Smart Security Using Raspberry pi, Camera module and OpenCV

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ABSTRACT

The proposed system can be extended to be used for different properties and facilities such as banks and offices. Human emotions can be understood by text, vocal, verbal and facial expressions. In this project we use the raspberry pi3 microcontroller for the processing and the raspberry pi camera is use to capture the images of person and stored it in database. If the image of person matches with database then the door will be open. The implementation recognition at real-time on raspberry pi 3 and average accuracy above 85% is achieved at real-time. In this project the algorithm use in used is Eigen face detection algorithm for the face detection and the open CV algorithm for the face detection and recognition purpose. The main application of this project is to provide security to the very confidential and more secure areas. To provided remote monitor and control for the home appliances. The propose system can be extended to be used for different properties and facilities. It provided maximum safety to the academic and business field.

Keywords: Raspberry pi 3, Raspberry pi camera, smart home, door system, image processing, OPENCV, python, home automation security

I. INTRODUCTION

Nowadays technology plays an important essential role in our daily life in which different types of interests are taking advantages by this technology. Nowadays, smart phones and computers have significantly contributed to our daily life where many adjustments and computations are being completing such types of technologies. Security of homes has become one of the most concerning issues are facing many of the people. By the expanded duration of time to leaving the home due to any work, study and other duties, our homes are being more unsecured, vulnerable for several threats specially being burgled. Most from the threats for this there are different cases where securing or the monitoring the house is very difficult, critical such as the presence of elderly individual or kids. For the home security system or so-called Home OS because it has been proposed in order to provide most secure arrangements. Such concept tells about to turn our home into a smart in which different types of tasks especially the monitoring can be performed by the remotely. Monitoring and controlling some of the tasks inside the house have the ability to provide better maximum safety.

Home automation system is a application that connect to different types of electronic devices for the monitoring and controlling the all home appliances. This home automation system is a area that caught several attentions by the both academic and business fields. The earliest effort of home security system was relied on wired home networks however, due to the appropriate planning and construction works required to offer a wired home, such effort tend to be insufficient.

II. METHODOLOGY

In this proposed smart digital door system, the setup works in two communication modes one is Raspberry Pi and another is email modes, Raspberry Pi is a small computer board working on the Linux operating system which connects to a computer monitor, keyboard and mouse. Raspberry Pi can be used to electronic appliances and programming network circuits, it can also be use as a personal computer and Apache Web server, MySQL, can be installed in the board.

The input is placed for the control module is keypad screen of the user or new visitor. The control module is then start its camera PI and capture image then send the file to the database by help of Email. The result data sends to user includes the access to the door for the user at the door by using LED (red and green). It also includes message alarm on door and also sending live feeds to the owner and notifications to the owner about the user when authorized person he/she enters and leave the house.

The control module controls the camera pi, keypad and communication between server and all the important running processes are done by this control module. The control module Raspberry Pi is the central units of the door lock system where all process cycle is done. The control module is the server for verify the user id and the microcontroller. Camera is connected to Raspberry Pi 3 for surveillance purposes. All the operations are done by the control module which includes sending SMS and image to the Email of the owner, check that the guest is authorize to enter the house and the image.

III. PRIOR APPROACH

In this project with a minicomputer Raspberry pi 3 different input and output is interfaced. In info area there is calling ringer, PIR sensor & wireless camera.

In processing section a minicomputer raspberry pi 3is used. Raspberry pi3 is equipped with wifi dongle. And on the output terminal there are Lcd, magnetic door lock, emailing services. A calling ringer is set on entryway so that on the off chance that somebody visits the client the individual will press the chime and the ringer will produce a flag to Raspberry Pi 3 indicating presence of a person. There is also another way of sensing human and that is passive infra red human motion detection sensor. If any thief tries to break into the house PIR sensor will identify the motion of that human and will transmit an alarm to Raspberry Pi 3. Most important input device is the wireless camera. It is used to see image stream and also whenever a person comes it takes a snapshot of that person and transmit it to Raspberry Pi 3. Raspberry Pi 3 process these inputs like whenever it gets a calling bell as input it transmits a signal to wireless camera to capture an image of the visitor. Inside the time it gets the image it create a Tweet alarming the client that somebody has arrived infront of entryway. After receiving the image Raspberry Pi 3 sends a mail to user attaching the picture. User can control the magnetic lock throughemail. In the event that client needs to allow the guest get to he can turn on the lock and on the off chance that he needs to dismiss access in any capacity whatsoever client can demonstrate the reason to LCD tweeting a text for visitor.

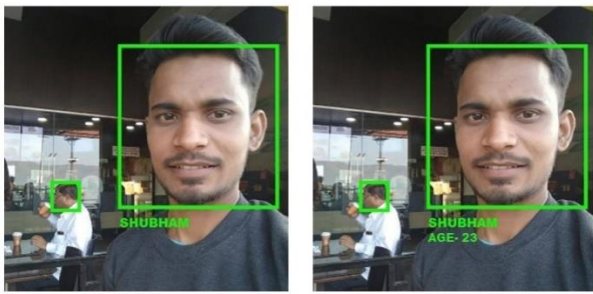**Figure 1.** Data-set of Authentic face of a person

Figure 2. Face Detection Using Open CV

IV. OUR APPROACH

In this proposed work, the brief description of proposed system followed by the operation of the Raspberry Pi 3 module in our design, the screen keypad door lock and the Camera Pi module has been added. This smart digital door lock is a system to monitor and control some home devices. This smart digital door lock system works over internet network by using Raspberry Pi 3. The structure of system consists of the three phases input, processing and output. In this input phase aims to input the key for a newcomer and if the key is valid or the image of that person is matching with the image in the database, the door is opened, otherwise the door is not opened and a photo is taken and then it sent to the owner of the house by e-mail system and then if the owner of the house permitted to allow him to enter, the key and the image of that person is stored in the database. By this the person is granted permission to enter at any time by the authentication of the password in the database or by his image.
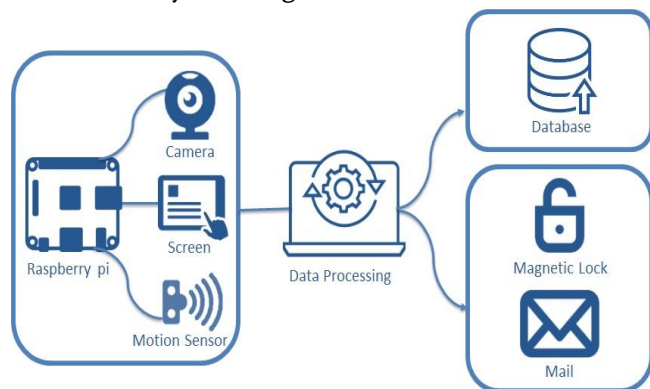

Figure 3. Existing Mechanisms for your paper

V. CONCLUSION

The project design and implemented a security system based on the Raspberry Pi. The aspects of the system are: motion using a motion sensor, video capturing using a Raspberry Pi Camera and sending out an alert through e-mail. It did not however achieved the option of image processing in the Raspberry Pi because of system constraints i.e. processor speed.

The framework can be utilized in a few spots like banks, emergency clinics, labs and other advanced mechanized frameworks, which drastically diminish the peril of unapproved section, proof can be given to" the security department if any robbery issue occurs.

VI. REFERENCES

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