Raspberry PI Based High Protection Voice Identification Based Bank Locker Security System with Live Image Authentication

Saurabh Mahajan[1], Anup Sarode[1], Rahul Warkhede[1], Mrs P.R. Shahane[2]

UG Students, Department of E&TC Engineering[1]

Assistant Professor, Department of E&TC Engineering[2]

STES'S Sinhgad Academy oF Engineering, Pune, Maharashtra, India

Abstract: *Bank security is an important thing as we people grow and achieve many things that are important for each individual we need a proper security for such things as could be some important papers, jewellery, personal stuffs etc . The world has changed a lot from the old and mechanical stuffs to the modern electronics world. So to keep up with the advancement many ideas are proposed to develop the security of the banks and one of the best ideas are using biometrics. We can use face and voice authentication as a base for this idea and we can develop more advanced security with the development in technology.is Privacy and Security are two universal rights and to ensure that in our daily life we are secure, a lot of research is going on in the field of home security, and IoT is the turning point for the industry, where we connect everyday objects to share data for our betterment. House security matters and people always try to make life easier at the same time. That's why we put up with this project, Face Recognition Door Lock System. Facial recognition is a well- established process in which the face is detected and identified out of the image. We aim to create a smart door, which secures the gateway on the basis of who we are. We want to develop this system based on Raspberry-pi 3, to make the house only accessible when your face is recognized by the recognition algorithms from Open CV library and meanwhile you are allowed by the house owner, who could monitor entrance remotely.*

Keywords: Raspberry pi kit , Camera module , Face detection

I. INTRODUCTION

This document is in a situation where there may be excessive degree of theft there may be want for higher protection device. To comfy it in opposition of theft, crime, etc a powerful protection system is needed not most effective to detect but also pre-emit dangers. In this project alerting buzzer with low power consumption are located in the bank locker. Here the locker is opened with the help of face recognition and voice identification. If unauthorized person tries to open the locker then with the help of camera it captures the face and through mail it sent to the person who handles the locker. Then buzzer is used to alert the surrounding people nearby. On the other hand, this security gadget stays in idle function and performs nothing if nobody comes near the locker
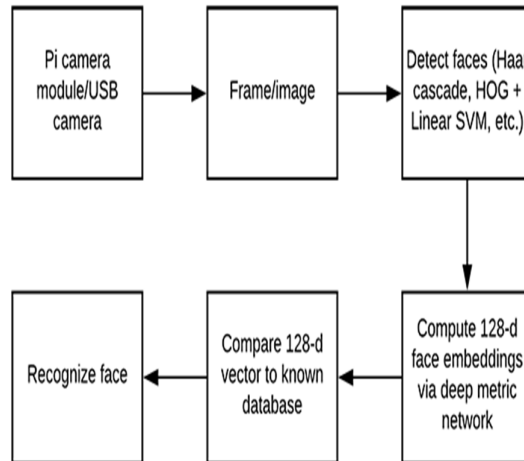
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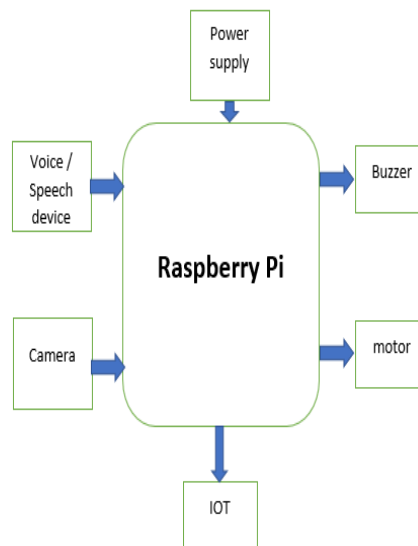**Figure 1:** Working of face detection process [1]

Figure 2: Raspberry pi kit [10].

II. OBJECTIVE

1. To design and develop an anti-theft security system which is portable, high efficiency, low cost and easy to operate.
2. To detect the present of person when he or she reach in front the door and the the face recognizer will recognize owner face.
3. To notify owner and start surveillance system in real time when stranger detected.
4. To record the door access about time, user and locker status.
5. To have door access time restrictions.

