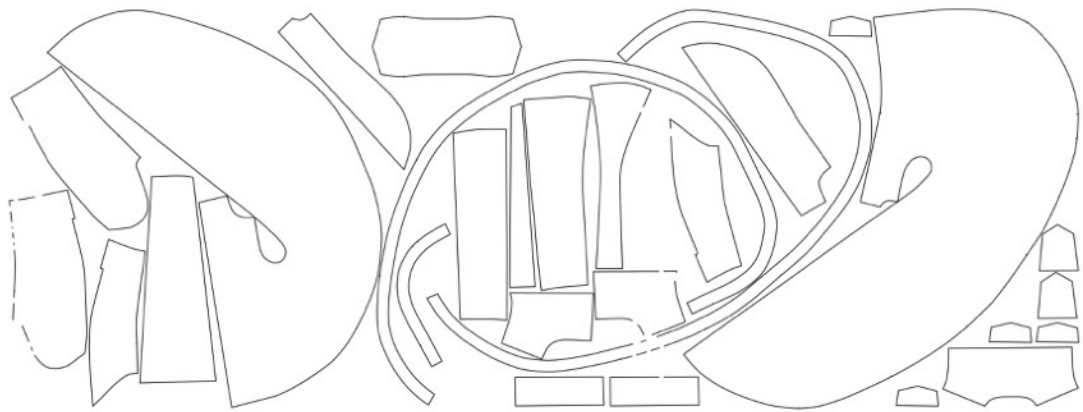
Figure 23: Denim jacket pattern vector file

4.3.3 Cipher

The purpose of a cipher wheel is to convert a message into a form which can prevent an unauthorised person from acquiring the information or vice versa, a process known as encryption and decryption. The logo for the collection is a design based on the idea of a cipher wheel that encrypted with the word "hacker" in a smily face(Figure 24) created by Osamu Sato with only basic vector symbols, in this case, circles. Figure 25 is the complete version of my cipher wheel, where the text "hacker" can be extract and read from the smiley face graphic. I simplified the complete cipher wheel to a minimalistic symbol(Figure 26), along with a hand-drawn version of the it(Figure 27). They are used as the logos of my collection.
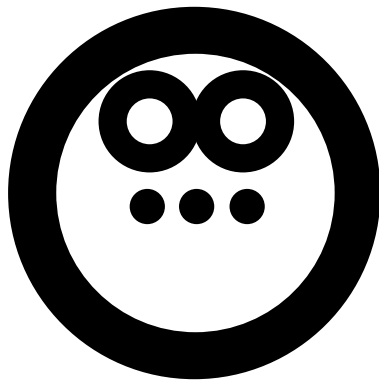
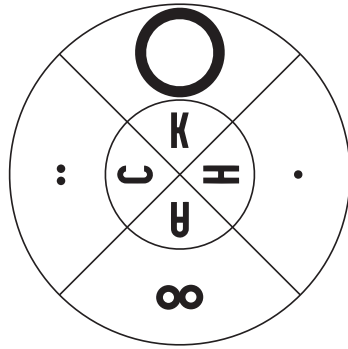*Figure 24: Smily face graphic created by Osamu Sato*

Figure 25: Complete version of my cipher wheel
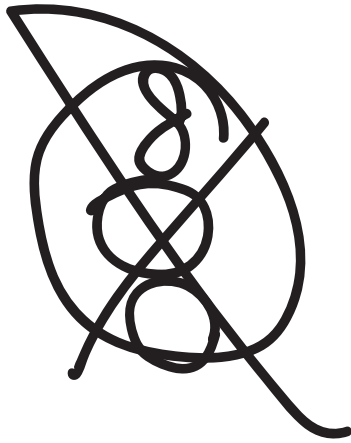
Figure 26: Cipher wheel logo of my collection

Figure 27: Hand-drawing cipher wheel logo of my collection

Figure 28: Hand-drawing cipher wheel embroidery on back pocket of jeans

4.4 Trojan

A trojan horse is a program that intended to cause damage in computer systems by masquerading as a benign system entity[36]. For example, a trojan horse virus can infect a computer by disguising as a Christmas card attached to an email whilst the hidden virus will deploy the function such as copying or deleting local files. The virus is usually embedded in a webpage, an email or a downloaded file with entertaining contents. Essentially, the cleverness of the trojan horse lies on the smooth disguise, it places people in a comfort zone where they feel familiar and entertained.

The philosophy I extract from the trojan horse mechanisms is: instead of adding new features to the design, I find the opportunities given by the existing property and redesign them. In this case, I act as the bricoleur of classical clothing features and elements. The discipline is especially effective on redesign classical clothing, that is, the strong character of the entity(entertaining contents) is reserved while some features(hidden virus) of it will be twisted. Accordingly, this method of design makes the new features of redesign both standing out and blending in the original

classical garments, in the meantime, it keeps the clothing relevant, modest, and accessible.

4.4.1 Materialness

The inspiration of material choice came from the original materials of the hacker wardrobe pieces, which are cotton jerseys, denim, and faux leather. Besides, two outfits that are inspired by the Chinese culture, where the material choice is silk and "polyester nightmare".

