Office Security System

Siddhesh P. Adivarekar[1], Rajan S. Sawant [2], Sarthak S. Vaidya[3]
[1, 2, 3] Dept of EXTC
[1, 2, 3] Finolex Academy of Management And Technology,Ratnagiri, INDIA

Abstract- *In these days security becomes an important parameter In all areas such as colleges, malls, offices various security systems are required. This paper mainly focuses on development of a system which focuses on a security required for offices. The system based on raspberry pi having wireless camera for face recognition and other systems like damage detection, password based door lock system. The security camera is provides to which will shoot the video and capture the images in real time and send to user via email with help of IoT. The system gives good level of security in all manners for offices.*

Keywords- Email, Face Recognition, Internet of Things(IoT),Pi camera, Raspberry Pi

I. INTRODUCTION

In the modern world crime becomes modern too, a lot of incidence occurs like robbery, stealing, unwanted entrance happens. So security matters a lot in daily life. In offices, malls, banks security systems are required. For authentication purpose various systems like fingerprint based system, iris scanner, voice unlock system etc are required. To entry only to a authenticated person we are going to implement a face recognition system based on raspberry pi and matlab. For face recognition system various algorithms are present to do analysis of face.

For monitoring the visited customers a visitor monitoring system is used. It is a wireless system, a camera will capture a photo and send it wirelessly to a raspberry pi and raspberry save the photo with a date and time at that instant. A password based door lock system in case of face recognition system fails. If any thief tries to break the door the damage detection system is used to fire up the alarm.

A security camera is also provided for an office cabin. It records the video of the cabin and it can also send the images of a cabin to that cabin holder via email through internet. It is a IoT based system, by use of internet the user can get images via email.

These are some security systems which are required for any office. The systems can be modified according to the need and security level also can be modified.

II. LITERATURE SURVEY

A. Research Elaborations-

[1] This paper describes an automatic face recognition algorithm for a security entrance. This face recognition algorithm is very efficient on computing time and taking little storage space. In this system security entrance allow authorized personnel un-interruptedly.

walking into the entrance. The user's face image was taken during the early stage in the one's entering. The field of face detection and face recognition have increasingly attracted researchers' interest over the past a few years. While the face detection is the foundation of face recognition. For human intelligence, the face detection is a easy task; but for the artificial intelligence, it takes quiet a while to do the computing to detect a face. Every human being has their unique facial feature having different mathematical value. Human face is central to social interaction. It is the main source of information by which people identify each other, and the focus during a conversation this technology can be used for the verification as well as identification. This system requires the various features matching of the face by the administrator with a pre-defined data. Face recognition is a computer technology the determines the locations and sizes of human faces in digital images. It detects facial features and ignores anything else. The system does not depend on 3-D models or intuitive knowledge of the structure of the face (eyes, nose, and mouth). Classification is instead performed using a linear combination of characteristic features (eigen faces).

These paper offer an advance security system in automotives, in which consists of a face detection subsystem. The face detection subsystem bases on optimized AdaBoost algorithm and can detect faces, that face is compare to the data base it is matched means motor ON otherwise make an alarm loudly or soundlessly.

The facial recognition process normally has three interrelated phases or steps. The first step is face detection, the second is normalization and the third is feature extraction. These steps depend on each other and often use similar

techniques.Each of these steps poses very significant challenges to the successful operation of a FRS.

Detecting a face in a probe image may be a relatively simple task for humans, but it is not or a computer. The computer has to decide which pixels n the image is art of the face and which are not. Once the face has been detected, the face needs to be normalized. This means that the image must be standardized in terms of size, pose, illumination, etc., relative to the images in the gallery or reference database. To normalize a probe image, the key facial landmarks must be located accurately. In feature extraction, a mathematical representation called a biometric template or biometric reference is generated, which is stored in the database and will form the basis of any recognition task.

The security system is based on Eigen faces. For this a webcam will be used which would be fitted at the entrance. The webcam will be interfaced with PC and it should have MATLAB. The database will be created of trained images and is in the wok folder of MATLAB saved as 'Trained database'. Whenever a person needs access to the room his/her face will be captured by the webcam.The captured image will be processed and would be compared with the previously stored trained images. If the face recognition is successful the access is granted and if not the buzzer will buzz. This system prototype is built on the base of one embedded platform in which one SoC named "LPC2148" (works at 60MHz) controls all the processes. Experimental results illuminate the validity of this car security system.

