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Project proposal

Overview

The goal of this project is to make a smart doorbell that uses a fingerprint sensor to turn a servo motor that can open the door. In addition, the doorbell will have a camera that captures the picture of anyone that rings the doorbell and sends it to the home owner's cell phone.

Peripherals

- Finger print sensor
- Bluetooth HC-05 module
- Camera module
- Servo Motors
- Push button
- LCD Display
- Wifi module (stretch goal)

Serial Interface Protocols

- UART: Finger print sensor, Bluetooth HC-05 module
- SPI: Camera module

Block Diagram

Please refer to the website: https://sites.google.com/view/ece153b-smartdoorbell

Software structure

There will be two modes that the doorbell can operate in. The first mode will be configuration mode and the second mode will be operation mode. An iOS or Android app can be built to communicate using Bluetooth with the doorbell to switch it between the two modes.

In the first mode, after placing your finger on the doorbell press the pushbutton to generate an interrupt that start communication using UART with the fingerprint sensor to capture the user's fingerprint and store it in its database.

In the second mode, every time someone wants to open the door they need to press a pushbutton first. When they press the pushbutton, it will generate an interrupt that starts reading from the fingerprint sensor using UART and also take an image from the camera using SPI of the person in front of the door. If the fingerprint sensor detects that the fingerprint is in its database, it communicates to the servo motor to turn 90 degrees, otherwise, it displays on the LCD a message to the user that they cannot enter and can try again. In addition, every time the doorbell is pressed, a message will be sent to the user's phone using UART that someone tried to enter their house along with the picture of the person.

First mode:

push button interrupt:
        communicate using UART with fingerprint sensor and store fingerprint
        send message to user through UART HC-05 that fingerprint is stored.

Second mode:
push button interrupt:
        communicate using UART with fingerprint sensor to check that fingerprint is in database
            if true:
                turn servo motor and unlock door
            if false:
                print on LCD to retry

            send message through HC-05 to user's phone that someone tried to enter door
            capture and send picture of person to user's phone