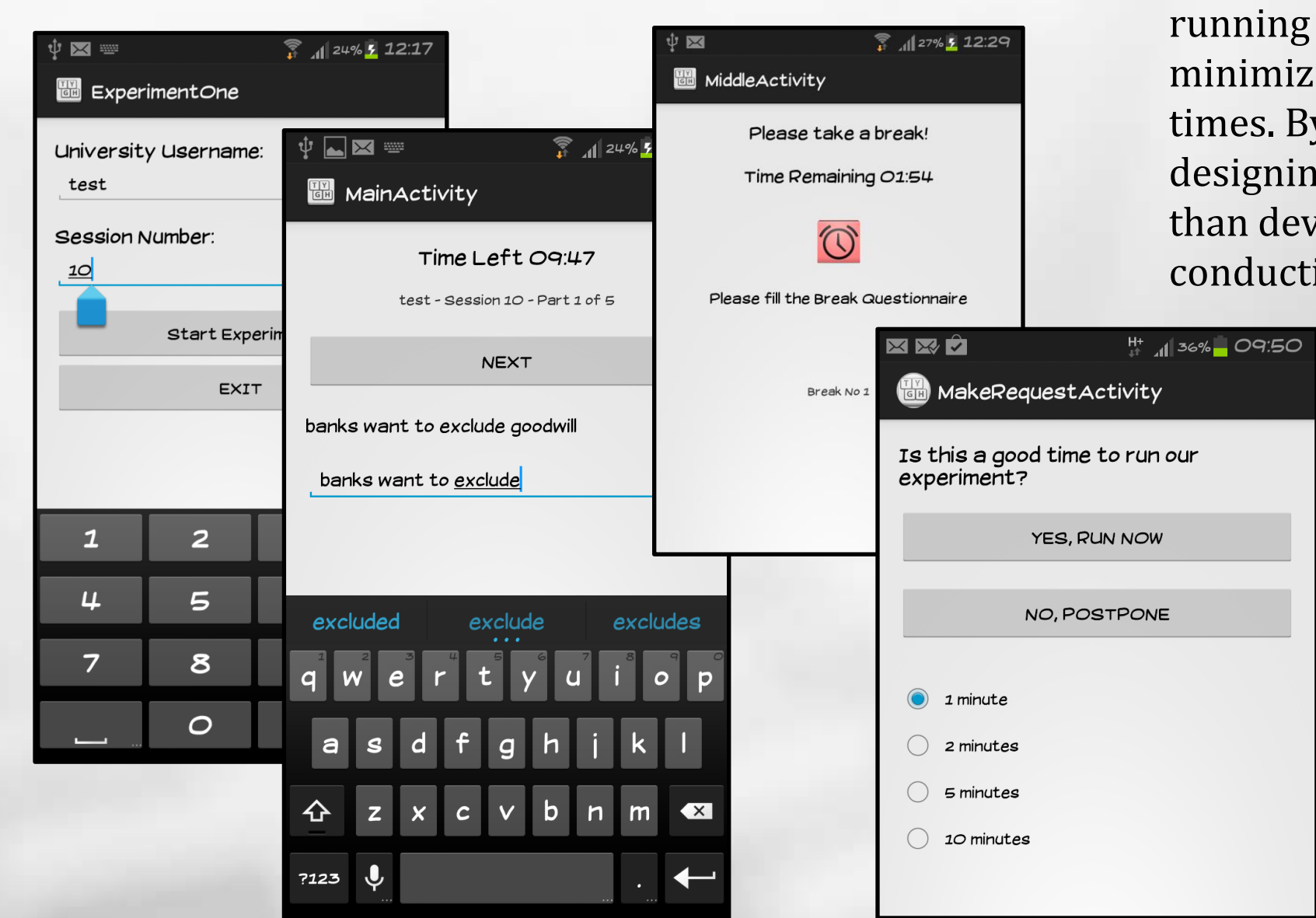


TOOLS FOR MEASURING TEXT ENTRY PERFORMANCE



