



HIGH PROTECTION VOICE IDENTIFICATION BASED BANK LOCKER SECURITY SYSTEM

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Abstract:

Encountering the real time challenges in the “security” arena and enhancing the existing criteria by designing an advanced technology. This project introduces a door locker system which integrates fingerprint reader in it so as to provide a good level of security. Implicit guarantee of your money in the bank being safe has always been the fact of concernment. With huge development people felt a need to secure their earnings.

Here we are using Fingerprint sensor for identifying the person and his voice (i.e., Authentication Key). The main goal of fingerprint door locker with image capture project is to provide security with no manual security flaws. We can compare with the registered images of fingerprints if it matches with the register fingerprints and based on the voice command (i.e., Authentication Key) the locker will open otherwise locker will not open. So, the system is very beneficial for stopping the robbery by providing security.

Keywords: *Raspberry Pi, NodeMCU, Fingerprint Sensor, Image Capture, Authentication Keyword.*

I. Introduction

In this world, people are more worried about safety and security for their expensive things like Jewelry, money and any important things. So, most of the people are preferring the bank lockers are the safest to store them. In this fast-growing world more technologies have been emerged for security purposes. Especially for storing valuable items in banks and in Museums.

Fingerprint verification has become one of the most using and secured identification for identifying an individual by comparing the data base which is stored with the Fingerprints of every individual.

In the identification mode the system recognizes an individual by searching entire template data base for match. And the system performs one to many comparisons to establish the individual identity or fails if the subject is not enrolled in the system data base. So, in our project we are using fingerprint security system.

II. Existing system

In existing system, we have used buzzer alerts in case of any unauthorized persons tries to open door. And we have used RFID for detecting authorized persons. For this RFID can be used by anyone so that no safety and security is available. If RFID tag is stolen then the person needs to worry about as the tag can be used to open door.

Drawbacks:

- No safety and security
- Card is Compulsory
- Stolen chances are high

- Web Camera
- Fingerprint Sensor
- 5V 2A Adapter
- USB Cable

III. Proposed System

In this proposed system we have used fingerprint image capturing techniques with the help of raspberry pi. So that if any unauthorized person tries to open locker, then the mail will be sent along with the persons face. In this we have used voice recognition also i.e., a keyword is given to verify whether the person is authorized or not. If the person gives the keyword, then it checks whether it is correct or not if it is correct then the door will open. In this we can use either Fingerprint Recognition or voice keyword recognition.

Block Diagram:

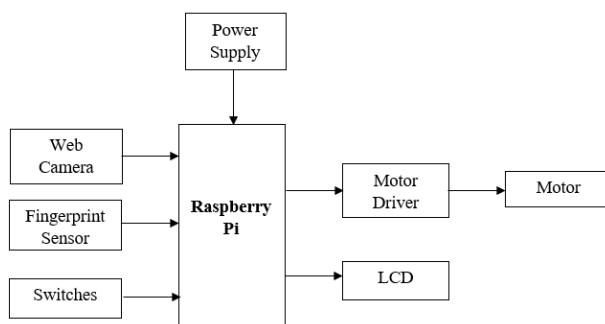


Fig 1. Block Diagram

A) Raspberry Pi:

Raspberry pi is a powerful microcontroller that exists in credit card size. It serves as micro controller, also it serves as a minicomputer by connecting essential cables like HDMI cables, audio cable. Simply we can say Raspberry Pi is a credit card sized computer which also serves as microcontroller. It is fast as compared to other controllers.



Fig 2. Raspberry Pi

B) NodeMCU:

NodeMCU is an open-source firmware development board. It has in-built WIFI Module which ESP8266. Multiple GPIO pins on the board allow you to connect the board with other peripherals and are capable of generating PWM, I2C, SPI, and UART serial communications.

IV. Hardware Requirements

- Raspberry Pi
- NodeMCU
- Liquid Crystal Display

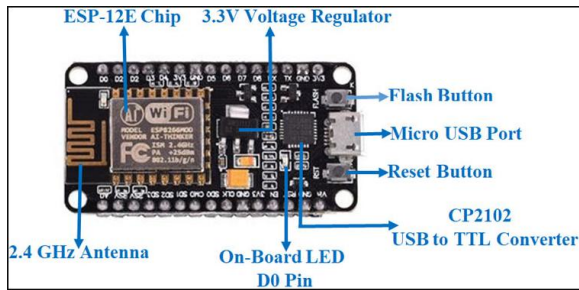


Fig 3. NodeMCU

C) Liquid Crystal Display:

LCD is 16X2 LCD which displays 32 characters at a time. It has 8 data transferring Pins, RS which is Register select, En is Enable, and R/W is Read and Write Pin.

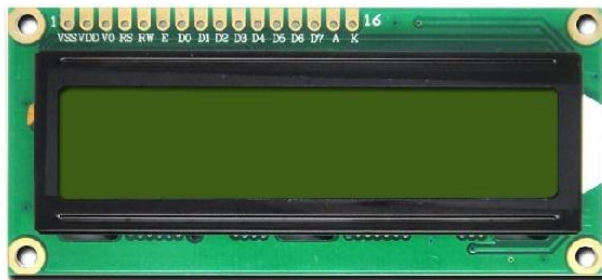


Fig 4. Liquid Crystal Display

D) Web Camera:

A webcam is a video camera that feeds or streams an image or video in real time to or through a computer to a computer network, such as the Internet. Webcams are typically small cameras that sit on a desk, attach to a user's monitor, or are built into the hardware. Webcams can be used during a video chat session involving two or more people, with conversations that include live audio and video.



