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A 2FA Security System for securing rooms and

DMN sYSTEMS

DMN Alarms

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Table of Contents

[Introduction 2](#_Toc116153104)

[Hardware 3](#_Toc116153105)

[Circuit Diagrams 3](#_Toc116153106)

[Hardware Requirements: 4](#_Toc116153107)

[Data, Data Storage and Data Processing 5](#_Toc116153108)

[Security 5](#_Toc116153109)

[The UI, User and User Testing 5](#_Toc116153110)

[Versioning 6](#_Toc116153111)

# Introduction

Our IoT application is an alarm system for single-entry rooms containing valuable documents of some form. After passing fingerprint and facial recognition, the electric strike door lock is unlocked, and entry is granted. There is a door sensor to detect when the door is open and closed. A Database is used to store fingerprint, facial images, date, and time of access. Each stage of the process is accompanied by a speaker, buzzer, or light (to facilitate various levels of abilities). A flask website is to be used to facilitate a typical front-end user.

# Hardware

## Circuit Diagrams

**Circuit:**

Diagram, schematic

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**Fritzing circuit commentary:**

* Raspberry pi 3 used for diagram.
* Assuming leds need 2.2 forward voltage, the resistor needed is a 68.75 ohm one.
* The grounds of all the leds may be connected, and then plugged into a single ground pin on the pi, freeing up n-1 ground pins.
* Momentary switch button will be used for sending a signal to raspberry pi.
* No physical pull down resistor is needed for the switch since an internal pull down resistor may be assigned to a pin through code.
* It is possible to half the amount of gpio pins used to drive leds by using a scheme such as the one below, however, it is not useful in our case as we have enough pins, the constraint is in the total amount of current these pins can provide on a single pi. The difference would be, if we were to use the scheme below, per green/red pair of leds, little/no current would be provided by the pi when all leds are red, but 48mA would be provided by the pi if all leds are green at once. Doing it the way it is in the current fritzing diagram, 48mA is provided no matter the permutation of the 3 red/green led pairs, since at any one time, either the red or green is on in all three pairs.
* On the PIR sensor in the fritzing diagram, the VCC, OUT, and GND are inverted compared to the PIR sensors bought from pihut, so exercise caution when wiring the real thing.

![Diagram, schematic

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**Problems to solve:**

* Research how to restrict the “Field of vision” of the pir sensor to only see a specific area.
* Build homemade door switch & add to Fritzing diagram
* Figure out a way to use less power and perhaps less connections to GPIO pins for the LEDs (Since there is a 50mA current limit the pins can provide in total).

## Hardware Requirements:

**Acquired:**

1x pir sensor

1x pi camera module (specially made, plugs into special port)

1x buzzer (works with gpio and 220 ohm resistor)

1x speaker (hdmx, connected to aux, perhaps powered thorugh usb)

**Purchase required:**

1x fingerprint sensor <https://thepihut.com/products/round-all-in-one-capacitive-fingerprint-sensor-d?variant=41540357849283>

1x USB to UART <https://thepihut.com/products/usb-to-uart-module-micro-mini-type-a-or-type-c?variant=41771472584899>

(3x red leds & 3x green leds **OR** 3 rgb leds) <https://thepihut.com/products/ultimate-5mm-led-kit?variant=188614180881>

1x electric strike lock <https://www.amazon.co.uk/gp/product/B0027VB810?psc=1>

1x door switch (commercial or built)

1x button

# Data, Data Storage and Data Processing

What Data is gathered

How it will be stored

How it will be processed

# Security

How to secure stored data

Physical device security

Locking mechanism

# The UI, User and User Testing

Front-end Interaction

# Versioning

Version 1: Document Creation – 07/10/2022

Version 2: Introduction, Table of Contents and Hardware requirements – 08/10/2022