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A Breakthrough in the Traditional Combination of Psychology and Interaction Design

---- Wearable Devices

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Abstract: Wearable devices are currently mostly used in the medical field to monitor the physical condition of humans, but little study is known on the mental level. This article focuses on the implications of applying wearable devices to contemporary design and art, and how wearable devices can care for the spiritual aspect of the wearer. For achieving this, it is essential to invite the audience to participate in the design process, to consider and discuss an idealized design product together, and to move away from "design to solve the needs of human life". The study received positive feedback from participants through case studies and a self-practice component. It can be concluded that wearable devices targeting the traditional healthcare industry have become the traditional way of healthcare, society and individuals should turn their attention to human consciousness, psychological interactions and how to deal with tricky intimate relationships.

Keywords: wearable devices, interactive design, humanist design, user-centred design, contemporary design

1. Introduction

This article focuses on the possibility of wearable devices, a product of psychology and interaction design, through case studies and independent practice. In the 21st century, wearable devices should focus on three main points - technology, aesthetics and emotional communication and interaction with the wearer. Currently, wearable devices are mainly used in medical field to detect a person's heart rate, sleep status, blood pressure and other conditions. There have been many designers who have developed a range of wearable devices and smart systems that aim to focus on the human consciousness and address the unwanted negative effects of psychological and emotional issues. But in response to the question of how consciousness arises Scientists can only explain this as a process of hundreds of millions of neurons firing in response to the biological algorithms of the organism, but the most plausible explanation for the creation of consciousness needs to be questioned, if this is true, AI does not have consciousness opposing argument [1]. This article is not about how to analyze the generation of consciousness from science aspect, but how to stimulate it through design to generate new perceptions from psychology and design aspects or to look beyond the existing products of contemporary society to utilize a new way of thinking about what

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contemporary design can bring to the human, the author also specifically explores cases of traditional and contemporary design, expressing the same and different perspectives within two different conceptual fields of design - human-centered design and exploring more possibilities. Designers are equally concerned with the relationship between the individual and society, leading us to think about the new relationship between people and society through products they design and how to make design a non-organic partner in our psychological aspect.

2. The Application of Psychology in Interactive Design Field

2.1. The Relationship Between Psychology and Interaction Design

The combination of psychology and interaction design is a design philosophy based on the principles of humanist design, which focuses not on physical healing but on inner observation and interaction, and is currently an important branch of contemporary design. Humanities Design Lab, funded in November 2011 in the Design Department of the Politecnico di Milano, was aimed to extend and exemplify the innovative contributions of humanities to design and to make visible the knowledge networks that surround design [2]. In the past, human design was limited to solving the most basic problems of life, but in the future, its sustainable nature should be integrated with other disciplines to give design more meaning.

Talking about design, most discussions circulate around physical objects or products, around their invention, development, production and marketing. While most modern design approaches do also cover questions pertaining to human interaction, e.g. within user- or human-centered design philosophies, a systematic and fundamental conception of the role and implications that human perception and emo-cognitive processing take with regard to designing physical goods is lacking [3]. The design has faced unprecedented challenges since the industrial revolution, from the beginning of design to solving and meeting the problems of life, society and production, gradually developed into a design that focuses on the human heart. “Design studies is an interpretative practice, rooted firmly in the techniques of the humanities and the social sciences, rather than in the natural sciences.” [4]. In detail, the birth of liberal humanism allowed people to focus more on the emotional experience of the human psyche, which led to the birth of humanist science and humanist art and design, and other disciplines with humanism as their dogma. It is a major challenge in the field of design to make people “communicate” efficiently with the products of design, to make design a way of life that enriches the needs of the human psyche and solves the problems of the inner rather than the actual problems of life in the industrial age. This means that psychology is one of the fundamental disciplines of contemporary design and art. Based on the theory of “Speculative Everything Design, Fiction and Social Dreaming”, Designers should invite the audience to participate in the whole process of design together, so as to explore the possibilities of design in the future, what direction they prefer design to develop, and discover more possibilities by means of discussion, rather than just limiting to market research and emotional analysis and study at the beginning. Interactive design does play a significant role between psychology and interactive design.

