

Review on Human-computer Interaction Technology and Market Development

Ding Chen ^{1, a}, Yicheng Ding ^{2, b}, Xiaoyu Du ^{3, c}, Zimo Hao ^{4, d}, Jiale Liu ^{5, e}

¹ 1617 Valdora St. Apt 20, Davis, CA, 95618 University of California, Davis, CA 95616, USA

² China Jiliang University, No. 258, Xueyuan Street, Qiantang District, Hangzhou, Zhejiang, 314423 China

³ University of Pennsylvania, Levine Hall, 3330 Walnut Street, Philadelphia, PA 19104, USA

⁴ University of California, Davis, 1 Shields Ave, Davis, CA 95616, US, CA 95616, USA

⁵ Northeast Agricultural University, No.59 Mucai Street. Harbin. Heilongjiang, 150038 China

^a dinchen@ucdavis.edu, ^b Laifuling2022@163.com, ^c alanduxiaoyu@gmail.com,

^d zimhao@ucdavis.edu, ^e 671011dream@gmail.com

Abstract. Human-computer interaction (Human-Computer Interaction, HCI) mainly studies the information exchange between users and systems, and it mainly includes two parts: user-to-system and system-to-user information exchange. Human-computer interaction technology, as an interface for information exchange between humans and computers and a human-centered methodology to guide system development, plays a very important role in the development of both humans and computers. The opportunities for human-computer interaction are enormous. Advances in more practical and natural human-computer interfaces are invaluable and will profoundly change our daily lives. This paper mainly introduces the development status of human-computer interaction and the application of cognitive psychology in human-computer interaction. Moreover, it further analyzes the market status and future development trend of human-computer interaction.

Keywords: Human-computer Interaction; Cognitive Psychology; Market Development.

1. Introduction

Human-computer interaction (HCI) is an area of applied cognitive science and engineering design [1]. It is a science that studies the interaction between systems and users, in other words, it is the process of information that language of conversation is used between human and computers, which in a certain interactive way to complete a determinate task. To put it simply, it's communication between human and computers. In this way, the system can understand the habits and requirements of users better, so that better services could be served.

With the birth and continuous development of computer technology in the last century, people pay more attention to the ease of use of computers, In 1960, Liklider JCR firstly proposed the concept of Human-Computer Close Symbiosis. Based on the user's experience requirements, computer developers have to pay more attention to Human-computer interaction on the basis of ease of use (This encompasses not only ease of use but also new interaction techniques for supporting user tasks, providing better access to information, and creating more powerful forms of communication [2].), In this way, the competitiveness of products is enhanced. Research in HCI has been spectacularly successful and has fundamentally changed computing [3]. Human-computer interaction is the development from people adapting to computers to computers constantly adapting to people.

In recent years, with the rapid development of computer hardware, many man-machine devices with fast computing speed, large storage capacity and intelligence have emerged on the market; at the same time, with the development of hardware technology, the size of computers has become smaller and smaller, and the application fields The wider it is, the more functions it has. Computer technology represented by computer portability and virtual reality and augmented reality have become two important development trends of computers, and man-machine terminal technology is one of the key

technologies to adapt to this development. Human-computer interaction is human-centered, which is a necessary condition for computer systems, and the realization of efficient cooperation between human-computer psychology will be the main goal of the next generation of human-computer interaction [4].

2. Cognitive Psychology in Human-Computer Interaction

Cognitive psychology is a branch of psychology that deals with people's perception, memory, attention, problem solving, and decision making. Human-computer interaction is largely study of the design of interfaces between humans and computers, in which researchers study users' thought patterns to predict their behavior and thus create more intuitive interfaces that enable people to use computers more effectively [5]. Human-computer interaction involves many disciplines, including computer science and social science, with cognitive psychology playing a large role in interface design.

One example of cognitive psychology that involved in Human-computer interaction is Simon effect [6]. The Simon effect is a study of attention, which shows people respond more quickly and accurately to stimuli that occur at the same relative location as the response. The user's attention follows the cursor, and when the cursor moves to the place the user wants, the image of that place will be darkened, and this information will stimulate the brain, so the brain knows that the darkened place is the place where the information can be obtained.

Another example is transference. It originally means that people project their feelings about one person onto another person. In Human-computer interaction, it means that the user assumes that the new system can be used in the same way based on the experience of using the previous computer system.

In addition to attention and learning ability, memory is also an area that needs to be studied by researchers. Cognitive load is the amount of working memory being used, and researchers need to take it into account when designing an interface, because if there is too much information that exceeds the user's Cognitive Load, the user may stop using the interface. There are three types of cognitive load. The first one is intrinsic cognitive load, it is the difficulty of the task itself. To reduce intrinsic cognitive load, the designer should make the interface as simple as possible, so that the user can get the desired result as fast as possible; The second one is extraneous cognitive load. This is the difficulty that factors other than the task itself can cause, such as fonts. The last one is Germane cognitive load. It means the difficulty in translating new knowledge into long-term learning. van Merriënboer and Sweller (2005) have pointed out the relations between working memory and long-term memory in cognitive psychology during the design of the interfaces between humans and computers [7]. In this process, scientists have structured more worked examples instead of offering problems to solve. The problem is working memory is dealing with organized information, thus, when dealing with novel and unorganized information, the effectiveness of problem-solving will be challenged. The rich and real-life learning tasks are based on complex learning, which seriously challenges the working memory during cognitive load. As a result, the human-computer interaction will focus on improving problem solving skills.