The denim fabric for jeans and denim jackets is made of 100% silk, which enables a draped and fluid effect for a large volume of ruffles. Contrariwise, the silk fabric is made of 100% polyester nightmare to ensure a glamours shine, bonded with a thin layer of silk on the backside to keep a clean edge of finishings from the blade cutter. Furthermore, the cotton jersey and faux leather are produced by bonding two same layers of fabric back to back, to keep a clean edge from the

blade cutter as well as to add some force and heaviness to the draped effect.

4.4.2 Hardware

Electronic waste such as cables, mouses, controllers, keyboards, button batteries and wires have been used in details, trimmings and accessories in the collection. The hardware appears as a replacement instead of as a new element, for example, to replace the cotton drawstrings with keyboard wires or controller strings(Figure 29), the buttons have been replaced by button batteries(Figure 30), extension cables have been used as trimmings, and circuit boards have been used as sunglasses lens(Figure 31). The replacements of garments' details create circulation between the original clothing elements and the hacker gears, in the meantime bridging the distance between hackers and the objects of hacking.

Figure 29: Design detail: cable as drawstring

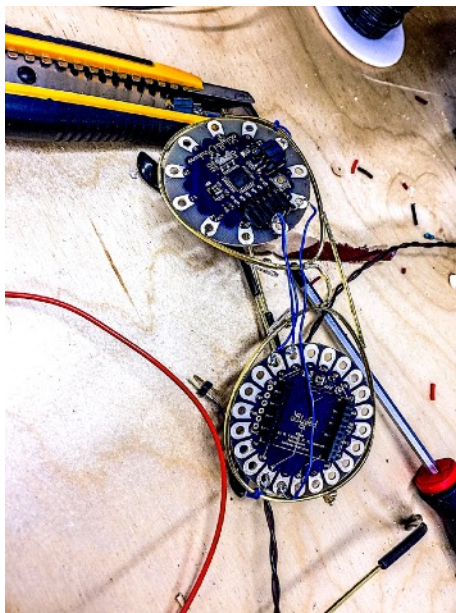*Figure 30: Design detail: button battery as button*

Figure 31: Design detail: robot-eye glasses

4.4.3 Red-Stilettos

Kellie Pickler: "Nobody holds a candle to me, in my red high heels"[37]. A pair of stilettos in red colour is a symbol of seduction and attraction, it has a magical power to bring out the femininity and maturity of a woman. The red stilettos came to my mind directly when I think about choice of shoes, to balance the masculine silhouette, to highlight the mysterious conjecture of feminine beauty. A pair of red stilettos is at the same time an overturn for the modest and masculine hacker wardrobe undertone, that is eye-catching, uncomfortable and gender-oriented.

Figure 32: Accessory: red stilettos integrate with wires

#5. Outcome

5.1 "Hackers"

5.1.1 Photographs

The models are selected delicately according to each outfit's attitudes, that is, they should be able to communicate with the clothing in order to present harmony in the photographs.

Lighting, background, and camera settings are adjusted to capture the fashion pieces with still-life photography aesthetics. As a photographer, I want to reach a balance between mystery and moderation.

I would like to portrait the mental and physical state of the women who stand inside the clothes, to see how they fit in and their personal intuitive reaction to the clothes. From my point of view, one of the fashion's function is communication, that is the clothes can bring out and demonstrate the wear's certain characters.

From a critical point of view, model is a concept of the commodity, where the fashion products usually incorporate the model's character instead of emphasise it. The intensions of the photographs often create a new discourse for the fashion pieces, which is what I intend to avoid. Hence, I try to take photographs with no purpose, which at the end inevitably forms another intension.

Figure 33: A white-T draped into a big ruffled dress

Figure 34: A biker jacket with open back

Figure 35: A denim jacket draped to one side with heavy volumes

5.1.2 Näytös 19

The hacker appears from the backstage with a voluminous black hoodie dress with puffed sleeves, the raffles draped on the open-back tossed to the front side. The jeans are draped with a heavy volume of shredded ruffles, the slick red stiletto touches the ground and the denim ruffles flipped to the side. Hoodie jersey is dark and black; white-T is bright and big; denim jacket are indigo sewed with heavy white thread; purple is cyberpunk; then is gleaming satin in Pale Dogwood; finalise with pitch-black leather of liberation. Every girl has a hoodie on their head and a hacker logo glasses on their face. They were playing blank keyboards and listening to game music through a pink headphone.

Figure 36: Look 1-8 in final fitting

Figure 37: Look 6 captured at backstage

5.2 Conclusion

The hackers' power of manipulating technology and information has drawn great attention from government and corporate. Meanwhile, the hacker subculture has been continuously recontextualising itself to keep the authenticity and fluidity of the underground culture.

As one of the purposes I stated in the preface, the process of producing and writing this thesis will be carried out as a journey to understand myself. For that, I did get some idea, for what has been motivated me in the past as well as what I am heading toward in the future. All in all, a curious mind for a better understanding of the world will live forever. I will enclose this chapter with a quote from Alex Mayfield: "Every time (some software engineer) says, 'Nobody will go to the trouble of doing that,' there's some kid in Finland who will go to the trouble"[6].