2.2. Related Works about the Application of Psychology in Interactive Design

2.2.1. A Driving System for Safety

A driving system for driving safety and driver psychological changes was developed. This driving system comprehensively detects the driver’s emotional changes when driving a motor vehicle, and the designers designed the product from the driving experience, communicating with the driver through various in-car interactions to improve driving safety. We present design-led research

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focusing on identifying scenarios that contain normally unarticulated emotions and mental reminders that drivers use to make a journey safer and develop concepts for in-vehicle interactions that assist with these rituals [5].

2.2.2. PICNIC Game for the Young

Another example is a game developed for children's behaviour, which combines knowledge from the field of human-computer interaction with that of behavioural psychology. The game, named PICNIC, was designed to address the problem of children's feeding difficulties by providing them with a deeper understanding of food and a new perception of how to enjoy and actively eat [6].

2.2.3. Wearable Devices Become a Product of Psychology and Interaction Design

Driving systems for safety and PICNIC studies illustrate how psychology, in the traditional sense, can be applied to the field of interaction design, where the designer uses traditional research and production methods to solve the current problem. Interaction design as an interdisciplinary discipline combines significant research findings from many fields, especially in the field of psychology, and presents many substantial proposals and possibilities. As a broad field of interaction design, interaction design should not only be about a specific system or a large mechanical device, but wearable devices are also an important aspect of this, as they can often be used more frequent and convenient than virtual systems and huge machine with humans and more effective and direct way of communicating with them.

3. The Application of Interactive Design in Wearable Devices Field --- Case Study

3.1. The Kinetic Wearables --- Kino with Jewellery Form

The invention of Kino provides a meaningful case for the possibilities of wearable devices. The designer confirms that jewellery and accessories have long been objects for decorating the human body; however, they remain static and non-interactive. Kino explores opportunities for accessory-like kinetic wearables and their association with individual styles [7]. This work can move freely on the garment and create wrinkles on clothing. The designer has created wearable devices based on computer programming and jewellery shapes as shells (see Figure1,2), which not only satisfy the wearer's aesthetic pursuit of jewelry, but also provide fun to wear with a internal drive unit (see Figure3). Author also outlines how personalized aesthetics is significant for the meaning making of novel on-body devices. In the increasingly technological contemporary society, the author has interpreted a new definition of jewellery. The combination of technology and jewellery has become one of the possibilities for the direction of contemporary jewelry development.

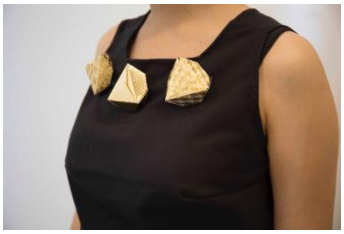


Figure 1: Diamond shaped shell and movement [7].

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Figure 2: Diamond shaped shell and movement [7].

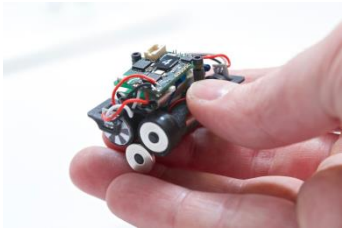


Figure 3: Internal drive unit [7].

3.2. Interact with Strangers --- Hooze

Wearable electronics and smart textiles are generating both academic and commercial interest [8]. The designer utilizes the material of animal fur touch, cardboard, servo motor and vibrator motor to make an interactive device to be worn on the shoulder (see Figure4,5,6). When participants touch the device, it vibrates like a living creature. The author tested the work by wearing it in different public places, and many people were very happy to touch the furry-looking appearance, which in effect brought them closer to strangers. These projects not only suggest novel experience paradigms but also work towards addressing intimate and social aspects of people's lives, important dimensions for cultural relevance [9].