III. LITERATURE REVIEW

Based on the research found, there are some project works related to the face recognition on security system. Through a research paper "Web-based online embedded door access control and home security system based on face recognition" written by Sahani, M., Nanda, C., Sahu, A.K. and Pattnaik, B.. The strength and weakness on their product can be identified after analyse. The strength of their product is they used wireless network technique ZigBee based. The ZigBee module

combine with electromagnetic door lock module to operate the door accessibility. The proposed system is designed with wireless access control so the lock module can be added easily if have the need. Email and SMS are used to notify the house owner when detected a stranger face. It helps to reduce the need of server so the user can directly login and control the embedded system in real time. User can control the system with SMS, email and website. However, it still can be improve from it weaknesses. The face recognition can be by pass with a photo of owner face. The system can be improve with add on password authentication, sound recognition or fingerprint authentication. The product cost can be lower with reduce the SMS module and use the WIFI module as replacement. Since our phone always connected to internet and the latency should be lower if compare with GSM network

IV.COMPONENTS

Raspberry Pi :

Raspberry Pi (RP) is an ARM-based single board computer. The Raspberry Pi 3 Model B is the third generation Raspberry Pi [3].It has Broadcom BCM2837 64bit ARM Cortex-A53 Quad Core Processor SoC running at 1.2GHz and 1GB RAM. The operating system used for Raspberry Pi is Raspbian as it is open source anyone can use. Raspbian is a Linux-based computer operating system. It has 40 pins in which 24 are GPIO pins these pins are used for general purpose, 8 ground pins, two of each 5V and 3V power pin. It has four USB-2 ports and a Micro USB power source. It runs on the 5V power supply. Additionally, it adds wireless LAN (BCM43143 WiFi on board (802.11 a/b/g/n)) and Bluetooth connectivity making it the ideal solution for powerfully connected designs.

Pi Camera:

Pi Camera Module is a custom designed add-on for Raspberry Pi. This interface uses the dedicated CSI interface, which was designed especially for interfacing to cameras [4] The CSI bus is capable of extremely high data rates, and it exclusively carries pixel data. The sensor itself has a native resolution of 5 megapixels and has a fixed focus lens on board. In terms of still images, the camera is capable of 2592 x 1944- pixel static images, and supports 1080p30, 720p60 and 640x480p60/90 video.

Keypad:

Attach matrix 7-pin interfaces to 7 free GPIO pins, 3 column pins are set as output which are directly connected with GPIO, while 4 row pins are set as input with pull-up resistor.

Servo

Attach the servo to a GPIO (we selected GPIO 17 here) of the Raspberry pi A and control its rotation utilizing pulse-width modulation. The servo is powered by a 6V-battery pack.
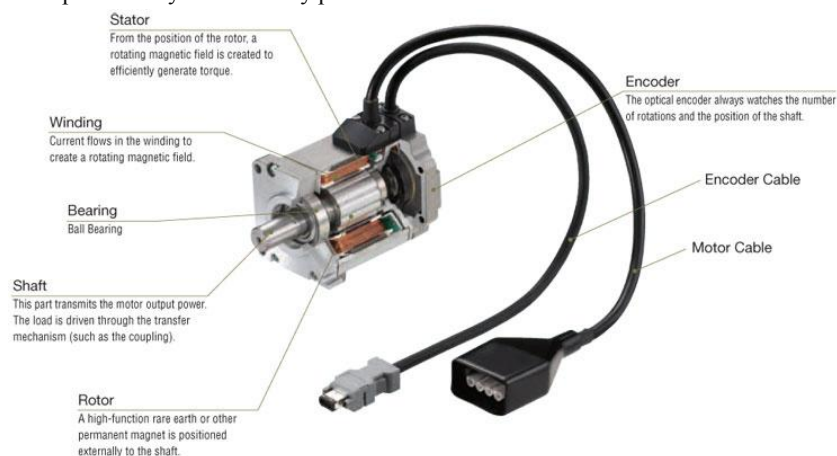
Buzzer
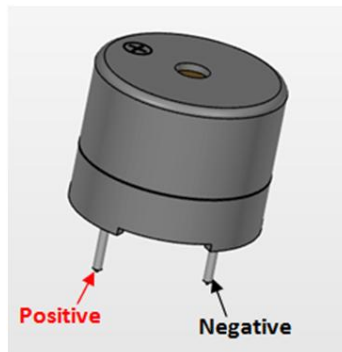
The buzzer is used to indicate the status of lock and unlock of the door. After unlock the door or lock the door it will notify user. When the face of the user is not recognised correctly, it will produce a long "beep" sound to alert the user.

