Designing Sensory Experiences -Receive, Release and Generate Sensory Information

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Summary of Dissertation

This paper mainly expounded new form of interaction through creating art works against the background of the information age, discussed human-computer interaction relationships from the perspective of cognitive science, and presented that sensory organs are the interfaces between the human and the machine.

Exploring human-machine co-existence relationships was the main concern of this research in a three-year doctoral period. The era of machine intelligence is about to begin, and new technologies, materials and energy sources are being found. However, how smarter machines will enter life and how these machines and human beings can coexist with mutual benefits is a problem demanding prompt solution. Multidisciplinary and interdisciplinary research will be required to explore how future designers will design machines and participation in design is even more needed. So, we can know that the "interface" is the interface we exchange information, and the relationship between people and technology. We use this sense to establish a connection with the world, so we can say that the senses are the interface between people and machines so to explore new forms of interaction is how to enhance this HCI relationship.

After the introduction of sensory age background in the first chapter, then proposed the main goal of studying new forms of interaction through create art works and the significance of research. The third chapter studies and reviews sensory design, sensory organs, and sensory experience information, as well as presents the storylines for three experimental installations from breathing to smell. Proposed designer Kenya Hara's and scholar Joy Monice Malnar's discussion on sensory design, the relationships between sensory feelings and cognition, memory and emotions are explored from the perspective of cognitive science and cerebral nerves. The influences and significance of senses on a person is discussed, and the significance of designing senses for design is presented then.

Based on James Gleick's proposal in the Information—we see everything as information, to reviews and discusses the information processing design of a single sensory feeling and multi-sensory information design conversion, and puts forward the view and assumption that sensory organs are the interfaces for humans to receive and release information, as everything is information. Then proposes three aspects related to the behavior of breathing from the three works, which lead to three interactive installations from the behavior of breathing, respiration and the senses of breathing.

In the fourth and fifth chapter, from the aspects of receiving and releasing information through sensory organs, two of the experimental human-machine interaction

devices—Breathing shelter and Breathing Sofa—are explained. And summed up the direction of converting sensory information and transmitting sensory information. These installations were designed in the doctoral research period focusing on the methodology and knowledge of man-machine interaction, bio-sensing, cognitive psychology and neurology, to verify the opinion and assumption that the conversion and transmittion of sensory information, and this was done via exhibition and interview-based experiments.

In the sixth chapter, the main work "Scentgraphy", which took place during the doctoral research phase, is presented. It is an olfactory interaction installation that can calculate, save and generate smells. The installation combining converting sensory information and transmitting sensory information to realize the generation of new sensory information. The entire chapter is divided into four parts—the relationships between olfaction and human, the information conversion between vision and smell, the designs of the Scentgraphy (1.0/2.0/3.0), and the exhibition and summary of the Scentgraphy (1.0/2.0/3.0). In the first part, it is presented that olfactory sense is an extremely important but neglected sense in human life. In the second part, three experiments are utilized to create and verify databases for colour and olfaction conversion. In the third part, the evolution and manufacturing process of the Scentgraphy are described from the perspectives of interaction process design, software, hardware, materials, appearance design and so on. In the fourth part, Scentgraphy and olfactory interactions are discussed and two exhibitions and interviews used to verify that a sense can generate information.

In the 7 chapter, the above study is further explored and verified, and then future interaction design and human-machine relationships re-examined and forecast. Since humans learn and connect to the world through the senses, establishing a mutualistic human-machine relationship via senses is a critical point of future interaction design and interactive system design. And discussed to realizes the generation of new sensory information by combining conversion and transmission of sensory information. The application of senses in interaction design is summarized in the last part. Therefore, this research explores new form of interaction though creating art works and verifies the feasibility of multi-sensory design in design interaction and investigates the methodology of such by studying the reception, release and production of sensory information, and also explores the future and wider application of multi-sensory design methodology.