

Smart People Identification and Tracking System Using on IOT

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Abstract- In planned system we introduced a extendible framework for embedded sensible home security system is planned, that consists of a face recognition system. Here we victimize haar like options and for recognition of face we have a tendency to square measure victimize native Binary Pattern bar chart (LBPH). A cascade classifier is employed in face detection and face recognition is dispensed in 3 stages feature extraction, matching and classification. The distinctive and at the foremost useful choices square measure extracted and face image is compared with footage in info throughout last stage (classification). In this native binary pattern for person's face recognition take under consideration every kind and texture information for analysis. The image that is given is segregate into very little components from that native Binary Pattern square measure taken and clubbed into one vector feature. This feature vector helps in mensuration similarities between footage by forming Associate in nursing economical illustration of face. Throughout this technique the Face recognition victimize Open CV on Raspberry Pi three. And conjointly that image sends to mail. Person detection and tracking is the main objective with alert of SMS API and image attached to the mail using SMTP.

Keywords- Raspberry Pi 3, face recognition system, OpenCV, Python, USB Camera, home appliances, Mail, SMS API.

I. INTRODUCTION

The police work became an enormous difficult downside within the gift world, sake of security purpose in phone or banks or alternative public places we have a tendency to be victimization many alternative security systems like countersign, finger prints and pattern recognitions. The pattern or passwords used are often treed simply once if the user is thought well or if the pattern is seen once or standard. The finger print system doesn't attain full-fledged result the through place is low thanks to the miss matches or a layer of distraction because of external sources and lots of alternative reasons. To supply a correct police work we have a tendency to be going for face recognition, the distinctive options of every individual are taken into thought. There are totally different styles of strategies for face detection and recognition, during this paper face detection is finished supported haar options and face recognition is finished supported native binary pattern bar chart.

During this paper the Face recognition and detection is finished victimization Open CV on to the Raspberry Pi three.

A. Monitoring & Control:

The proposed system also includes an intelligent system for the intelligent face recognition using Open Source Computer Vision (OpenCV).

This technology plays a crucial role in enabling remote access to a person/ owner which requires the face recognition of the person. If the person wants to control or monitor the area from the remote area the person has to make database of the images that are authenticated.

Also if any unauthenticated person came it will detect and also will send the mail to the owner by capturing the image and attaching it to the respected E-mail id using SMTP. This subsystem is implemented using Python programming language along with the OpenCV module running on the Raspberry Pi 3.

II. SYSTEMDESIGN&ARCHITECTURE

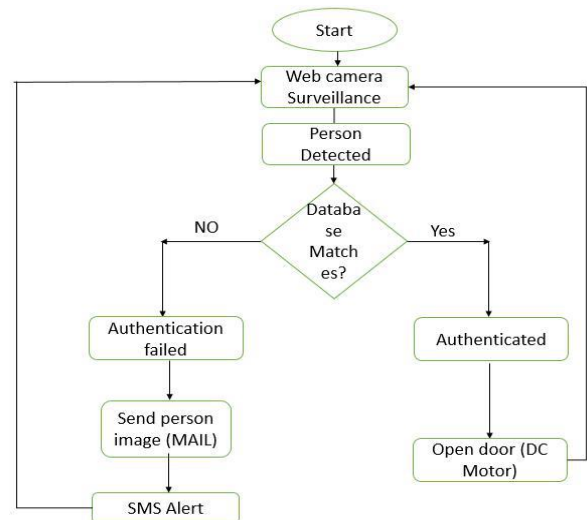


Fig.1: Flow Chart

As with any system, initial stage is to monitor the location using USB webcam which will be in surveillance mode always. As the person detected it fetch the face using haar_cascade_frontal_face classifier and compare with the database and accordingly give the result.

A. System Architecture

The proposed system is new approach to the identification and recognition of the person using the live surveillance method, Here Raspberry pi is used which is connected to the USB camera for the surveillance database is made of the people who are authenticated. As the camera detects a person using Haarcascade frontal face classifier it fetches the data of the face and compares with the database by training it using the CreateFisherFaceRecognizer module in OpenCV. As the person is authenticated automatically it opens the door (DC motor) and if the person is not authenticated it will capture the image of the person and send it to the mail using SMTP and also give an alert message using the Twilio API.