Figure 4: Wearability and interaction [9].



Figure 5: Wearability and interaction [9].

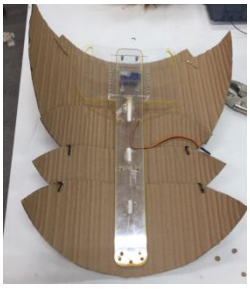


Figure 6: Servo motor and vibrator motor [9].

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3.3. The Main Reason of Choosing Wearable Interactive Devices

Wearable interactive devices break the characteristics of the traditional single aesthetic and offer many other forms. According to the two case studies above, wearable interactive devices show their own potential and offer more possibilities for fabric design --- making fabrics with “movable wrinkles” through Kino and making wearable interactive devices their “friends” or being a part of themselves like a pet or partner. Today, traditional wearable accessories such as watches, glasses, jewellery and clothing are an important part of our lifestyle, yet wearable devices should be as much a part of traditional accessories as these [10]. Another point is that wearable interactive devices can bring people closer together or deal with tricky intimacy, making it easier to socialize.

3.4. A Work for Avoidant Personality Disorder (AVPD)

Based on the theories of the above work, the author of this article similarly considers how tricky intimacy like AVPD can be addressed and expressed through wearable interactive devices. Avoidant personality disorder (AVPD), as conceptualized in the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5), is characterized by extensive avoidance of social interaction driven by fears of rejection and feelings of personal inadequacy [11]. A wearable “hugging machine” through the principle of mechanics was created (see Figure 7,8).

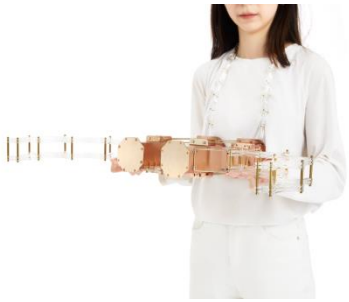


Figure 7: The wearable hugging machine.

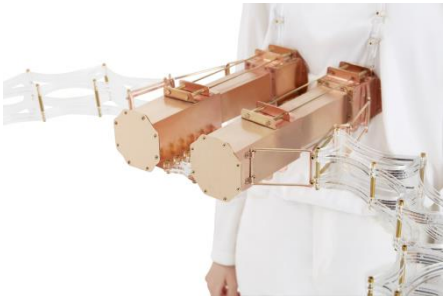


Figure 8: The wearable hugging machine.

This work uses the way worn on the chest to simulate an artificial robotic arm, which is driven by the force generated in the opposite direction when people hugging (see Figure 9,10,11). According to Speculative Design the author invited students of the same major and strangers to wear and experiment, and gave feedback, the participants said: “This work looks like an artificial intelligence device, through the author’s guidance, people are willing to try this work by two people to complete the display of this work, the participant wearing the work can give each other a hug without doing any action. A hug brings strangers closer to each other, and can also help people who are reluctant to express their inner emotions to express their love for those close to them. “



Figure 9: The process of hugging.



Figure 10: The process of hugging.

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Figure 11: The process of hugging.

4. Conclusion

This paper demonstrates the importance of psychology and interaction design in the field of wearable devices through case studies and the author's own experiments. The author hopes to apply psychology and interaction design to wearable devices in a more comprehensive way in future design work, not only following the traditional design concept of problem-solving but also focusing on how wearable devices can communicate with people on a psychological level, bringing them closer to each other and making wearable devices a psychological communication object for humans. Whether the product of traditional design concepts - Driving Safety System and PICNIC, which are designed to solve problems for the sake of solving them, or contemporary design concepts - Hooze and Kino, which inject new concepts into contemporary design. The basic idea of humanism is to bring more and better possibilities and meaning to human society through designers' products. Wearable devices are closely related to interaction design and psychology, and the author needs to communicate further with people in both fields and push the boundaries of his own knowledge in the specific area to create a more meaningful and promising project.

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