ABSTRACT
This position paper characterizes HCI research in China by comparing it with international HCI research traditions. We discuss the current streams and methodologies of Chinese HCI research. We then propose future HCI research directions such as including emergent users who have less access to technology, and addressing the cultural dimensions in order to provide better technical solutions and support.
1. INTRODUCTION

Human-computer Interaction (HCI) is an interdisciplinary research field involving multiple disciplines, such as computer science, psychology, social science and design. It studies the interaction between users and computer in order to better design technologies and solve real-life problems. HCI field has been increasingly popular, since the first conference on Human Factors in Computing Systems in 1982 in the United States[1]. With the remarkable growth of the Chinese technology market, HCI research receives increasing attention both in academia and industry, since the First International Symposium of Chinese Computer-Human Interaction (Chinese CHI) organized in 2013 [2].

In this position paper, we firstly introduce the mainstream HCI research topics that have been mainly investigated in China. Then we discuss the research methods applied by the Chinese HCI community. We propose that HCI research could focus more on the emergent user groups in China. We specifically state that HCI research in China should pay more attention to the study of cultural factors when designing new technologies, taking the example of the digital red-packet. We conclude by suggesting potential directions for HCI research in China.

2. STREAMS OF HCI RESEARCH

The research conducted in the Chinese HCI community is slightly different compared with the international HCI research tradition. In China, HCI research in both academia and industry study tends to be more technology-focused than behavioural research based. Here, research focuses on back-end hardware building or software engineering, such as speech recognition interfaces and Chinese keyboard applications for mobile phones. Researchers develop new or improve existing interfaces by quantifying how much faster or more accurately users can complete tasks. This type of HCI research is relatively technology-driven and focused on the computer-orientated quality attributes such as performance, robustness, reliability, efficiency, scalability, etc.

With the increasing popularity of user-centred design (UCD) approach, more industry companies (e.g., Alibaba, Tencent) have raised their awareness on the usability of their products and services in order to provide better user experiences. However, there is still a lack of attention to the human behaviour surrounding computer systems. Much less attention has been paid to the behavioural and cultural dimensions of human-computer interactions. Protenitional questions could be explored including the troubles people face in everyday life when using technologies and their individual goals and preferences. A better understanding of individual practices is key to shape more usable and useful technologies [3].

Schneiderman [4] proposes the two categories of HCI research: Micro-HCI and Macro-HCI. Chinese HCI research seems to focus more on the Micro-HCI category that aims to improve the completion time and performance of tasks. The current international HCI community investigates also the Macro-HCI category that involves broader research topics, such as motivation, social collaboration, trust and wellbeing, engagement, as well as the emotional experience. These Macro-HCI research questions have more societal-level impact and they need to be studied with research methods borrowed from sociology and psychology fields (i.e. qualitative research rather than controlled lab experiments). Chinese HCI research seems to focus more on building new artefacts and empirically evaluating the performance of HCI system in a quantitative way. We encourage to examine not only Micro-HCI but also Macro-HCI research topics in order to solve practical human issues.

Artificial intelligence (AI) research also becomes increasingly popular. Current AI researches (i.e. Deep Learning, Computer Vision, Natural Language Processing, etc.) in China lay a particular emphasis on developing the intelligence of the machine with the research focuses on pushing the boundaries of the model performance. Indeed, dealing with big data from the large-scale population is easier than deeply understanding the individual. The initial purpose of AI is to better serve human being. In china, there is an undermined research area of understanding the human side, including research questions such as where AI is needed, what questions should be addressed by AI techniques, and more importantly, how AI should be designed in the life of human individuals, and how AI

KEYWORDS

HCI research in China; Research topics; Research methods; Emergent users; Cultural factors and HCI

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should be user-centred. HCI research, therefore, should play an important role in the development of AI especially in China, to solve real-necessary human and societal problems.

3. METHODOLOGIES

The research focus discussed above leads to the differences in HCI research methods. The Chinese HCI research community employs controlled lab studies with traditional evaluation methods such as hypothesis testing, statistical test, controlled groups, considering the quantitative quality attributes of existing or newly proposed HCI prototypes. However, these quantitative methods are not sufficient to understand the lived experience of when and how people encounter problems and what needs they have. In HCI communities, noticeable amount of research adapt methods from psychology and social, behavioural science to understand the individual [5]. Popular methods include field studies, interviews, dairy studies, and ethnography. Such approaches have the advantage of digging into the research questions like what the fundamental issues or basic needs are, why these issues/needs matter, and what the new opportunities of designing novel human-computer interaction are.

There are two types of research methodologies in HCI research: top-down and bottom-up. In China, many HCI researchers tend to apply the bottom-up approaches for designing a new type of HCI interface. Technology is often developed before gaining an in-depth understanding of human-related issues. It tends to be examined with followed-up evaluations and then applied into the realistic practice later. However, by looking at the research papers previously submitted to the CHI conferences, many applications used top-down approaches to explore the opportunities for designing novel technology and solving a real-world problem.

