

SmartTouch: 3-factor authentication application on a smartphone

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SmartTouch is an authentication service provider, which allows a user to identify himself on his smartphone. It uses handwritten symbols, drawn on the touch screen of the device, for the authentication process. The algorithm analyzes the entered password, as well as the biometric characteristics of the entries. Together with the device it builds a 3-factor authentication system.

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In an earlier Bachelor's thesis and a Master's course project, this 3-factor user authentication system, based on handwritten digits, was proposed. In this Master's thesis, it was extended to work with any kind of symbols and is now implemented in the Android app called SmartTouch.

SmartTouch is an authentication service provider, which can be invoked by other apps to authenticate the user. It includes all necessary modules to build a strong authenticator and runs on every Android smartphone with OS 5+.



Another central task of this Master's thesis is security and cryptography. SmartTouch is an authenticator using sensitive data, so it's important to use state of the art security to make the app safe against assaults. In addition, the authenticator is prepared to be implemented in a standardized protocol recently proposed, called Unified Authentication Framework (UAF) protocol. This protocol was proposed by the FIDO Alliance (Fast IDentity Online) about a year ago. The FIDO Alliance is a consortium to address the lack of standardization and federation in today's authentication systems used throughout the web. Its goal is to make available authenticators (e.g. fingerprint sensors) allocatable for different locations and services. All major industries in mobile IT are represented in the consortium. The UAF protocol was analyzed in detail and the key parts were implemented in SmartTouch.

For analysis and testing reasons, different other apps were implemented during the development of SmartTouch. One app, called DigitCollector, records drawn digits from multiple users and allows them to share the data. It was used for the analysis of the algorithms. Therefore, the drawn digits of ~ 50 users were recorded and tested with the developed system. AuthRequest is another app, it simulates an authentication request for the SmartTouch service.

In the tests SmartTouch proofed to be a feasible authenticator with a lot of potential for further development.



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