Phone – Controlled Fingerprint – Enabled Door Lock System

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Project Overview

The advancement of Internet computing has led to the "Internet of Things" era in which everything can be easily and readily accessed from our mobile devices. This has also allowed home security automation to develop. However, the current home security system poses several vulnerabilities to break-in, lock – picking, and the homeowner’s unawareness of whom has entered the door, and access convenience.

To solve those issues, we have developed an inexpensive smart home security lock system using fingerprint as the main authentication method with motion-sensing camera, and a web – based control and notification system integrated into a mobile application for the user. This project aims to maximize the home security and enhance the convenience of users in a highly efficient and cost effective manner.

Features:
- Access the system through fingerprint and PIN matching (dual-layer protection)
- Monitor entries by motion-triggered camera and mobile app’s push notification
- Remote lock/unlock the door through mobile application (secure access to mobile application by PIN or Apple TouchID)

Methodology

The system we developed consists of three main modules shown in the diagram below:

- Hardware (Arduino) Subsystem
- Data Storage and Communication Link (RPI) Subsystem
- Mobile Application Block Diagram

Results

We have successfully developed a fully functional smart – lock system according to our objective.
- The system can recognize fingerprints previously enrolled, and activate the door-unlocking
- Enrolling fingerprints can be done with root user permission (PIN authentication – dual layer security)
- Remote lock/unlock from mobile phone
- Alerts can be monitored from the mobile application (push notifications included)