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Research Topic

Security and authentication

Research Problem

Can current methods of analyzing keystroke dynamics be improved such that a user's typing patterns can be used as a reliable form of identification?

Operational Definitions

Keystroke dynamics: Detailed information about a specific user's typing style as defined by the time intervals between keystrokes, time spent pressing each key, and pressure used to press each key.

Problem Statement

Given a set of typing speed and pressure measurements collected from various users, construct a system that can accurately and reliably identify a specific user given their typing patterns.

Operational Definitions

Typing speed: How quickly a user progresses from key to key while typing as well as how long they spend pressing each key.

Pressure measurements: Measurements of the amount of pressure used to press a key on a keyboard.

Typing patterns: The typing speed and pressure associated with a particular user.

Problem Description

In recent years, issues of computational veracity have come up in many court cases, both civil and criminal. In terms of evidence gathered from computers, it is important to be able to verify data such the identities of the users who accessed the computer, who modified particular files, and so on, and this data needs to be dependable. One method that can be used to help authenticate the identity of a user is to monitor their typing patterns, also known as keystroke dynamics. Keystroke dynamics are useful for two-factor authentication, continuous re-authentication, questioned document analysis, and insider threat detection. Developing a dependable system for analyzing keystroke dynamics will allow forensic investigators to

determine who was actually using the computer, even if the person was logged in under another user's identity at the time.

Computer Science Perspective

Computers are ideal for measuring and analyzing keystroke dynamics, as they can record large amounts of data about the typist's speed and the pressure they place on each key and then quickly analyze this data using machine learning techniques to detect each typist's unique typing patterns. A verifiable and reliable method of identifying users via keystroke dynamics would be useful to computer scientists in that it would provide another way of ensuring system security. Maxion's research has improved upon other methods of analyzing keystroke dynamics by improving the timestamp used to record typing data. By making the timestamp more accurate, they have achieved 100% classification among 26 users typing 10 character passwords.

Description of Disciplines Involved

Though the benefits of this research can extend to many disciplines, at the moment no other disciplines are currently involved in this research.

Actively Involved Disciplines

Computer science.

Operational Definitions

Actively Involved Discipline: Any discipline from which one or more researchers made a significant contribution to the research design and interpretation of the results. Typically, the resulting research would add to the actively involved discipline's body of knowledge in some way, thus benefiting the discipline as a whole.

References

Presenter's homepage:

<http://www.cs.cmu.edu/~maxion/>

By

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Updated

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