Although no research method is perfect, in order to maintain the academic solidness and rigor, it is rather insufficient to develop a new HCI system without understanding the needs for it. Therefore, there is a call for Chinese HCI community to pay more attention to utilizing multiple research methodologies especially for better understanding user behaviours from a psychological or sociological perspective at the initial stage of the research.

4. TOWARDS INCLUDING EMERGENT USERS

In spite of the rapid growth of economy during the past decade, China still remains a developing country that faces various challenges and a series of societal issues such as the inequality in Wealth and Education Resources Distribution, as well as the increasingly serious aging issue. International HCI community has started to include people experiencing these issues. The HCI notion – “emergent users” refers to the people who received less education or have a low level of living conditions [6]. This also includes people who are living in the underdeveloped rural areas lagging in infrastructure, education and economic construction [7].

Emergent users are different compared with the traditional users in terms of their needs and experiences. There are 85 million disabled people in China [8]. However, not all of them has the access to the advanced assistive technology. Some disabled people who live in a poor financial condition cannot afford advanced assistive technology (e.g. a smart wheelchair). Similarly, in some undeveloped regions of China, the children who do not have the supervisions from parents could easily get addicted to unhealthy online information and mobile games through the widespread smart phones. HCI researchers should, therefore, also study how technology could be introduced to emergent users at young age when they are just beginning to appropriate advanced mobile devices, in order to avoid the potential negative influences, such as addictions.

Therefore, the development of Chinese HCI industry should not only focus on the novelty of trending technology such as fancy and more advanced interfaces, but more importantly take into account the realistic utility of the emerging technology for better practical support to the demanding needs derived from particular social problems. HCI researchers should also look at how to design assistive applications and devices that are affordable, practical and sufficient for emergent users. To achieve these, it is essential to understand the living and economic conditions of respective groups from a sociological perspective. Research methodologies in sociology could have potential for digging into deeper social problems, in order to provide relevant and feasible technical solutions to specific issues. In addition, these types of HCI research can also help the policymakers to inform better regulations, public policy and even laws for these population, especially in the areas about accessibility, ergonomics, health, and education [9].
5. **TOWARDS ACKNOWLEDGING CULTURE DIMENSIONS.**

As HCI research is heavily involved with and affected by cultural factors, Chinese HCI community should study more on the cultural and behavioural factors to better understand the people’s needs and behavioural differences when designing new HCI system. China is a country where culture plays an important role in shaping the human behaviours and citizen’s lifestyle. Importantly, Chinese culture is very diverse. People from different region or ethnic groups may have different preferences and requirements for the human-computer interaction. Previous Chinese HCI conferences organizer also identifies the importance of looking at the difference between ethnic groups in China when considering the user behaviours [10].

To better understand the cultural factor, here, we rethink the example of digital application of Red-Packet. Red-Packet (also called Hongbao in Mandarin) is a nationwide tradition during the Chinese New Year festival [11]. Older people normally prepare a red envelope containing lucky money and give it to young children as a gift with good wishes. In 2015, WeChat (an instant message app developed by the Chinese technology company Tencent) firstly introduced the digital version of Red-Packet that allows people to give and receive the lucky money via online message. WeChat also allows people to “grab red-packets” within their group chat. During the Chinese New Year festival, people also have the chance for winning 3rd-party red-packets by “shaking their phones ceaselessly”[12]. This new format of Red-Packet, as a novel way to do social interaction, became very popular and caused a huge amount of participation (around 10 billion) especially during the New Year Eve.

As HCI researchers, we need to think about people’s motivation for giving/receiving Red-Packet, while other questions need to be considered include how the digital red packet changes/exists with the traditional red-packet culture? and how digital red-packet is differing from traditional red-packet? Why does the traditional one is still happening? Why do people want to grab/fight for Red-Packet within their group chat? An in-depth understanding of these cultural behaviours will help to maintain and even promote the engagement of this cultural tradition, as well as enhance the social relationships between people.

6. **CONCLUSION**

In this position paper, we have outlined the current landscape of research streams and applied methodologies in the Chinese HCI community. Based on this understanding, we propose that the Chinese HCI community should not only focus on incrementally innovating hardware to improve the quality attributes of HCI systems (Micro-HCI), but also investigate the behavioural and cultural dimensions of human-computer interactions to explore fundamental question, such as: what are the needs of the explored user groups and how could these be supported with technologies (Macro-HCI)? In order to better address these questions, it seems reasonable to put more emphasis on, firstly, understanding a phenomenon before developing the interface, and to adopt more research methods from psychology and social science, in addition, to the traditional lab-controlled empirical evaluation methods. More importantly, the Chinese HCI community should pay attention to designing for emergent users who have less access to advanced technologies. Last but not least, cultural factors are particularly important and should be carefully looked at when conducting HCI research in China.
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