Socio-Technical Aspects of Text Entry

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ABSTRACT

Mobile text entry has become an integral part of our daily life. We regularly input text on smartphones, laptops, desktops and increasingly on smartwatches, VR systems, interactive tabletops/walls, and kiosks. This text entry is done in all social settings, from solo individuals writing private notes, through social networking in bars with friends, to jointly writing on collaborative devices in public spaces. Traditional tap-based input is increasingly being replaced with or supplemented by voice input or multimodal control. With the ubiquity of text entry, it is becoming increasingly important to consider socio-technical systems perspectives in the design, development, and evaluation of new techniques. The purpose of this one-day workshop is to share and encourage research exploring various socio-technical aspects of text entry, including social and cultural impacts, developing socially and culturally acceptable techniques, and techniques to support all users of varying ages, social and technical backgrounds, language, and physical abilities.

BACKGROUND

Text entry has become a part of our day-to-day activities. The ubiquitous nature of text entry has deemed it necessary to look beyond the speed and accuracy of a technique and consider its socio-technical aspects.

Traditionally, the process of inputting text with physical and virtual keyboards has been a private activity, which made it a means to freely and privately express one's thoughts. Yet, many emerging text entry techniques compromise this privacy. For instance, speech, gesture-based, and hybrid techniques that utilizes several modalities [23] require the user to speak out loud or perform expressive touch and mid-air gestures [3,20,21,26]—all activities that bystanders can witness shattering privacy and often creating inappropriate moments when the user dictates a private thought or performs a gesture that may appear erratic to someone unfamiliar with the technique (Figure 1). Thus, it is necessary to explore both the personal and social acceptability of techniques to identify and adapt to use scenarios. Research must also investigate any potential cultural aspects of text entry techniques, particularly whether a technique's appropriateness varies between different cultures. Several studies have explored the social acceptability of speech recognition and gesture-based interactions [12,17], but rarely in the context of text entry.

Figure 1. Users can input text using hand gestures in virtual worlds.

While there are many reasons to enter text on a mobile device, much of it concerns communication with other people. Errors in sent messages can lead to humorous incidents, but also to misunderstanding, confusion, and potential embarrassment. There has been little research onto the impact of different text entry techniques and error correction on the social and communicative aspects of texting. Studies with older adults [8,11] (Figure 2) showed a strong concern for sending erroneous messages, a dislike for auto-correction, and a feeling that it was the user's responsibility to type accurately. Some refinements aim for smarter error correction [4], while others focus on reaction of users to incorrect auto-corrections [15].

Freedom of expression is a core article of human rights, however most current text entry techniques were designed and tested in technologically advanced countries for young able-bodied adults. This can lead to techniques that are not as effective with, for example, children [5,16] (Figure 3), older adults [13,25], physically impaired users [6,14] (Figure 4), and low-income individuals [1]. Further investigation is necessary to fully understand these users' needs, desires, and

expectations to investigate how different techniques fit their social environments and affect the balance of power in relationships, and to address these issues through novel or improved techniques. The text entry community must also extend its research to underrepresented languages and multilingual settings, including the use of transliteration and its assumption of education levels [1,18]. Furthermore, there is no consensus on how to measure text entry speed and accuracy for non-Latin languages [18].

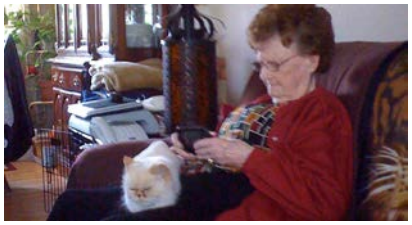

Figure 2. "Granny on her cell phone texting". CCBY JoAnne Sparks. From Flickr.

Encouraging users to learn a new, improved text entry technique has always been a challenge. Users are very reluctant to move away from the grossly inefficient Qwerty tapping regardless of new a new technique's long-term superiority. While many techniques including forced removal of features [2] and Passive Haptic Learning [19] have shown benefits, improved learning remains an open problem in text entry that is limiting advancement of techniques.

GOALS OF THE WORKSHOP

This workshop has the following goals.

- Identifying research challenges involving the social acceptability of emerging text entry techniques.
- Identifying research challenges associated with the development of text entry techniques for special user groups (e.g., children, elderly, physically impaired, and low-income) and languages other than English.
- Exploring and discussing methods for improving social acceptability and to encourage users to learn and use novel text entry techniques.
- Adapting evaluation metrics to new situations and users.
- Connecting researchers with allied interests to facilitate progress in addressing these challenges.

