Smartphone Authentication With Micromovements

Zdeňka Sitová
Advisor: Prof. Václav Matyáš

Hi Zdenka, I heard you defended your thesis at Masaryk University, congratulations! What was your topic?

Hi Alice, nice hearing from you! My thesis is called "Evaluation of Hand Micromovement Features For Continuous Authentication Of Smartphone Users During Typing", my advisor was Prof. Vaclav Matyas.

Such a long title? What are these "micromovement features"? And what does "continuous authentication" even mean?

The idea is quite simple. We verify user's identity based on the way his smartphone is shaking when he's typing. We're using accelerometer and gyroscope to measure the micromovements of the phone.
It's called "continuous authentication", because we're authenticating the user the whole time he's using the device.

Interesting, but why would anybody need it?

Because someone can steal your PIN. Or get to your phone when it's alredy unlocked. And some people don't use PIN protection at all, they think it's annoying to enter the PIN!

I hate spending time by unlocking the screen... This sounds useful, actually. Where can I download the app?

Well, there is no app yet. Our work is a "proof of concept", first evaluation of this type of authentication. And it works quite well. When we fused our method with two other methods (contact size of finger and key hold time), the Equal Error Rate improved from 10.5% to 7%. For practical usage, the EER needs to be decreased more, though.

It's still great you were able to achieve such an improvement! How did you do the evaluation?

My colleagues collected data from 100 users, each user was typing what he wanted for about one and half hour. After that, I used various machine learning techniques on the dataset.

I see. By the way, is this what you were doing in New York? I saw some pictures on Facebook:)

Yes, this was done during my one year's research stay at New York Institute of Technology, the research was funded by DARPA.

Wow, DARPA! Did you manage to publish anything?

We wrote a paper "HMOG: A New Biometric Modality for Continuous Authentication of Smartphone Users" by me, J. Sedenka, Q. Yang, G. Peng, G. Zhou, P. Gasti, and K. S. Balagani. We submited it to IEEE TIFS journal and are waiting for reviews. Also, we had a poster on ACM SenSys 2014 when we published the dataset.

Congrats again! What're you working on now?

I have an idea which will make me a fortune. I'm creating an app for unicorn spotters. Users can keep track where they saw the unicorn, store photos, we'll even give them useful tips. Did you know that 72% of encounters with unicorn happens at sunrise? But it's still top secret! Don't tell anybody, please. Do you remember Eve? She's known for stealing other people's ideas and she's working on unicorns as well.

Muhehe, this is Eve, Alice forgot her phone on a table in cafe :D Thanks for the info :D

WHAT???!!! This world really needs continuous authentication on smartphones!