In the future, human-computer interaction will increase its adaptation across the whole society including banking, marketing, education, medical diagnosis, cyber defense, and even in wars. The most important factor in the interaction design is to understand and develop the psychology of trust, teamwork, and communication [8], which seems very easy and common among humans. Currently, consumers still prefer to get advice or diagnoses based on human-only services or predications in many situations [9]. This is because consumers will give more tolerance for human error instead of the error of the algorithm. Therefore, future human-computer interaction will increase the trust between consumers and machines as well as improve the psychological process of machines to enhance the user experience.

3. Market Development Prospect of Human-computer Interaction

The human-computer interaction technology has made great progress in the application level, and has played a powerful role in promoting the economy. However, the human-computer interaction technology is still affected by policies, social ethics and other factors. The rapid development of human-computer interaction technology in many fields has brought about product reform and efficiency optimization, promoting economic development. The human-computer interaction industry started late, and the industrial chain was formed late, but the development speed was extremely fast, and the market share increased rapidly, providing new impetus for economic growth. The human-computer interaction equipment market has broad prospects for growth, with a global scale of 100 billion US dollars. With regard to the rapid development of human-computer interaction technology, enterprises in various fields have paid great attention to this technology, and have successively carried out research and development on it, so as to quickly occupy the market. Human computer interaction products have become popular in the market, and have an extremely fast growth rate, which can be said to be the focus that enterprises must pay attention to. With the rapid development of human-computer interaction technology, human-computer interaction still has obvious defects at this stage. Although there are many new ways of human-computer interaction, the use efficiency is still not high, and the application field of human-computer interaction technology is still relatively limited. Secondly, the human-computer interaction technology is not accurate enough for information collection at this stage, so it is unable to collect information absolutely correctly to make correct operations. It is not perfect in stability. At the same time, the information collection method is relatively simple, which is vulnerable to interference from peripheral factors, and it is easy to make wrong operations under complex environmental factors. This series of short boards has also become a major factor limiting the development of the human-computer interaction market.

Human computer natural interaction technology can be widely used in electronics, communications, industrial equipment, machinery, instrumentation, transportation, security, services, military and other fields. At present, robots are an important application market of human computer natural interaction technology. The new trend of human-computer interaction technology is to achieve new development through a more people-centered perspective in the way of new media and new channels. Through the improvement of the naturalness and efficiency of human-computer interaction, and in view of the characteristics of human feeling channel and effect channel, the multimedia human-computer interaction technology and multi-channel human-computer interaction technology are combined to form a new mode, which has a broad application prospect in the fields of virtual reality technology and scientific computing visualization. Virtual reality is a new computing environment. It has very important value and broad application prospects to complete virtual assembly with virtual environment in manufacturing industry. Virtual environment technology has a strong strategic position at present. The application of virtual environment technology can better improve products, reduce time and cost, and also better solve problems in product development. Through the application and development of human-computer interaction technology, the human-computer interaction technology in virtual environment has also developed rapidly, so that people can better use virtual environment technology to solve a series of problems encountered in virtual environment before, so as to better promote product research and development, promote market development, and become an economic fuel. The human-computer interaction technology in virtual environment plays a huge role and receives more and more attention, The prospects for development are very promising.

The human-computer interaction technology also has a broad application prospect in the military industry. With the modernization of weapons, the efficiency of human-computer interaction will greatly affect the operational efficiency. With the development of modern science and technology, weapons technology has also been highly developed, with a higher degree of intelligence, and also promoted the application of human-computer interaction technology. The application of new human-computer interaction technology can significantly improve the human-computer interaction efficiency of weapon equipment system, and thus improve its combat capability and efficiency. Better human interaction technology can greatly improve the efficiency of weapon systems. The application

of human interaction technology has become a major focus in the military industry. In the military industry, human-computer interaction technology has huge development space and excellent prospects. Human computer interaction also has an excellent development prospect in the business field. With the application of computers and the Internet and the arrival of the information age, the traditional business model is gradually going downhill, while the new business model formed by the use of human-computer interaction technology is developing rapidly, which has huge advantages over the traditional business model. Through the application of human-computer interaction technology, businesses can better obtain customer information, customers' interests and preferences, and investment styles, so as to better serve customers and meet their needs. At the same time, the information through human-computer interaction can help businesses find customers better, find customers more accurately, and save time and cost. On the other hand, customers can better obtain the information they need and find more correct choices. Through the application of human-computer interaction technology in the market, the economic development has been better promoted. At the same time, the human interaction technology has also attracted attention in the market. More traditional businesses focus on human-computer interaction technology, laying a better foundation for the development of human-computer interaction, and further expanding the market prospect of human-computer interaction. Human-computer interaction technology has begun to receive more and more attention in many fields, and gradually become a technology that must be developed. human-computer interaction has a very good prospect.

The market scale of human-computer interaction will be further expanded in the future, and will continue to develop rapidly. At the same time, the application fields of human-computer interaction will be more and more, so as to occupy more market shares. Taking the market scale of China's core human-computer interaction products as an example, the market scale will become larger and larger, but the growth rate has passed the peak and will gradually start to decline, but still maintain a high development speed. From a global perspective, countries with an early start in human-computer interaction technology already have a considerable market and have received great attention. The human-computer interaction market will further expand, but the growth rate may be slow. For newly emerging countries, the human-computer interaction market will expand rapidly and have a high growth rate. In general, the scale of human-computer interaction will be further expanded and developed.

4. Conclusion

Since the emergence of the human-computer interaction industry, it has developed rapidly. From the early stage of manual work to today's VR, AR and somatosensory interaction. There are more and more ways of human-computer interaction, and technology is also advancing step by step. I believe that in the near future, people will get rid of any form of interaction, and the way of information will become more and more simple, random, and capricious. With the help of the fusion of artificial intelligence and big data, the computer system can capture information very intuitively, directly, and comprehensively. To the needs of users and assist humans in processing.

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