#6. Discussion

So, what is hacking? All the things that you can remember among everything you have been experienced, are the things of hack. It is a cool way to make things suck, and make suck things right.

I caught myself among the forces of merely hacking my own freedom within the system while discussing calmly of its symptoms and consequences, and at the same time retain a semi-positive attitude towards life while the system is surely sick and keeps pushing people to an unnatural state of mind and body.

I believe when discussing a cultural discourse, one needs to understand the culture in its widest sense as possible. On the one hand, for me as a novice hacker, I try to avoid misrepresenting the hacker subculture ideology by being modest and observant. On the other hand, me standing at the juxtaposition of cultural discourse, could initiate a test for the boundary and promote further intercultural communications.

During the writing process, I noticed that my artistic intuition and inspiration can often be traced back to previous experience or knowledge, which I perceive as a recall of memory or subconsciousness. Therefore, when I sat back and started to analyse the design and production process, I was surprised to discover a clear logic flow of what has been done.

The formation of the writing part took on an extremely fragmental style, different or even opposite ideas hit me

through reading books and articles related to the hacker subculture. I was struggling with settling down with one particular ideology of the hacker subculture, which I find very hard, if not impossible. In the end, I realised that different ideas can be co-existing, the hacker subculture is a dynamic concept that evolves through unsettling times, it is complicated.

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#8. Figures

Figure 1: Invitation to the first Homebrew Computer Club(HBCC) meeting. Retrieved from: https://en.wikipedia.org/wiki/Homebrew_Computer_Club#/media/File.

Figure 2-3: DEF CON 1 group picture(1993). Retrieved from: https://media.defcon.org/.

Figure 4: DEF CON 3 group picture(1995). Retrieved from: https://media.defcon.org/.

Figure 5: Design and production process illustrated. Author created, free for distribution.

Figure 6: Traditional Chinese circle-shaped pattern. No caption.

Figure 7: Traditional Chinese circle-shaped pattern encoded with the hacker manifesto. Author created, free for distribution.

Figure 8: Traditional Chinese circle-shaped pattern encoded with the hacker manifesto(zoomed in). Author created, free for distribution.

Figure 9: Archimedean spiral. Author created, free for distribution.

Figure 10: logarithmic spiral. Author created, free for distribution.

Figure 11: The first method to apply a spiral structure on clothing construction design(A). Author created, free for distribution.

Figure 12: The first method to apply a spiral structure on clothing construction design(B). Author created, free for distribution.

Figure 13: The second method to apply a spiral structure on clothing construction design. Author created, free for distribution.

Figure 14: Use an Archimedean spiral curve as the cutting line to segment an ellipse surface. Author created, free for distribution.

Figure 15: An elliptic helicoid, see bibliography list [34].

Figure 16: Ellipses E, see bibliography list [34].

Figure 17: A right sinusoidal conoid, see bibliography list [34].

Figure 18: A prototype of drape constructed with elliptic helicoid on a white T-shirt. Author created, free for distribution.

Figure 19: A hoodie dress with ruffled open back. Author created, free for distribution.

Figure 20: A biker jacket with ruffled open back. Author created, free for distribution.

Figure 21: ASCII table of the 128 characters. Retrieved from: https://www.cs.cmu.edu/~pattis/15-1XX/common/handouts/ascii.html.

Figure 22: A demo of ASCII art. Retrieved from: https://www.asciiart.eu/miscellaneous/money.

Figure 23: Denim jacket pattern vector file. Author created, free for distribution.

Figure 24: Smily face graphic created by Osamu Sato. Book Source: Sato, Osamu. The Art of Computer Designing: A Black and White Approach . 1993.

Figure 25: Complete version of my cipher wheel. Author created, free for distribution.

Figure 26: Cipher wheel logo of my collection. Author created, free for distribution.

Figure 27: Hand-drawing cipher wheel logo of my collection. Author created, free for distribution.

Figure 28: Hand-drawing cipher wheel embroidery on back pocket of jeans. Author created, free for distribution.

Figure 29: Design detail: cable as drawstring. Author created, free for distribution.

Figure 30: Design detail: button battery as button. Author created, free for distribution.

Figure 31: Design detail: robot-eye glasses. Author created, free for distribution.

Figure 32: Accessory: red stilettos integrate with wires. Author created, free for distribution.

Figure 33: A white-T draped into a big ruffled dress. Model credit Vuokko Meriläinen. Photography credit Mo Ziwei.

Figure 34: A biker jacket with open back. Model credit Ksenia Malkova. Photography credit Mo Ziwei.

Figure 35: A denim jacket draped to one side with heavy volumes. Model credit Hilda Maaria. Photography credit Mo Ziwei.

Figure 36: Look 1-8 at final fitting for Näytös19. Author created, free for distribution.

Figure 37: Look 6 captured at backstage. Photography credit Guillaume Roujas.