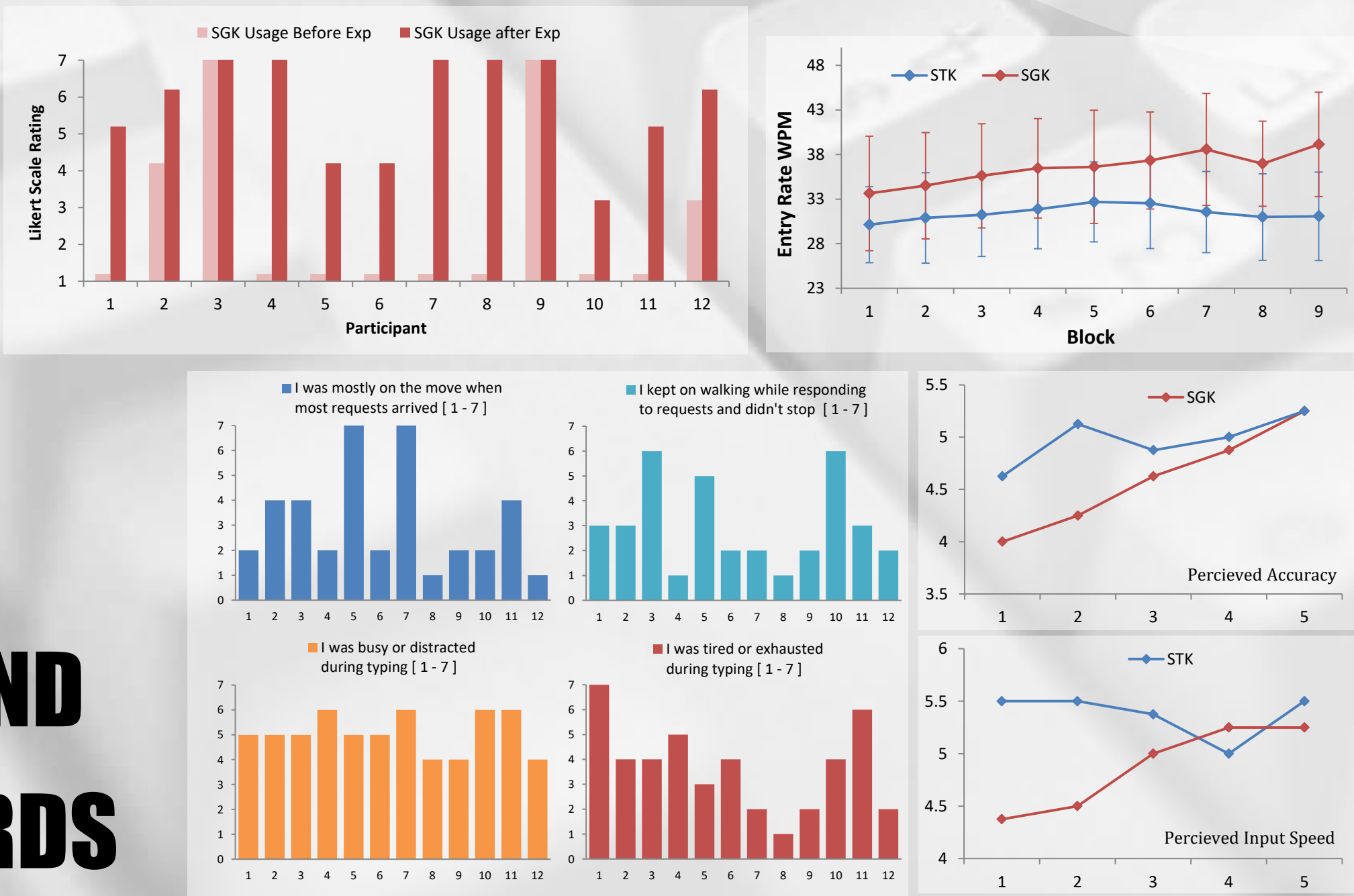
With: **Per Ola Kristensson**, University of Cambridge