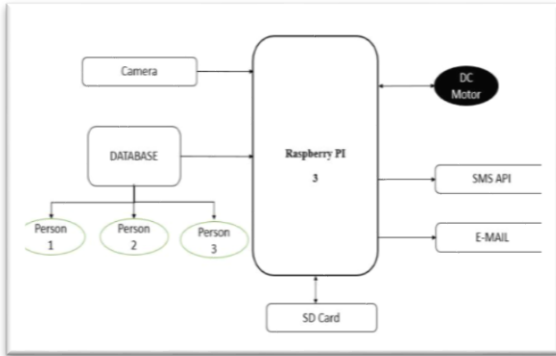


Fig.2: Block Diagram

The heart of this system is the core module which is realized using the Raspberry Pi 3, its responsibilities include, and acquiring images from the camera, processing the acquired image as required maintaining and updating the information through SMS alert and send MAIL with the attached image and switching on the required hardware automatically.

III. SYSTEM DESCRIPTION

This section gives an overview of the various concepts, components and modules of the proposed system.

A. Imaging Module

The imaging module in the proposed system is realized using a USB web Camera, the main reason behind choosing USB Camera over the Pi camera is the cost effectiveness.

The camera features a high-quality CMOS sensor, with an image resolution of 25 MP (Interpolated), an adjustable lens for focus adjustment, a frame rate of 30 fps and f2.0 lens.

The USB camera also is equipped with night vision for low light photography. The camera interfaces with the Raspberry Pi via the USB 2.0 port and is responsible for capturing images when requested; the pictures are captured by using the command `fswebcam`.



Fig.3: USB Camera

B. Raspberry Pi Core Module

The core module of the system is realized using a Raspberry Pi 3 board; it's a \$ 35 bare-bones computer designed and developed by the Raspberry Pi Foundation, the Pi 3 features a BCM 2837 System-on-Chip which includes a Quad-Core 64-Bit ARM Cortex A7 CPU clocked at 1 GHz paired with 1 GB of RAM. It also has VideoCore IV GPU for graphical processing applications, it also includes four USB ports for peripherals and 40 Pin General Purpose Input Output (GPIO) pins for interfacing the Pi with external electronic circuits, these GPIO pins are used to interface the Pi to the door lock module. The Raspberry Pi is designed to run various Linux based operating systems and has Raspbian as its official operating system and Python as its official programming language.

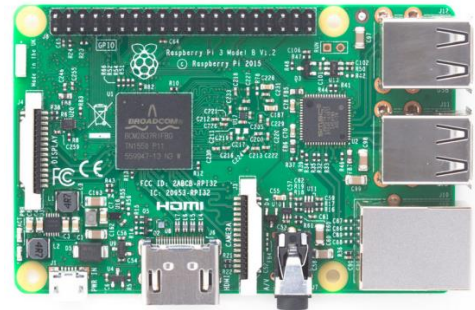


Fig.4: Raspberry Pi 3 Module

In this system the core module plays a highly pivotal role and is responsible for various functions, the core module is responsible for acquiring the images from the camera, processing and send mails.

It's also responsible for maintaining the update of the location with the image capturing process. It is in charge of employing the authenticated remote access to the server with the controlling and monitoring part. It's responsible for monitoring the sensor, controlling modules by sending commands using Python code via GPIO to the motor driver.

C. Embedded Server & IoT

Another crucial function of the core module is to act as an embedded web server, the primary responsibilities of this server include, transmitting the visitor/ visitors images via email to the owner, look for emails to the owner and send the images of the unauthenticated person in case of any problem.

This system employs an embedded server approach for communicating with the user and with the internet/ intranet. Python code is used to program certain aspects of this system such as sending and receiving emails. Standard Python libraries corresponding to the E-MAIL such as urllib2, cookielib, imaplib, poplib, email, smtp, etc. for sending and receiving emails are imported and used accordingly.

This system uses OpenCV with python which plays an important role for person detection and recognition.

D. Person Authentication.

Designing a local database of the person who are authenticated in a folder with just running a simple python program and capturing each frame by extracting the face of the image and saving it in the database with the name of the person as the folder name with as much features as possible. This database plays an important role in authentication if the image quality is less or if the features of the person are not accurate it may affect the authentication process of the person. As the person is authenticated with the correct database automatically the door will open.

IV. HARDWARE IMPLEMENTATION

This section emphasizes on the actual hardware implementation of the proposed system, the various modules, components, peripherals and the interconnections between them are discussed here.

The first stage of the implementation is to prepare the Raspberry Pi 3 module for its first boot; this is done by downloading the latest version of the Raspbian operating system from the official Raspberry Pi website. A microSD card is the formatted using SD Formatter; it's then flashed with the Raspbian OS using Win32 Disk Imager. The first boot is then completed on the Raspberry Pi connecting the required peripherals, such as power supply, keyboard, mouse, Ethernet cable, etc.

The Raspberry Pi for optimal operation requires a quality power supply; the Pi can be driven by using any Micro USB based mobile phone chargers with a good current rating, and this system is powered by a 5V 2.5A power bank for uninterrupted operation.

