CS 307 – Software Engineering

ATM 2.0

Project Requirements Backlog

Team 25
Anthony Goeckner
Krutarth Rao
Austin Reed
Harold Smith

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Problem Statement

Currently, automated teller machines (ATMs) are subject to fraud by use of stolen bank cards and information. Our solution, the ATM 2.0, involves the use of three-point biometric and traditional PIN authentication, which will effectively negate this risk by requiring fingerprints and facial recognition in order to dispense money. Such ATM systems are not used commercially in the United States at this time.

Background Information

Automated teller machine technology reached a plateau in the 1970s. The machines have continued to use PIN and card authentication to verify the user's identity. Over time, these systems have grown increasingly vulnerable to security threats, both through software and through physical means.

ATM 2.0 hopes to provide banks a more secure way to dispense cash to their customers. Through three-point biometric authentication, the bank can be sure that the intended customer is collecting the cash and the customer can be sure that no unauthorized user can withdraw cash from their bank account without their presence.

Standard ATMs use only two-factor authentication. The addition of biometric authentication ensures protection of the user's bank accounts against malicious activity, since the user's biometric characteristics are unique and cannot be stolen or forged.

In recent years, biometric ATM systems have been developed in many foreign countries. However, this increased security has not yet reached American shores. While American banks are currently researching the possibility of adding biometric systems, we believe that we can deliver better value in a faster timeframe and in a more cost-effective manner.

Functional Requirements

- As a user, I need to withdraw specific amounts of money.
- As a user, I would like an intuitive, touch based interface.
- As a user, I need to deposit money.
- As a user, I need to manage my security preferences, such as enabling/disabling biometric authentication.
- As a user, I need to view my account balance.
- As a user, I should be able to set my PIN.
- As a user, I should be able to enter a backup password received from the bank.
- As a user, I need to transfer funds between accounts.
- As a user, I would like to select my language. (If time allows.)
- As a user, I would like a "Support" button in case I run into problems.
- As a user, I would like the ability to print a receipt. For demonstration purposes, receipt might not be physically printed.

- As a user, I would like the ability to make multiple transactions.
- As a user, I need the ability to log out of my account.
- As a user, my account should log out automatically after a certain period of time.
- As a user, I need the ability to cancel a transaction.
- As a user, I would like the ability to withdraw using a “fast cash” feature.
- As a user, I would like the ability to set my “fast cash” amount.
- As a user, I would like the ability to enter an “emergency PIN”, which will silently contact the police in case of a robbery. (If time allows.)
- As a developer, I would like to use Triple DES level encryption on the authentication data collected from the user before being sent to the network layer.
- As a developer, I would like USB ports disabled to prevent unauthorized access.
- As a developer, I would like Windows to be the operating software for interoperability with Azure.
- As a developer, I would like the connection between the Raspberry pi and the server to be over a VPN.
- As a developer, I would like to create an interface for the bank to add/modify customers’ details in the customer database. (If time allows.)
- As a developer, I would like to use Azure services to host my customer database, authentication protocol and banking interface.
- As a developer, I would like to use C# and LINQ queries to modify my database.
- As a customer, I would like the machine to be capable of detecting sensor failures.
- As a customer, I would like the system to be capable of functioning as a standard ATM in the case of biometric sensor failure.
- As a customer, I would like to warn the user that the ATM is operating in reduced security mode in case of biometric sensor failure.
- As a customer, I would like each user to be able to choose whether their account will be accessible in reduced security mode.
- As a customer, I would like the ATM 2.0’s backend systems to be compatible with standard ATMs. (If time allows.)
- As a customer, I would like my logo to be displayed on the screen.
- As a customer, I would like for my users to be authenticated a second time before allowing them to change their settings.
- As a customer, I would like optional remote terminal access to the machine.
- As a customer, I would like the ATM to enter “sleep” mode while waiting for additional users.
- As a customer, I would like the ATM to display my logo on the screen while in sleep mode.

Non-Functional Requirements

- As a customer, I need the machine and software to be energy efficient so as to minimize electricity costs. This involves using energy efficient hardware such as a Raspberry Pi, and software that is not resource intensive.
- As a developer, I would like to have code that is sufficiently documented and well formatted. The software should be documented using a tool such as Doxygen, which generates documentation from comments placed in the code.
- As a developer, I would like code that is modular and built to accommodate updates in the near or far future. Since the ATM 2.0 may be used by multiple, independent financial institutions, the system and tools must be reusable and modular to allow for easy application to new customers.
- As a developer, I would like a robust and customizable framework for the graphics user interface. Some options might be the wxWidgets or QT graphics libraries.
- As a developer, I want my customer database to be easily scalable to allow for growth. The database system should be accessible from multiple ATMs without significantly increased response times.