The Usability of Text Entry Systems Now and in the Future

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Abstract

Text entry is an active and growing research domain. Our
SIG serves three purposes. First, to strengthen the text
entry community by bringing text entry researchers
working in the human-computer interaction, natural
language processing and augmentative and alternative
communication communities together in one room.
Second, to promote CHI as a natural and compelling focal
point for all kinds of text entry research. Third, to
follow-up on and broaden the discussions that emerged
from two previous text entry workshops held at CHI [3, 4]
by engaging in dialog to identify obstacles for success and
formalizing procedures for measuring progress in the field
of text entry.

Author Keywords

Text entry, augmentative and alternative communication,
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ACM Classification Keywords

H.5.2 [Information interfaces and presentation]: :User
InterfacesInput devices and strategies.

Introduction

Over the past decade the practice of entering text into a
mobile phone has become a pervasive activity performed
by billions of people each and every day. It is common to

witness individuals sending text messages and emails, tweets and Facebook posts, while going about their daily routines. For the past ten to fifteen year, inputting text into mobile devices has shown no sign of slowing down. The field of text entry has been focused for since the late nineties on quantifying, improving, and optimizing typing performance on mobile phones. Though typing on mobile phones is going to continue to be a focus for the field moving forwards, the number and types of devices carried by individuals is set to grow and change substantially over the next decade as wearable computers, smart watches, and other types of on-body electronics enter the marketplace and the mainstream conscience.

The last two decades have seen a lot of innovation and interest surrounding the creation and evaluation of novel text entry methods. Text entry techniques have been designed to support various user groups, devices, and contexts of use. Areas of active research include designing text entry methods for mobile phones (see [5, 7] for extensive overviews), video games (e.g. [13]), wall-sized displays (e.g. [10]), surfaces (e.g. [2]), wearable computers (e.g. [6]), for augmentative and alternative communication (AAC) devices that help users with communication difficulties interact with the people around them (e.g. [12]) and for non-Western languages (e.g. [8]).

Such a fundamental activity as inputting text into a device however, has meant that these research efforts are today scattered across a large number of research communities: human-computer interaction (HCI), augmentative and alternative communication (AAC), speech recognition, human factors, and accessible computing being just some of the more prominent. As a result of the fragmented nature of the field, many researchers are unaware of progress made in domains outside of their specialty. In an

effort to focus the field and to keep abreast of recent developments, we believe that there is a need to reach out and (re)connect with communities outside of HCI so that we can learn from others and help strengthen the field as a whole. We strongly believe CHI has the potential to become *the venue* where researchers from all fields, not just HCI, send their best text entry research. Recruiting researchers from disparate domains and getting everyone in one room to discuss the direction of the field is an important step in building the text entry community and in cementing CHI as it's home base.

We want to unify the text entry community and discuss ways to create a curated archive of text entry methods and results that reflect the best work of the past two decades. Doing so will help us set the stage for the next ten years of mobile text entry research. We plan to impact future research by producing a special issue of the International Journal of Mobile Human Computer Interaction that is dedicated to text entry - past, present, and future. Our hope is that based on the discussions we have in the SIG, attendees will have a clear path to inclusion in this special issue journal.

Goals

Community building
Today, text entry researchers are scattered across the human-computer interaction, intelligent interactive systems, experimental psychology, human factors, augmentative and alternative communication, natural language processing, and speech and signal processing communities. Furthermore, research in novel text entry solutions takes place in both academic and industrial research labs. We want to raise awareness of the research activities and priorities that concern people in different research fields and learn from each other's successes and

failures. We want the CHI community to become known to text entry researchers who may be more active in other communities. A goal of this SIG is to advertise CHI as a natural and compelling venue for text entry researchers from any field.

A constructive research dialogue
Since researchers are scattered across different research fields, the scientific dialogue is equally scattered. People in different communities may not be aware of research progress and resolved controversies in neighboring fields. A major goal of this SIG is to bring all these people together to discuss difficult issues that are hard to manage within the traditional format of research papers. By understanding and leveraging the great work done in the past in each of these fields, we have the opportunity to strengthen future research approaches and to unify research practices moving forwards.

Suggested panel topics for text entry

For CHI 2014, we want to leverage the momentum of the successful community-building efforts initiated at the CHI 2012 and 2013 workshops. The SIG will be structured as a panel discussion that will focus on areas of interest that are important to the greater text entry community. We believe the sample panel topics below are of tremendous importance for our community.

Outreach and community building
How do we reach out to the text entry research communities outside of HCI? For example, how would we reengage with the AAC or Accessible Computing communities? Recently there have been cases where an HCI researcher may not realize that relevant text entry research may exist in the AAC community, and vice versa. For example, we have recently witnessed concurrent efforts

to design accessible text entry methods for blind users (e.g. [1, 11, 9]). These techniques all leverage the same principles resulting in very similar mode of interaction. By combining efforts we may increase the rate of progress in text entry research and avoid duplicating efforts.

Connecting the past to the future
How can we create and maintain a curated text entry archive for the benefit of current and future generations of text entry researchers? Many text entry methods risk becoming forgotten or ignored when new generations of researchers continue to create new methods. This is particularly the case with the scattered nature of text entry methods. We think a shared and clearly advertised high-quality archive of text entry methods developed and maintained by the active research community would be tremendously helpful for text entry researchers in all research fields.

New environments and technologies
The frenzied pace of technology development will drive the need for new text entry methods in the future. For example, as wall-sized displays and large surfaces become more prominent we predict that the demand for high-quality text entry methods will increase. Additionally, the next few years promise a wealth of new on-body technologies. What are the best ways to input text while people are in-motion? What about inputting text on smart watches or wearable computers? As these on-body technologies become prevalent in society, we predict that it will not be enough to simply learn how to quickly and accurately input text into these devices. Users will also have to figure out techniques for rapidly inputting text in unobtrusive and socially appropriate ways.

Conclusion

The text entry community is currently very active and regularly makes significant contributions to both the research literature and our society at large. However, our community is scattered across different research fields. In workshops at CHI over the past two years, we have attempted to unify the text entry researchers scattered across different research fields into an interdisciplinary text entry community centered at CHI. We attracted high-quality submissions and brought researchers active outside of the HCI field to the CHI conference. We want to leverage this momentum and open access our community further by hosting a SIG to ensure we can create a sustainable interdisciplinary text entry community at CHI focused on strengthening the science of text entry and pushing the boundaries of the field in a common direction. Trying to establish a set of best practices across our varied communities will position the field to learn from the past and present so that we can march forward together to address the text entry challenges of the future.

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