Since the Raspberry Pi 3 has inbuilt Wi-Fi and Bluetooth is used for connectivity; the Pi also has an Ethernet port which can be used to gain wired internet access.

Using Python programming language preinstalled on Raspbian the source code of the system is provided and tested appropriately. The USB Camera is interfaced, the GPIO pins are programmed using commands in Linux and Python in this

stage. The camera is interfaced to the Pi via the USB port and the door lock module is interfaced via the GPIO pins on the Pi.

V. EXPERIMENTAL RESULTS

This section emphasizes on the final results of the proposed system, the system has USB webcam which acts as the live surveillance and tracking with the help of OpenCV module in python integrating OpenCV with the Camera for fetching the face of the person with tracking and recognition of the person. The system automatically detects the person face automatically using the OpenCV modules.

With an alert section and send the image of the person using SMTP mail. Also the main part of this project is the controlling of the authenticated person from anywhere throughout the world by an automatic database system and using the Twilio SMS API and SMTP mail which plays a crucial role by giving alert to the owner.



Fig.5(a): Final Setup

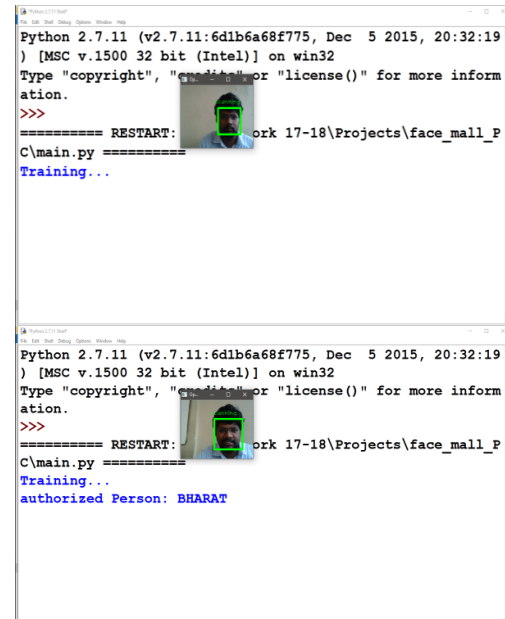


Fig.5(b): Authorized user



Fig.5(c): Unauthorized user

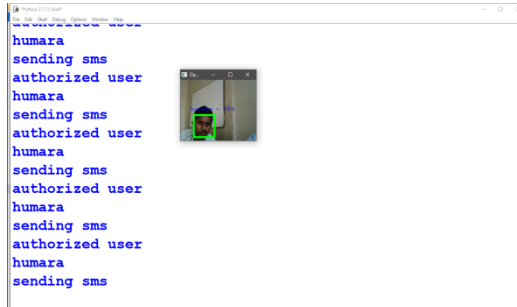


Fig.5(d): Sent unauthorized user image to our email or registered number

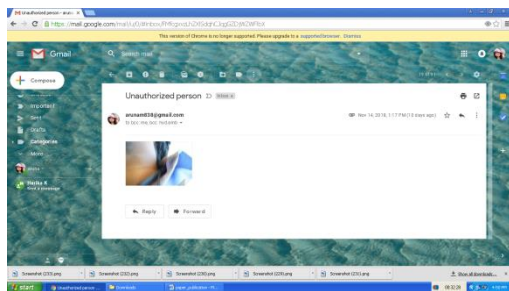


Fig.5(e): Email

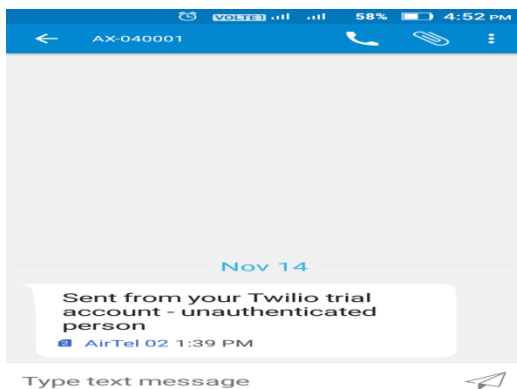


Fig.5(f): SMS

VI. CONCLUSION

This paper presents the design and implementation of a Smart authentication system which performs at a high speed and accuracy with the live surveillance using the USB webcam without any initial button to capture the image of the person. OpenCV plays a crucial role in implementing this project as we are using OpenCV module for capturing, extraction and recognition part of the person accordingly. This reference style is used for authentication in home security, and alternative public places. So for a security purpose in real time we have a tendency to design a face recognition system in minimum expenses exploitation raspberry pi, open Cv.

VII. REFERENCES

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