## V. SOFTWARE REQUIREMENTS

Python IDE

Python be an interpreter, object-oriented, high- level programming language with active semantics. Its high-level build in data structures, collective with dynamic typing and dynamic binding, make it very prominent for Rapid Application Development, in addition to for use as a scripting or glue language to connect existing components mutually Python's simple, easy to learn syntax emphasize readability and consequently reduces the cost of program maintenance. Debugging Python programs be easy: a bug or bad input will never cause a segmentation mistake. In its place, while the interpreter discovers an error, it raise an exception. When the program doesn't catch the exception, the interpreter print a heap trace. A source level debugger allow inspection of local and global variables, evaluation of arbitrary expressions, setting breakpoints, stepping from side to side the code a line at a time, and so on. The debugger is written in python itself, testify to Python's introspective power. On the other hand, often the quickest way to clear up a program is to add a few print statements to the source: the fast edit-test-debug cycle makes this simple move towards very effective. Python is uncomplicated to learn. The number of description in the language itself is modest, require relatively little investment of time or effort to construct one's first programs. Python sentence structure is intended to be readable and straightforward. This effortlessness makes Python an ideal teaching language, and allows newcomer to pick it up rapidly. Developers use up additional time thinking about the problem they are trying to solve, and less time thinking about language complexities or deciphering code left by others

Raspbian OS

Raspbian is the free and foundation's official supported operating system based on Debian optimized for the raspberry pi hardware. Raspbian provide more than pure OS if compare to the other operating system. It comes with over 35000 packages, precompiled software bundled in a nice format for easy installation on raspberry pi. Software like python IDE, Scratch and more are included in this OS.
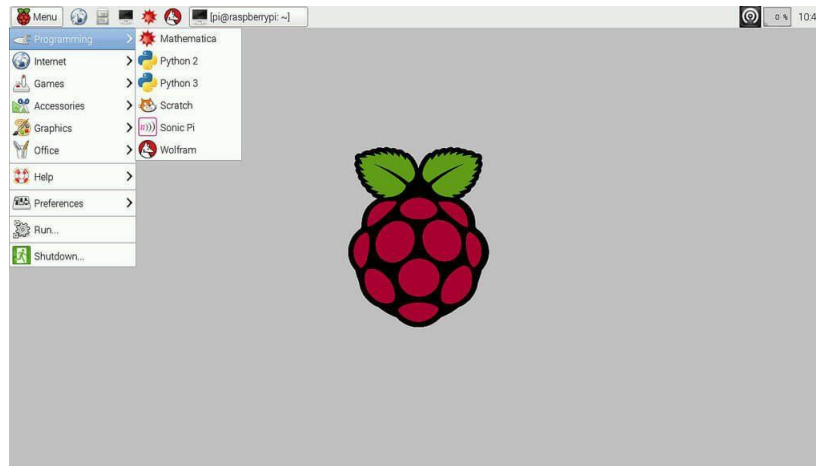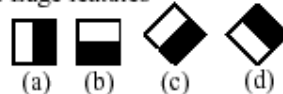
OpenCV

OpenCV is an open source computer vision software library. The library has a lot of optimized algorithms, which can be used in many IOT related sectors including face detection and recognition. As the libraries of our project we liked to use the Haar classifier, LBPH (Lower Binary Pattern histogram) face recognizer.

VI. HAAR CASCADE CLASSIFIER ALGORITHM

A Haar Cascade is basically a classifier which is used to detect the object for which it has been trained for, from the source. This proposed system uses Haar Cascades classifier as a face detection algorithm . Firstly, the algorithm needs a lot of positive images and negative images to train the Haar cascades classifier. Positive images are images with clear faces where negative images are those without any faces. Each feature is represented as a single value obtained from the difference of the sums of pixels in white rectangle from the sum of all pixels in the black rectangle. All different possible sizes and locations of classifier is used for calculating of plenty of features. As the number of classifiers increase the arithmetic computations seems to take a long time. Instead of it, the concept of Integral Image has been used. Image Processing Integral image is a data structure which is a summed area table and algorithm for quickly and efficiently generating sum of values in a rectangular grid subset

VII. CONCLUSION

In advanced world, autonomous system is gaining rapidly so the advancement in latest technology is continuously and rapidly made on different latest automatic lock security system. Face recognition offers a solution for protective the privacy for user. The system has successfully overcome some of the aspects existing with present technologies, by the use of face

recognition as the authentication technology. Face recognition is used for better security and accuracy. Also if the unauthorized person attempts to open the locker then camera is detected and captures their face and through mail their face is sent to the owner and the buzzer will be turn ON to give an alert information to the surrounding people. Thus the method is very much secured. This technique can be greater to higher level so as to further improve the security. From the consequences received it is far clean that proposed approach provides very excessive accumulator.

ACKNOWLEDGMENT

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