We evaluate two popular mainstream mobile text entry methods: the Smart Touch Keyboard (STK) and the Smart Gesture Keyboard (SGK). Our first study is a lab-based ten-session text entry experiment. In our second study we use a new text entry evaluation methodology based on the experience sampling method (ESM); participants installed an Android app on their own mobile phones that periodically sampled their text entry performance and user experience amid their everyday activities for four weeks. The studies show that text can be entered at an average speed of 28 to 39 WPM, depending on the method and the user's experience, with 1.0% to 3.6% character error rates remaining. Error rates of touchscreen input, particularly with SGK, are a major challenge; and reducing OOV errors is particularly important.

When exposed to both, users tend to migrate from STK to SGK. We also conclude that studies in the lab and in the wild can both be informative to reveal different aspects of keyboard experience, but used in conjunction is more reliable in comprehensively assessing input technologies of current and future generations.

With: **Shumin Zhai**, Google Research

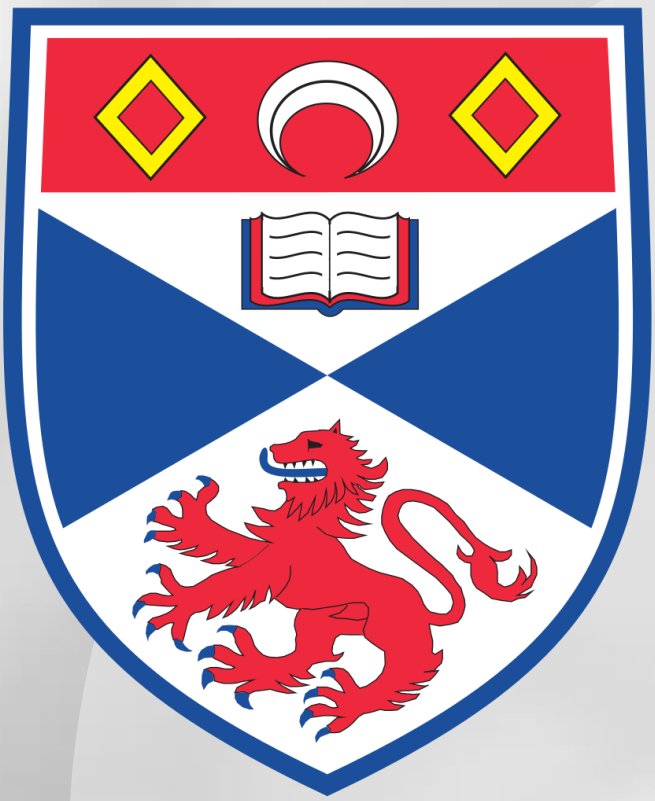
EVALUATION OF TOUCH-SCREEN AND GESTURE KEYBOARDS



Two open-source, fully customizable tools developed for researchers to study mobile text input performance on mobile devices.

The first tool assists in carrying out a traditional text entry performance study. The second tool is inspired by the more novel experience sampling method (ESM) that allows researchers to study text entry performance outside the lab by sampling users text input performance in a real setting.

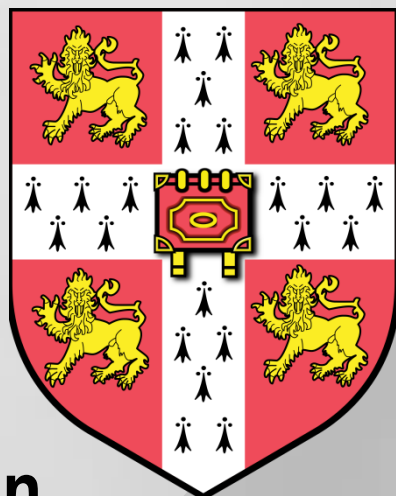
The tools assist in automating many of the steps involved in running a traditional or ESM based text entry study, thus minimizing manual intervention by the researcher at various times. By using these tools, researchers can focus more on designing studies and analyzing and reporting results rather than devoting time to actually conducting experiments.



sicsa* The Scottish Informatics & Computer Science Alliance

ROBUST IN-SITU MOBILE TEXT ENTRY

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We contribute an efficient text entry method for the Sinhalese Language. Sinhalese falls into the Indo-Aryan family of languages, along with Hindi, Urdu, Sanskrit and other languages. Indo-Aryan languages are known for their complex alphabets, syllables, and grammars.