AUDIENCE

Through a widely distributed call for participation we will target 15-30 attendees. Our workshop website[1] will include the call for participation, important dates, workshop structure, links to the organizers, and will form a hub of post-workshop activities. As we aim to facilitate wide discussions we reach out to researchers and practitioners from industrial and academic backgrounds both within the core text entry community and from outside it. We promote the following, non-exclusive, topics:

- Social acceptability of various text entry techniques;
- Cross-technique/device language model sharing;
- Methods of teaching/convincing users to learn and adopt new text entry techniques;
- Impacts of errors in text entry, and new error correction methods;
- Text entry techniques for special user groups;
- International text entry techniques.

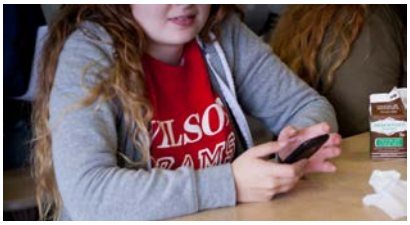

Figure 3. Young girl using phone. CCBY The Parents Union. From Flickr.

Based on our experience at previous workshops and SIGs, including CHI '12 [9], CHI '13 [10], CHI '15 [7], CHI '16 [22], and CHI '17 [24], we require only a lightweight position statement for attendance to encourage participation. This short statement will outline each participant's background, past and future work, and suggest a use-case they would like to explore during the workshop. Statements will be reviewed by the workshop organizers to ensure participants have a background or interest in the workshop's theme. Accepted participants may then optionally submit a longer, more technical paper for workshop distribution. At previous related workshops we found participants, especially early career researchers, have used the reviews and feedback at the workshop to improve and extend their work for later successful publication.

Figure 4. Renowned physicist Stephen Hawking uses AAC to communicate with others. In this picture, he is being presented by his daughter Lucy Hawking prior to his lecture for NASA's 50th anniversary. From Wikimedia Commons.

WORKSHOP STRUCTURE

This one-day workshop will use the following structure.

- A speed dating style meet-and-greet for introductions and "something about my research" (30 mins).
- Two technical paper sessions for short presentations (90 mins each, separated by coffee break).
- Group lunch to accommodate discussions and networking opportunities in an informal setting.
- A show-and-tell session for demos of newly developed systems and posters of new results (90 mins).

[1] http://www.asarif.com/workshops/mhci2018

- Group discussion session facilitated by the organizers to explore and discuss open research questions via development of low-fidelity prototypes (90 mins).
- Final group report backs and discussion of future community building, retiring to a local bar.

Community building and discussion are core to our plans. We aim for the technical and show-and-tell sessions to provide participants, particularly early career researchers, feedback on their work from experts, stimulate ideas, and initiate new collaborations.

PLANNED OUTCOMES

The purpose of this workshop is to highlight and encourage research investigating various socio-technical aspects of text entry. We aim to attract researchers and practitioners from both academia and industry, and also newcomers to the field—as such it can influence future research in the area. We hope that the workshop will identify open questions involving various socio-technical aspects, and inspire collaborative attempts targeting these questions that extend beyond the duration of the workshop. We will encourage and facilitate the authors to place their papers and demonstration videos on the workshop website. Finally, we intend to maintain frequent communication with the attendees through our text entry research mailing list, initiating discussion about ongoing research and recent advancements in the area.

ORGANIZERS

The organizers are all widely published experts on text entry. They have all published extensively in the HCI text entry community and often collaborate with researchers from outside the community, including Natural Language Processing (NLP), machine learning, speech recognition, and gesture recognition.

Ahmed Sabbir Arif is an Assistant Professor at the University of California, Merced. A major thread of his work focuses on smarter solutions for text entry and editing. He also models text entry performance and designs novel text entry techniques for underrepresented languages and user groups.

Wolfgang Stuerzlinger is a Professor at Simon Fraser University. His research spans Virtual Reality and Human-Computer Interaction. His current interests include better user interfaces for error correction and systems that facilitate learning of new text entry methods.

Mark D. Dunlop is a Senior Lecturer at the University of Strathclyde. He has been publishing in mobile text entry since 1999. His text entry interests include the underlying algorithms, use on new devices, supporting all users, and evaluation approaches. He has also conducted consultancy on commercial text entry.

Xin Yi is a senior Ph.D. candidate at Tsinghua University. His research interests mainly focus on supporting natural text entry experience in various modalities, such as phone, smartwatch, and HMD, as well as understanding and modelling users' behavior in basic interaction tasks, such as touch and pointing.

Caitlyn Seim is a Ph.D. candidate at the Georgia Institute of Technology. Her research focuses on wearable computing, haptics, learning, and cognition. Her work includes creating haptic systems for learning text entry and applying knowledge from psychophysics and neuroscience to enable new techniques for skill acquisition.

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