

INTELLIGENT SECURITY SYSTEM

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ABSTRACT

The most important feature of the home security system is the detection of people who enter or leave the house. Passwords or unique pins can be used instead of monitoring that the patient can be used because the patient is biometric function. These are congenital and cannot be changed easily or stolen. Security levels can be found and filed. The proposed face recognition system provides a more reliable autonomous safety device for low-power consumption and disability safety and doors in a very safe area, such as a home environment. The system is powered by Raspberry Pi circuitry. The Raspberry Pi electronics board is battery-powered, has a wireless internet connection using USB tethering, and includes a camera, PIR motion sensor and door. Whenever a person comes to the door, it recognizes a face, if registered, the door opens, if no face is registered, an alarm sounds. That's how the system works.

Keywords: Dataset Creation, Dataset Training, Face Recognition, Door Lock System.

I. INTRODUCTION

In today's era of automation and smart devices, privacy and security of information systems are important issues, so a change in system security measures is urgently required. A facial recognition system is a computer application capable of identifying or verifying a person from a digital image or video frame. Face Recognition appears to be one of the most versatile, collectable and available systems. This system not only increases security, but also makes the system keyless. Therefore, we considered face recognition to implement a very secure home lock system. So we have developed and put in force face authentication of captured photograph the use of digital digicam via way of means of OpenCV/ Python platform on Raspberry Pi. The captured photograph is as compared and validated with the database, if discovered matching then the get entry to locking tool is allowed.

Objective Of Intelligent Security System

- Step towards key less door lock.
- To create more safe and sanitary experience.
- High level security assurance.

II. METHODOLOGY

This security system first captures an image by web camera and creates a dataset on the raspberry pi. After dataset creation, the dataset will be trained on a given algorithm. After that, it will detect the face, then it will recognize the face from the dataset. If the face is matched with the dataset, then it will send a request to the raspberry pi to unlock the door.



Figure 1: SYSTEM DESIGN.

This system comprises of three main steps.

Dataset Creation

This process is commonly referred to as face recognition registration. We call this "registration" because we "register" and "register" users as an example of one person in our datasets and applications.

In our project, there is a GUI app for user-friendly environments. In this app, there is an "add new user" button that creates a separate folder with the user's name in the database folder and captures 25 or more images of the user.

Dataset Training

After successful dataset creation, the app shows a training model button. After clicking that button, model training starts on the "deploy.prototxt" and "caffemodel" algorithm.

The ".prototxt" file(s) which define the model architecture (i.e., the layers themselves)

The ".caffemodel" file which contains the weights for the actual layers

Face Recognition

After successful dataset creation and training the app shows a face recognition button after clicking on that button facial recognition start. Facial recognition systems work by capturing incoming images from camera devices. In this face comparison, the input image is mathematically analyzed without tolerance and the biometric data matches the person who needs to use the service or who requests access to the application, system or even the building.

In which we are using openface_nn4.small2.v1.t7 model which is based FaceNet algorithm developed by google researchers.

III. COMPONENT AND SYSTEM REQUIREMENT

Component Required

- Raspberry pi
- Web Camera
- PIR Sensor
- Buzzer
- Relay
- 12 V DC Motor
- 12 V DC Adapter

System Requirement

- Raspbian OS
- Open CV
- Python 3.7 or above
- Various Python libraries

IV. RESULTS

On figure 2 home of our GUI interface is shown where we can add and check users. In figure 3 and figure 4 shows how, image is captured for the training dataset in GUI app. This image will be used for recognizing and unlocking of the door and allows the user to enter the room. In figure-5 recognition of a face is shown, if it matches the trained data in system the door lock connected to raspberry pi will get unlocked and allow access to the user. If it doesn't recognize the face door will not open and show an unknown as name.



Figure 2: (Home Screen)

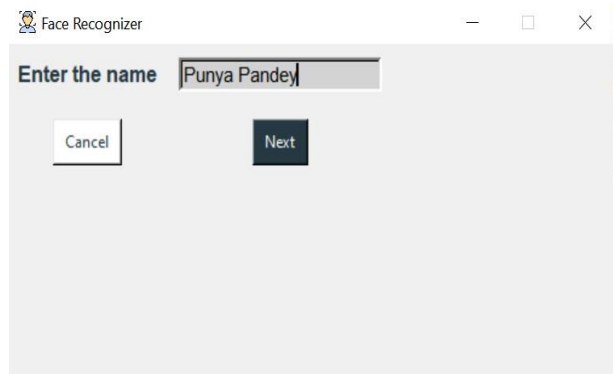


Figure 3: (Feeding the face data with name)

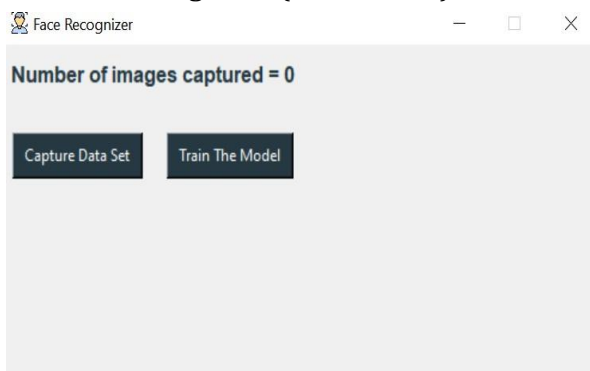


Figure 4



Figure 5: (Recognition Window)

V. CONCLUSION

In our article, we use Raspberry Pi, Web Camera, Relay Module, Motor and some programs that use OpenCV for Face Detection, Face Recognition will help us with the task. The main focus of our article is making an automatic door lock. This allows us to worry less about carrying around our keys every time we close the door. The system was also made more user-friendly by using a GUI to create and delete databases. A GUI interface can be used to learn and recognize a captured dataset.

VI. REFERENCES

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