For example, the Sinhalese language is spoken, read and written by over twenty-two million people worldwide including almost all the citizens of Sri Lanka. Sinhalese has sixty base characters in the alphabet, with each character having thirteen variations when combined with vowels .

Sinhalese features a greater diversity of rich and complex contextual phrases and idioms than many Western languages. Sinhalese sentences can also be very long: a single sentence can occupy a full paragraph with no punctuation, and without violating any grammar rules.

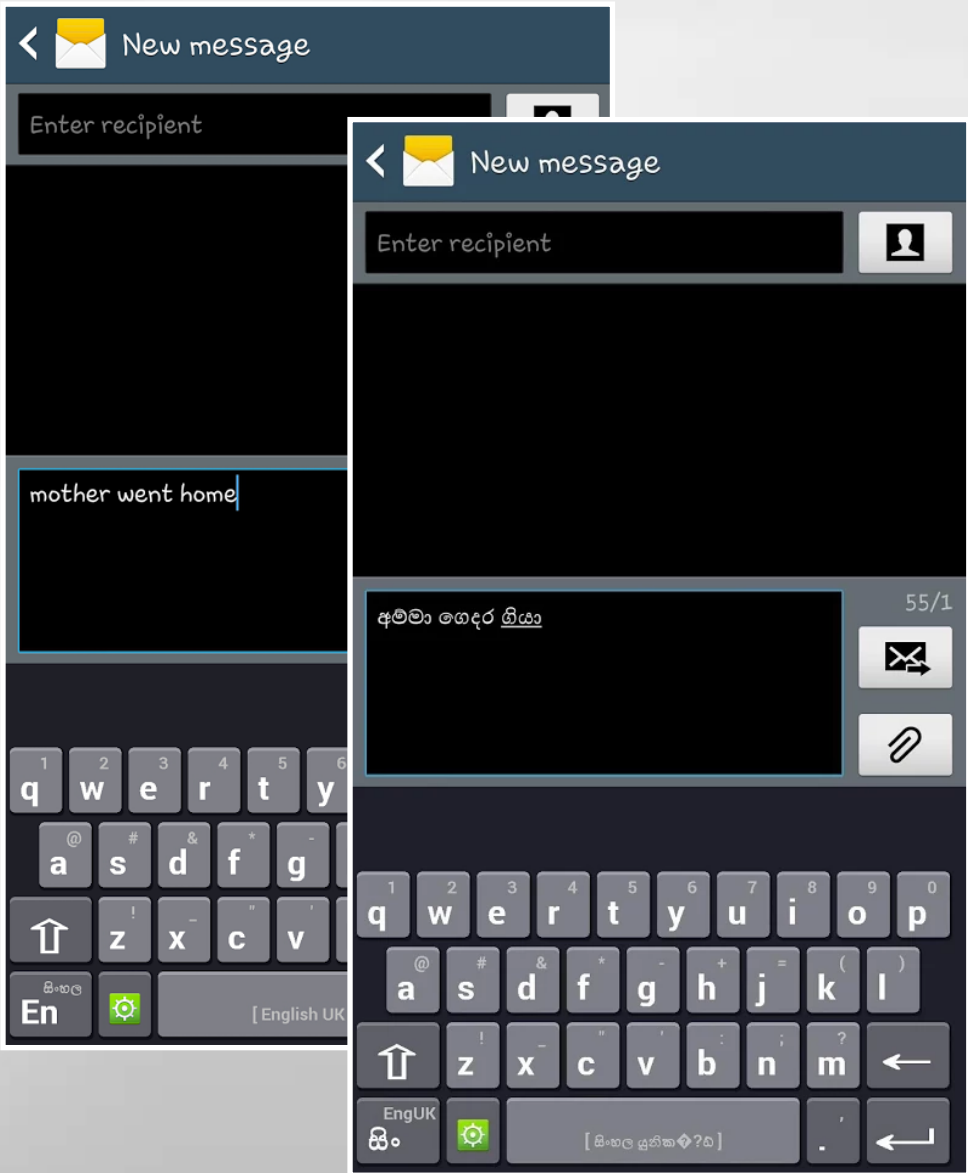
With: **Keith Vertanen**, Montana Tech

VelociTap is a state-of-the-art touchscreen keyboard decoder that supports a sentence-based text entry approach. VelociTap enables users to seamlessly choose from three word-delimiter actions: pushing a space key, swiping to the right, or simply omitting the space key and letting the decoder infer spaces automatically.

