INDIANA UNIVERSITY INFORMED CONSENT STATEMENT FOR

A Crowd-sourced Study on a Deep-learning based Mobile Keyboard App

Sponsored by Indiana University
PI: Feng Qian (fengqian@indiana.edu)

You are invited to participate in a research study of using a novel mobile keyboard app driven by deep learning. You were selected as a possible subject because you are at least 18 years old and are affiliated with IU Bloomington. Please read this form and ask any questions you may have before agreeing to be in the study.

The study is being conducted by Professor Feng Qian in the Computer Science Department, School of Informatics, Computing, and Engineering at Indiana University Bloomington. It is funded by Indiana University.

STUDY PURPOSE

A huge amount of textual content is generated by the Internet users. Every day there are 2 million comments posted to Reddit, 500 million Tweets, 3.5 billion Google search queries, at least 100 billion instant messages, and 200 billion emails sent and received. A significant proportion of these texts are typed in from mobile devices such as smartphones and tablets.

To make mobile users type faster, the research community and industry have developed numerous Input Method Applications (IMAs). An important component inside modern IMAs is Next-word Prediction. An accurate prediction of the next word a user is going to input reduces the number of clicks as well as the probability of typing errors. This feature is especially appealing on mobile devices where keyboards are small and fingers are big.

Under the above context, we have developed an IMA called DeepType. A key feature of DeepType is to use personalized deep learning to perform next-word prediction. For example, given the same prefix "every Friday night I usually go to the ___", Alice tends to input "gym" next, while Bob is likely to input "club." DeepType performs deep personalization so that every individual device uses a different, personalized prediction model, which fully adapts to the preference and context of the user.

In this study, we (the PI and his students) let real users install and use DeepType on their mobile devices. We will collect various performance data such as the accuracy of our next-word prediction model, the prediction latency, and the training latency. We will use the collected data to assess and improve DeepType's performance "in the wild". By improving the accuracy of next-word prediction, our research will make users type faster on mobile devices.

Participation in this research project on your part is completely voluntary.

NUMBER OF PEOPLE TAKING PART IN THE STUDY

If you agree to participate, you will be one of about 100 subjects who will be participating in this research.

PROCEDURES FOR THE STUDY

Upon your agreement to participate in the research project, you will be provided with instructions on downloading and installing our DeepType app. Please follow the instructions to install DeepType on your Android smartphone. Once installed, DeepType will become the default Input Method Application (IMA). **You should use DeepType to type English texts for the duration of your participation in the study. You should NOT intentionally uninstall DeepType or intentionally switch to a different IMA when typing English texts.** Using DeepType is

easy, almost the same as other IMAs. The main difference you will likely notice is that DeepType performs next-word prediction in a more intelligent way compared to a regular IMA.

DeepType will collect the following information:

- Participants' typing duration, i.e., how much time you spend on typing each day.
- The device's hardware configurations such as CPU frequency and memory size.
- The accuracy of our next-word prediction model.
- The prediction latency using our model.
- The training latency for our model.

Note that DeepType collects neither the actual texts that you type, nor other sensitive information such as personal ID or your phone numbers. The collected data will be uploaded to our secure server when the smartphone is charging. The data upload is encrypted.

During the study, we do not require you to come to our lab. When you have any issues or questions regarding DeepType, you can either email the PI, or schedule an in-person meeting with the PI in his office. Also, you can exit the study at any time.

The anticipated data collection period is one month. At the end of the data collection, you can uninstall DeepType from your smartphone. We will provide instructions on how to uninstall DeepType.

RISKS OF TAKING PART IN THE STUDY

Participants are not exposed to any risks other than those of normal smartphone users. We have thoroughly tested DeepType and confirm that it incurs negligible runtime overhead (so it will not slow down your phone). To protect your privacy, in this study we do NOT collect any texts you type. Also, the DeepType app itself does not upload any user-typed data to any external Internet server or cloud.

BENEFITS OF TAKING PART IN THE STUDY

Participating in this study provides no direct benefit to the subject except the monetary compensation.

CONFIDENTIALITY

Data and information collected from you in connection with your participation in this study may be reviewed by departments at Indiana University responsible for regulatory and research oversight. The collected data will be only identifiable by the user ID that is randomly assigned to you and all of the data will be used by us for research purposes only. All data collected will be held confidential at secure servers at the PI's research group. When the data is uploaded from users' smartphones to our secure server, the upload traffic will be encrypted using Transport Layer Security (TLS). All data analyses will be performed locally on the secure server, and no data will be copied out.

PAYMENT

We will compensate you $20 for your participation in this one-month study. If you exit the study early, we provide partial payment at the rate of $0.5/day. We will pay you within 3 days after you finish or exit the study.

CONTACTS FOR QUESTIONS OR PROBLEMS

For questions about the study or a research-related injury, contact the PI, Feng Qian, at 812-856-5521, or fengqian@indiana.edu. If you cannot reach the PI during regular business hours (i.e., 8 a.m. to 5 p.m.), please call the IU Human Subjects Office at 812-856-4242 or 800-696-2949.

For questions about your rights as a research participant, to discuss problems, complaints, or concerns about a research study, or to obtain information or offer input, contact the IU Human Subjects Office at 812-856-4242 or 800-696-2949.

VOLUNTARY NATURE OF THIS STUDY

Taking part in this study is voluntary. You may choose not to take part or may leave the study at any time. Leaving the study will not result in any penalty. Your decision whether or not to participate in this study will not affect your current or future relations with the Indiana University or the School of Informatics, Computing, and Engineering at IU.