
Text Entry Does Not Imply “English Text Entry”

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Abstract

The title above is an actual sentence borrowed from MacKenzie and Soukoreff’s seminal article on Text Entry for Mobile Computing (2002), which I found to be enlightening many years ago, and has inspired my latest work on text entry.

My latest work on text entry has been directed at improving the stimulus phrases when conducting evaluations with non-native English speakers. Together with my co-authors, I devised a couple of automated phrase sampling methods that produce phrases that are memorable (easy to remember), representative of the language or task, and easy to assimilate. This paper provides a brief overview of such methods as well as other contributions I have made to the text entry community.

Author Keywords

Text Entry; Phrases; Sampling; Multilingualism; Memorability; Representativeness; Semantics.

ACM Classification Keywords

H.5.m [Information interfaces and presentation]: Miscellaneous.

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Biography

Luis Leiva is working as researcher and Chief Technological Officer at Sciling, a Machine Learning company based in Spain. He is a former research staff member of the PRHLT research center at the Technical University of Valencia (UPV), where he worked as Principal Investigator. He got his PhD degree (with honors, international mention, extraordinary doctorate award) in Computer Science in 2012. He also has two undergraduate degrees—Industrial Design and Industrial Engineering—and an M.Sc. in Communications and Mobile Services Development (2006) from the UPV. His research interests include Human-Computer Interaction, Machine Learning, and the intersection between the two. His recent work on text entry includes Back-of-Device interaction [1, 3, 4, 5], new miniaturized QWERTY keyboard layouts [6, 7], and multilingual phrase sampling methods [2, 8, 9].

Overview of Past and Current Work

While this position paper will focus on phrase sampling, I believe it is worth mentioning my previous work on text entry as well.

Back-of-Device Interaction

I have investigated two contexts of use for Back-of-Device (BoD) interaction. The first one is BoD Taps [1, 5], an unlock technique that was found to be very usable and theoretically more secure than their peers. The second one is β Tap [3, 4], a tap-based BoD input technique that uses a low-cost yet highly discriminative set of features from commodity sensors, without the need to instrument the device.



Figure 1: BoD Taps. Top row: shoulder surfer view. Bottom row: front view.

Tiny QWERTY Keyboards

With the ongoing breakthrough of wearables, such as smartwatches or digital jewelry, text entry on devices with very small screens (1" wide or less) becomes increasingly relevant and a challenging issue, simply because space is at a premium. I contributed in this regard with ZShift [7], a callout-based text entry technique for diminutive QWERTY keyboards. I also investigated cost-efficient error auto-correction mechanisms [6], that can be easily implemented in current wearables.

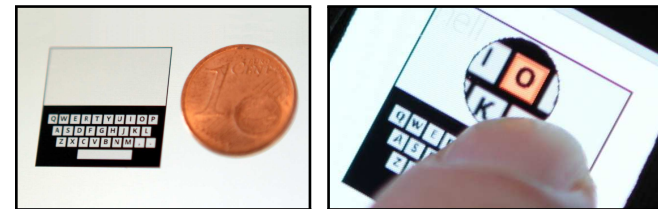


Figure 2: ZShift keyboard on a tiny touchscreen device.

Multilingual Phrase Sampling

This is the current line of research I am mostly involved in, motivated by the fact that text entry is fundamentally multilingual. Many text entry researchers are conducting user studies in many languages different from English, and the tasks given to participants are often language-sensitive. This suggests that, when conducting text entry experiments with non-native English speakers or in very specialized domains (e.g. medical devices, where technical vocabulary is commonplace), we either use a standard phrase set and accept that there will be differences in performance across studies, or we have to develop language- or domain-specific phrase sets. To solve this problem, automated phrase sampling methods like MemRep and Kaps become necessary.

On the one hand, MemRep [8, 9] was the first phrase sampling method that optimized both for memorability and representativeness (dual-objective function). Our experimental results showed that it performed significantly better than other sampling procedures. On the other hand, Kaps [2] sought a balance between memorability, representativeness, and complexity (grammar and semantics subtleties). We found that, by introducing this third variable, the method not only had better properties than MemRep but also that the resulting phrases exhibited better performance.

Proposed Scenario

I believe my recent research on text entry is of special relevance to text entry researchers interested in conducting experiments tailored to the linguistic capabilities of their participants. Therefore, I would like to contribute to the workshop with this topic. More concretely, I would like to dive in the importance that

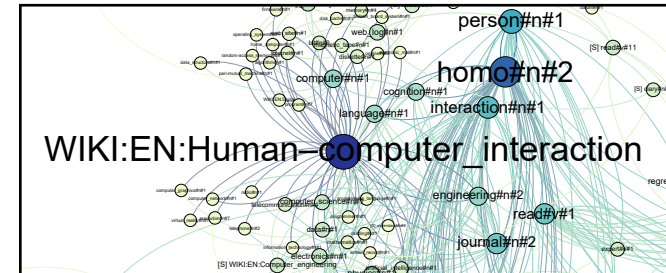


Figure 3: The Kaps technique uses knowledge graphs as a common concept representation across languages.

stimulus phrases may have in current text entry evaluations. Moreover, the phrase sampling techniques I created so far have been tested with Indo-European languages only, which represent an important portion of the current living languages but certainly there are may more languages worth of evaluation. I look forward to discussing this with the workshop attendees.

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