Raspberry PI Face Recognition Validation System

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**GitHub:** https://github.com/ThienDo95/SeniorProjectMaster

**Slack:** surveillanceworkspace.slack.com

# Project Summary

Utilizing a Raspberry Pi Zero W with additional camera and button modules, our team aims to create a cheap, alternative, accurate and modular face recognition validation system along with the appropriate front and backend web infrastructure to handle image uploads for users who opt in which are then compared to when an identified or unidentified user attempts to use the system.

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# Project Goals

* Build front end website utilizing HTML and CSS
* Build account backend system with functional signup and login utilizing PHP and SQL
* Generate unique identifiable token for users that sign up
* Give users the ability upload pictures of authorized personnel to Amazon Rekognition
* Send image of user that pushes button on Raspberry Pi Zero to Amazon Rekognition for facial recognition from group of valid photos which returns a JSON request which is then used for validation and notification system

# Product Features

**Raspberry Pi**

* Utilizes Amazon Rekognition with Raspberry Pi Zero W to be able to take a picture of a person standing in front of the system on a button press and send JSON requests back to the PI from AWS to validate users above a certain facial match percentage. On success, the owner of the Raspberry PI can program their device to take any action they would like.
* Ability to locally store images of all users who attempted to use system on SD card

**Website**

* Website will allow users to sign-up and log in to their accounts.
* User will be assigned a unique token to their account for easy identification
* Users have the capability to upload the pictures as well as deleting pictures for recognition service
  + Uploaded picture will be use as references to compare whoever rings the doorbell and getting scanned
    - If the person is recognizable, he or she will have the access to get in the property
    - If the person is not, he or she will not have the access to get in property
  + Deleted picture will be removed from the database. He or She will no longer has access to the property

# Limitations

* Cost
* Unknown if all tools are available/will work together to make this project function as intended
* Raspberry Pi Zero W specs may not be enough. (May need to upgrade to better Raspberry Pi maybe due to software or hardware compatibility issues with tools that will be used)
* User requires some technical skill to be able to add various modules to their PI after a successful face validation

# Stretch Goals

* Build live notification system into website that checks for JSON requests from Raspberry PI or AWS (Amazon Web Services) every X seconds and if any request was made, pushes a notification to individual users based on user preference who have a PI registered to their account by a unique identifier
* Integrate live surveillance video capability with object-recognition (using OpenCV)
* Integrate Smart Lock API to be able to unlock a door on successful match of a recognized face as a demo of one of the many things that can be hooked up to PI after successful face validation
* Time limit for a certain person to be able to use the recognition service (special event)
* Ability to manage multiple PI’s per account
* Along with a notification, push the image that was taken from the Raspberry PI to the user of the person whose picture was taken
* Incorporate an “Alert Emergency Services” system that would notify authorities if the account holder manually choose the option to do so if they did not recognize the person whose picture was taken
* Hash account information stored in database for improved security