Fig 5. Web Camera

E) Fingerprint Sensor:

The R305 is one kind of fingerprint sensor module used in biometrics for security in fingerprint detection as well as verification. These devices are mainly used in safes where there is a high-powered DSP chip used in the rendering of image, feature-finding, searching and calculation by connecting it to any microcontroller with the help of TTL serial, & send data packets to get photos, notice prints, search and hash. The enrollment of new fingers can be stored directly within the flash memory of on board.



Fig 6. Fingerprint Sensor

F) 5V 2A Adapter:

5 Volt 2 Amp Power Adapter takes an AC INPUT of 100-240V and gives 5V 2A DC output.



Specifications: -

- Input - 100-240 VAC 50/60Hz
- Category - Switch Mode Power Adaptor (SMPS)
- Output Type - DC
- Output - 5Volts 2Amp



Fig 7. 5V 2A Adapter



Fig 8. USB Cable

V. Software Requirements

A) Python:

Python is an interpreter, high level, interactive and general-purpose programming language. It was developed by Guido van Rossum during 1985 – 1990. The source code is available under general public License. Python is named after a TV Show ‘Monty Python’s Flying Circus’ and not after Python-the snake. It supports Object Oriented programming approach for developing applications.

G) USB Cable :

The term USB stands for ‘Universal Serial Bus’. USB cable assemblies are some of the most popular cable types available, used mostly to connect computers to peripheral devices such as cameras, camcorders, printers, scanners, and more. Devices manufactured to the current USB revision 3.0 specification are backward compatible with version 1.1.

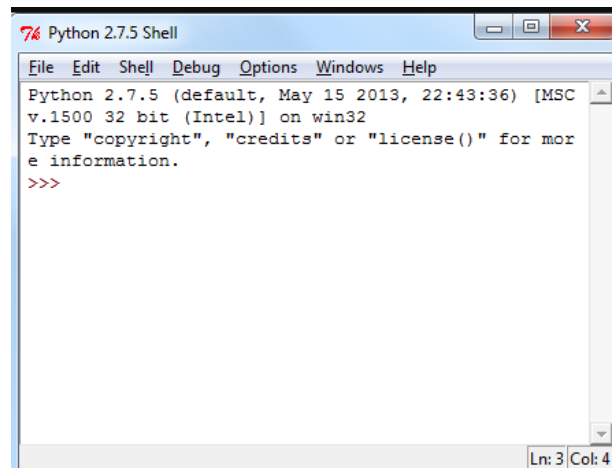


Fig 9. Python Shell



```
File Edit Format Run Options Window Help
num = 42
guess = int(input("Guess a number (1-100): "))
if guess == num:
    print("correct")
else:
    print("nope")
```

Fig 10. Python Script

VI. Working of the Project

The project consists of Raspberry pi, web camera, NodeMCU and Fingerprint Sensor. Here fingerprint is used to enroll and need to match the fingerprints that we enrolled. NodeMCU is for Voice Authentication.

A. Fingerprint Enrolment

In the enrolment process, the fingerprint of each student is recorded. The fingerprint of the student is scanned using the fingerprint scanner in the system. Each fingerprint is assigned an ID number. The ID number is stored on the Arduino Nano board. This number is unique for each student. Enrolment of fingerprints is performed only once. The student IDs can be changed or replaced as and when required.

B. Fingerprint Recognition and Comparison

The system, being portable, can be passed around during the lecture from student to student to record attendance. During the fingerprint comparison and recognition process, the student's fingerprint will be compared with the stored fingerprints in the Arduino Nano board. The student then has to place his/her finger on the fingerprint scanner. The fingerprint input is then verified with the stored fingerprints.

C. Validation of Recognized Fingerprint

In the previous process, the fingerprint input is compared with the stored fingerprints. If it matches a fingerprint present in the Raspberry Pi.

Voice is Proceeded by using NodeMCU which is interfaced with Adafruit IO which is a website.

Camera is interfaced with Raspberry pi USB ports if the fingerprint matches it will open the door otherwise it will capture the person image and is sent to the corresponding authorities through mail. In this we have added voice i.e., keyword. If it matches then it will open otherwise it won't. Likewise, the process continues.

VII. Advantages

- Less power consumption
- Real time observation
- Highly secured

VIII. Applications

- In banks
- In town areas
- In Jeweler Shops

IX. Conclusion

A security system is proposed by using Voice Authentication and Fingerprint. It is a low cost, low in power conception, compact in size and standalone system. The microcontroller compares the fingerprints scanned by it with its flash memory. If these fingerprints are correct, the microcontroller provides necessary control signal to open the bank locker otherwise the door remains locked and fingerprints are saved in database card after capturing. The proposed system can be used in other places such as offices and diamond jeweler shops.

X. Future Scope

In future we can add face recognition and some security alerts for this and we can use Iris system.

References



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