DREXEL UNIVERSITY
Cybersecurity Institute

Research project profile: **active authentication on mobile devices**

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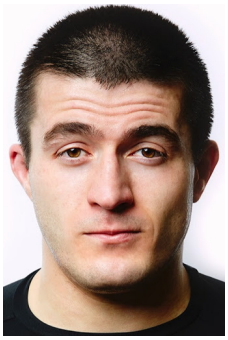
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Research summary: Active authentication is the problem of continuously verifying the identity of a person based on behavioral aspects of their interaction with a computing device. In this study, we collect and analyze behavioral biometrics data from 200 subjects, each using their personal Android mobile device for a period of at least 30 days. This dataset is novel in the context of active authentication due to its size, duration, number of modalities, and absence of restrictions on tracked activity. The geographical colocation of the subjects in the study is representative of a large closed-world environment such as an organization where the unauthorized user of a device is likely to be an insider threat: coming from within the organization. We consider four biometric modalities: (1) text entered via soft keyboard, (2) applications used, (3) websites visited, and (4) physical location of the device as determined from GPS (when outdoors) or WiFi (when indoors). We implement and test a classifier for each modality and organize the classifiers as a parallel binary decision fusion architecture. We characterize performance with respect to intruder detection time, and quantify how each modality affects overall performance.

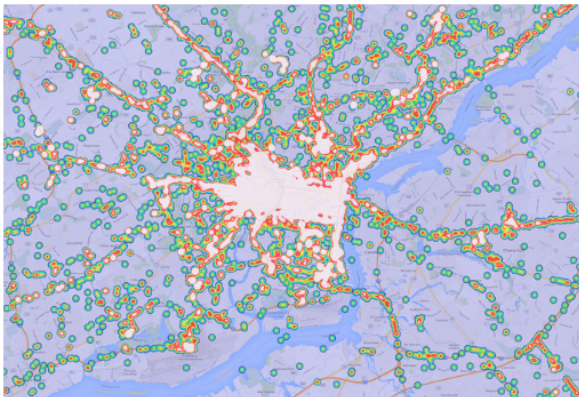

Figure 4: An aggregate heatmap showing a selection from the dataset of GPS locations in the Philadelphia area.

Publications related to this research project include:

[1] Lex Fridman, Steven Weber, Rachel Greenstadt, and Moshe Kam. Active authentication on mobile devices via stylometry, application usage, web browsing, and GPS location. *IEEE Systems Journal*, accepted August 2015.

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[1] Rachel Greenstadt (PI), Moshe Kam, and P. Juola. Active authentication via linguistic modalities. *Defense Advanced Research Projects Agency (DARPA) Active Authentication Program*, MONTH, 2012 – MONTH, 2013. $699,379.