Research on Wearable Smart Clothing for Life

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Abstract: With the improvement of human science and technology, wearable intelligent products have become a hot spot of development because of their unique advantages. Many kinds of wearable intelligent products are constantly bringing forth new ideas. Under this background, it is of great practical significance to study how to combine wearable intelligent products with clothing. In order to further promote the development of life-style wearable smart clothing, based on in-depth analysis of the current situation of life-style wearable smart clothing in the future, this paper points out the specific application mode of wearable smart technology in clothing, and forecasts its development prospects, hoping to provide help for the follow-up design of life-style wearable smart clothing.

1. Research background

1.1 Literature review

With the continuous development of science, technology and economy, the public's acceptance of new things has gradually improved, and more and more high-tech products are used in life. Although life-style wearable smart clothing is a new thing, it has great potential for development. If China wants to occupy a position in the market of life-activating wearable smart clothes, it still needs continuous efforts. At present, many scholars are interested in life-style wearable smart clothing, and have carried out a lot of research. Wu Yuxi and Wang Chaohui studied the application of flexible conductive nanofibers in smart wearable products. They believed that wearable equipment should be further developed and improved in health supervision, product performance and fabric wearability (Wu and Wang, 2018). Yan Nini, Zhang Hui and others have studied wearable medical guardianship clothing. They think that there are still some problems to be solved in the design, research and application of wearable medical guardianship clothing, and look forward to its development prospects (Yan et al, 2016). Sun Yue, Fan Jie and others have studied the application of wearable technology in textile and apparel. They think that there are still some problems in wearable equipment at present. They also look forward to the future development trend and prospects of wearable equipment (Sun et al, 2016). Sun Lei and Shao Gaoshuang studied the application of intelligent wearable system in firefighting and rescue training and firefighting and rescue operations. They believed that fire fighters could ensure operational safety through communication, positioning and breathing support functions of wearable equipment in firefighting and rescue operations (Sun et al, 2016). Fan Yanping, Hu Keqin and others discussed the development prospects and market potential of smart textile and apparel products. They believed that smart textile and apparel would be the mainstream trend of smart product development in the future (Fan et al, 2017). Wu Yun and Liu Xi studied wearable smart devices and wearable smart clothing. They believed that vigorous development of wearable smart textiles was conducive to improving people's quality of life (Wu and Liu, 2014). Ning Yanan, Ren Xiangfang and others discussed the design method of intelligent clothing model under emotional environment and the relationship between emotional design and intelligent clothing design, providing theoretical guidance for researchers engaged in this field (Ning et al, 2017).

1.2 Purpose of research

With the rapid development of China's economy and society, the public's psychological pursuit

of new things is becoming more and more intense. The market prospect of life-style wearable smart clothing is good. Life-style wearable smart clothing can better meet the diverse wearing needs of the people, but as far as China's current life-style wearable smart clothing is concerned, the design of products is mainly close to the direction of sports function. Therefore, the design of clothing is relatively single, lack of connotation and emotion. It is easy for people to keep their interest in such clothes for a period of time, and they will dislike products over time. Judging from the current situation, China has not yet occupied a major advantage in the market of life-style wearable smart clothing, and there is still a lot of room for progress in related technologies. Therefore, this paper takes this as a breakthrough point to study the life-style wearable smart clothing, in order to provide help for the continuous development of life-style wearable smart clothing in China.

2. Development status of wearable smart garments for life

As an innovative technology of interdisciplinary and integration, wearable technology is the product of the rapid development of high and new technology. In recent years, the research direction of wearable technology is hardware, software, Internet and industrial design. The research scope of wearable technology is extremely wide. Medical, education, health and fashion are all innovative products using wearable technology. Life is becoming more and more intelligent, and the quality of life of the public has been improved. The application scope of wearable technology has been expanding, and the new research direction has become smart clothing. Traditional clothing industry has changed because of the emergence of smart clothing, and the pursuit of personality of clothing by the public has been satisfied, because smart clothing is both beautiful and comfortable, and has strong function.

The development of bioelectronics, miniaturization, flexibility, wireless and embedding of electronic devices is a new development direction of wearable technology. Bioelectronics is mainly the method of adding bioelectronics chips to textile and apparel; the key point of miniaturization is the design of electronic fabrics, which uses conductive optical fibers and general fiber materials, so as to add fabrics with inductive devices in apparel; flexibility is to emphasize technical design, do softening interfaces and make softening interfaces. Research on flexible switch; wireless can make clothing, human body and environment achieve wireless communication; embedding focuses on the perfect integration of technology and structural design, so that the style, size and structure of clothing seamless. The development of smart clothing will make the combination of electronic products and clothing more intensive, so that there is no clear boundary between the two, clothing into wearable electronic products.

From the many smart products on the market, wearable products are mainly some smart bracelets and watches. Wearable smart clothing in daily life is almost nonexistent. Linking the wearing technology with traditional clothing will change the traditional life style of the public. The prospects for the development of smart clothing cannot be ignored, it will be a big hot spot.

3. Application of wearable intelligent technology in clothing

Wearable technology is actually a technology of human-computer integration, which is controlled by users and forms the interactive mode between human and computer. Wearable technology is a kind of communication and communication between devices and users. Devices and users act as receivers and senders to exchange information. Wearable technology is actually embedding multimedia technology, wireless communication technology and computer technology in people's clothing, and then some interactive ways occur. In many fields, wearable technology has brought many conveniences to people's lives. At present, wearable technology has made remarkable achievements in music, health, games and entertainment. With the increasing integration of hardware and smaller size, wearable technology research began to enter the field of fashion apparel, and smart clothing appeared in the public's eyes one after another.