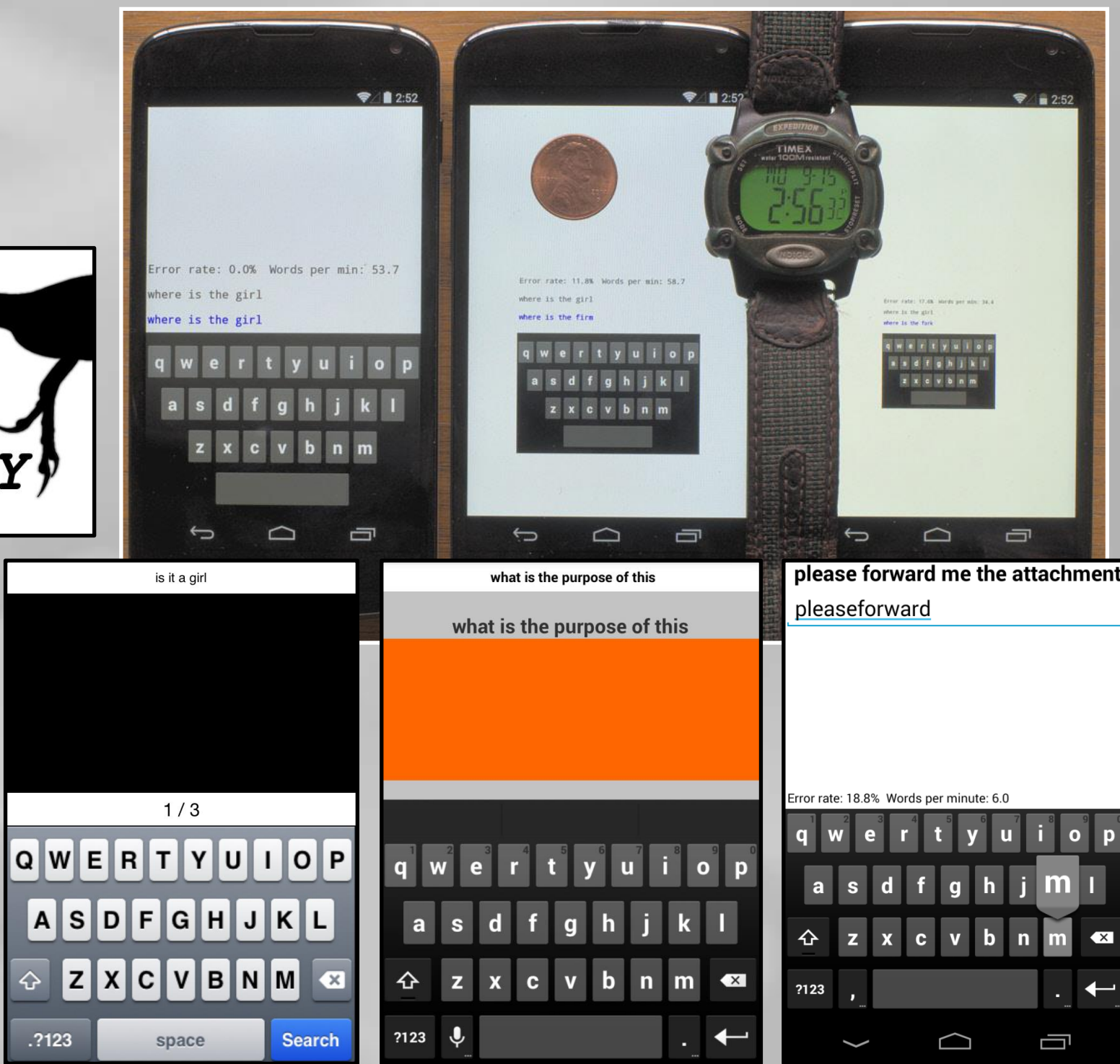
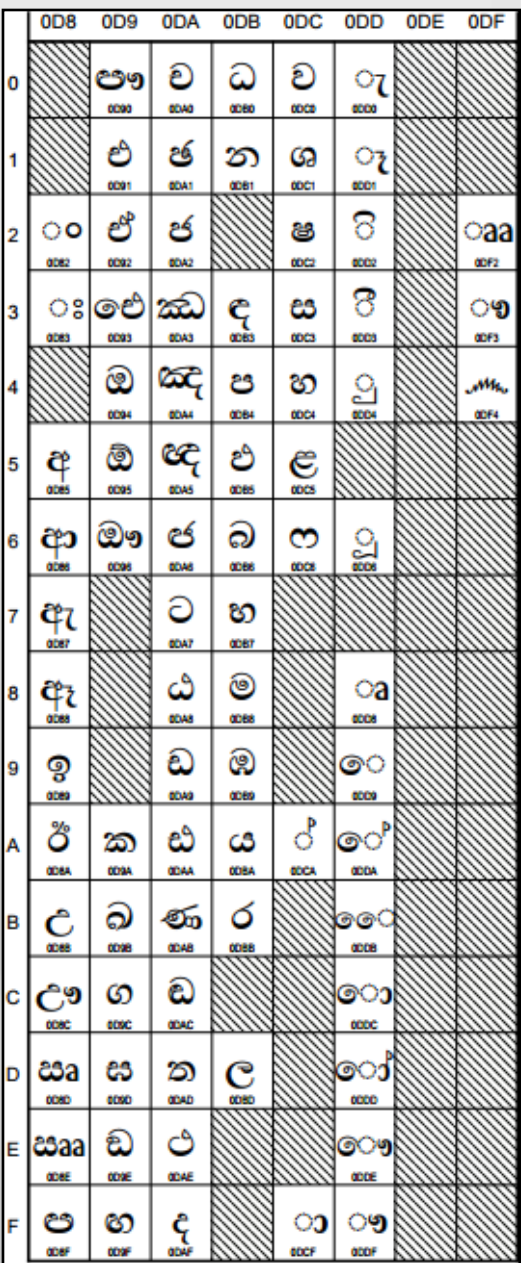
We demonstrate that VelociTap has a significantly lower error rate than Google's keyboard while retaining the same entry rate. We show that intermediate visual feedback does not significantly affect entry or error rates and we find that using the space key results in the most accurate results.

We also demonstrate that enabling flexible word-delimiter options does not incur an error rate penalty. Finally, we investigate how small we can make the keyboard when using VelociTap. We show that novice users can reach a mean entry rate of 41 wpm on a 40 mm wide smartwatch-sized keyboard at a 3% character error rate.

EFFICIENT MOBILE TEXT ENTRY METHOD FOR SINHALESE LANGUAGE



With: **Keith Vertanen**, Montana Tech



FAST MOBILE TEXT ENTRY USING SENTENCE BASED DECODING