The first is tactile technology. The sense of external stimuli is aided by the sensory organs on the surface of the skin, which is the sense of touch. The most real objects perceived by the public are

distinguished by touching the characteristics of the sensory objects and according to knowledge. Touch, an indispensable part of emotional communication among the public, plays an extremely important role. Interpersonal communication can link up with each other, and many cases are transmitted through non-verbal communication. Non-language is varied, including make-up, body language, clothing and so on. The information transmission function of clothing is stronger in non-language, and the role of clothing is larger. Different costumes show different identities and positions, and also reflect the different aesthetic and personality of the public. Clothing also plays an important role in releasing emotions and expressing attitudes. The most widely used technology in smart clothing is tactile technology, which can make the communication between the public more frequent and promote communication. Tactile technology is a wearable technology that can promote social interaction. Its main research area is the application of electronic intelligent materials and pressure sensors. See Figure 1 for details. Tactile sensing allows users to understand the Russian physical properties of the object surface, as well as the contour characteristics of the contact surface. Tactile sensing is essentially an imitative function, which allows the tactile sensor and the object to be squeezed to imitate the human touch. Tactile technology plays an important role in the development of wearable smart clothing.

Fig. 1 Application of tactile technology in dress

The second is LED technology. LED is a kind of light-emitting device, which is made of semiconductor materials. It can directly convert electric energy into light energy. LED technology is also common in the life of the public. LED products can be seen everywhere. They are mainly used in lighting appliances, display screens, traffic lights and lighting. LED has many advantages, such as low price, no space and so on. Behavior feedback and decoration are the application of LED technology in clothing. Behavior feedback is to make the LED lights change, using sensors to detect data changes, to create a comfortable and beautiful atmosphere for the outside world. Usually, the visual change of clothing is caused by various factors, and the change of light and color will affect it. Therefore, the behavior feedback type is actually the visual feedback to the change of things. The ever-changing environment around the wearer has a great influence on the visual of clothing. Decorative is to let the public feel the visual effect of clothing strongly, using the light-emitting characteristics of LED to show a colorful world. Therefore, in the process of stage costume design, most adopt decorative LED design. LED technology has brought the wearer a different experience from traditional clothing, and a new sense of vision. As an important part of smart clothing, LED technology can not only grasp the public's aesthetics and preferences, but also lay a good foundation for promoting the popularity of smart clothing in the future.

The third is intelligent fabrics. With the emergence of various emerging technologies, experts from all walks of life have increased their attention to intelligent fabrics and began to pay attention to research and development. With the continuous development of intelligent fabric, it has been widely used by the public, which will make intelligent clothing develop to a new height. Intelligent fabrics are devoted to reducing the difference between traditional fabrics and making them perfect in washability, softness, comfort and comfort. There are several kinds of intelligent fabrics, but the better ones are mainly optical fabrics, memory fabrics and phase change fabrics. Photoconductive fabrics occupy a greater advantage in meeting the intelligent requirements of the public, and are widely used in smart clothing. Optical conductive fabrics can transmit information and perception information completely and correctly, because they make use of the characteristics of easy processing, fast conduction and small diameter of optical composite fibers. Usually, this kind of fabric is used in monitoring various physiological indicators of human body and the temperature and humidity changes of the external environment. Memory fabrics can not only restore the initial shape under certain conditions, but also deform under certain conditions. Usually, the initial shape will be designed into a variety of shapes, such as spirals, lines, waves or other shapes. Phase change fabric is a kind of fiber fabric, which can automatically adjust its own temperature, and also can sense the ambient temperature. When the environment changes in heat and cold, the material can phase change to absorb heat or dissipate heat, resulting in refrigeration or thermal insulation effect.

4. The development prospect of life-style wearable smart clothing

As the future of wearable equipment, life-style wearable smart clothing is recognized by most people. Compared with traditional clothing, life-style wearable smart clothing has great advantages. The development of intelligent clothing is a systematic chain reaction. It is not enough to rely solely on the efforts of the traditional textile and garment industry. With the continuous improvement of the living standard of the public, the requirements for clothing have been raised accordingly. Intelligent clothing develops more rapidly to the civilian type, and the design is more artistic in appearance, price and wearing feeling, which promotes the diversification development of intelligent clothing. Therefore, the development prospect of this kind of life-style wearable smart clothing cannot be underestimated. First, clothing is a necessity for consumers, and life-style wearable smart clothing is easier to open the market than other smart products, and is accepted by consumers. Secondly, life-style wearable smart clothing does not require consumers to feel the existence of wearable devices, but this kind of clothing will invisibly pay attention to all aspects of consumer body indicators, to help consumers maintain health. This shows that the real science and technology is to make the people do not feel the science and technology. Thirdly, due to the diversity of clothing, life-style wearable smart clothing will also be designed in a variety of ways. When smart clothing becomes the mainstream development direction of wearable equipment, all kinds of clothing worn by consumers can be used as research and development objects.

5. Conclusion

Life-style wearable smart clothes will be more comfortable and personalized in the future, and more and more intelligent elements will be added to meet the needs of the public. Intelligent clothing conforms to the development of the trend of the times. It will become a new trend to perfect the integration of comfort and individuality of clothing design and constantly pursue functionality, which will be popular among the public. In the future, it is bound to be more magical and practical to meet the public in life and wear smart clothes.

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