[2] This paper is based on one time password based security system..Some security systems at present, none of them are providing complete solution to avoid theft or not restricting unauthorized entry completely. Now a day's so many useful technologies are coming out to make our life style more comfort, luxurious and secure, with these latest advanced technologies we are providing sophisticated security systems. To communicate with modules we need a powerful and fast processing micro controller, for this purpose we are using ARM7 based LPC2148 32 bit micro controller. In this system, Bluetooth technology is used in level1 security layer, it asks mobile password which should be entered from android mobile, send virtual password via Bluetooth communication to micro controller, then it checks second level using GSM technology., then controller sends one time password to pre register mobile number as shown in Fig.2. If the user has that mobile with him then only he can see that password and allowed to next level of security. For this SMS purpose we are using SIM900 GSM modem, which supports Quad-Band 850/ 900/ 1800/ 1900 MHz frequencies and the data format is UART with default baud rate is 9600 bps ,and it is operated

through AT commands. After getting password to GSM mobile user has to enter password using keypad, if password matched then only user can access the system. So that authorized persons only access the system, so that high level security was provided. The coding was written in embedded C language and compile using keil compiler. The relevant hex file was dumped into the microcontroller using FLASH MAGIC softwar. Modules Used In Proposed System.

[3] Recently, digital door locks have been widely used in households and offices. However, in many cases, an intruder has tried to penetrate a private area by circumventing the lock. In this study, we design and implement an IoT-based digital door lock to reduce the damage of digital door lock tampering and to enhance the various security and monitoring functions using IoT technologies.

Main Features of the Proposed System The main features of the proposed system are as follows. First, it has impact detection and alarm functions. This is to detect an intruder who tries to invade by applying physical force to the lock. Second, it has an image transfer function. Generally, an attacker who does not know the password will make a variety of attempts. Therefore, if an attacker mistypes the password more than a given number of times, the system obtains images of the intruder and transfers them to the mobile device. Third, the user can query the records of typed passwords and all incoming and outgoing records that are stored in the database. Fourth, the system can open the door lock in real-time after recognizing a visitor's image. If a visitor forgets the password, he can type a code into the door lock; then, the door lock system transmits his image to the mobile device user. The user can remotely control the door lock after reviewing the image. Fifth, the controller can detect a valid user approaching the digital door lock, if he is carrying the mobile device, and will open or close the door lock automatically.Overall Structure of the Proposed System. The proposed system consists of a digital door lock, a Raspberry Pi control board that is mounted in the lock, and the end-user's mobile device.

The controller detects physical impacts applied by a visitor, and notifies the user's mobile device. The controller detects if a password error occurs more than a certain number of times, and uses the camera to capture an image of the visitor. It then transfers the image to the user's mobile device. All of the access records are stored in the controller's database, which can be queried via the user's mobile device. If a visitor has lost his key, his image is captured and transferred to the user's mobile device by pressing a specific key; the user can then control the door lock remotely after verifying whether the visitor is valid. Another important function of the controller is automatically opening or closing the door when a

valid user comes near. When a valid user accesses the gate holding an object, because it is difficult to operate the door lock, the controller communicates with the user's mobile device via Bluetooth and opens the door lock automatically. The mobile device acquires the impact detection information and the invalid visitor image information from the controller, and then the user can take appropriate action. Further, if the user acquires image information for a valid visitor, it is possible to open or close the door lock remotely. It is also possible to query the incoming and outgoing records. And the operation procedures for invalid and valid visitors.The lock was designed to improve user convenience by allowing him to check the image of a valid visitor and open or close the door lock remotely. Another efficient system function is that when a valid user approaches the door, the door lock system opens or closes the door without additional operations. We expect that if the problems mentioned previously are resolved, the proposed system can be commercialized into a useful product, such as a secure security system with enhanced convenience, especially when compared to existing digital door lock systems.

[4] In recent years the energy crisis has become one problem which the whole world must confront. Home power consumption makes up the largest part of energy consumption in the world. In particular, the power consumption of lamps in a typical home is a factor which can't be ignored. The typical user needs different light intensities in different places. Sometimes the light intensity from outside is sufficient, and thus we don't need to turn on any light. But sometimesthe user leaves but forgets to turn off the light. These factors cause energy waste. Therefore some power management of light control in a home is necessary in order to save energy. Lightsare usually controlled by on/off switches. Of course, the user can switch a light on or off remotely by connecting a specific device to a PC, but there has to be at least a PC, consuming a rather large amount of power 24 hours a day, for the control mechanism [1-4]. Moreover, this inconvenient practice comes at a high cost for the user. In some designs one must install specific hardware and software to control the lights, resulting in unacceptable costs. Furthermore this type of system cannot detect either the temperature of the human body or the room light intensity. In this paper we propose a design for automatic room light detection and control.

This paper have proposed a design for automatic room light detection and control. It usesan HLCM at every light of a family for home power management. The HLCM detects if a human body is present or not by using the PIR sensor circuit. If there is no human body present, all lights are turned off. If there is, the HLCM then detects the light intensity under the environment by using the light sensor circuit and the system maintains sufficient room light by switching lights on/off. To realize light intensity support and light pre-control, the RF technology for light power management has been integrated. Consequently, the potential of the features of low cost, small size, low power consumption and power saving has been shown.

[5] This paper is to provide high level security and automation of appliances. This paper "Automated security system using surveillance" uses raspberry pi board which itself acts as a mini computer. Whenever a person enters into the room, the fans and light will automatically switch on. At the same time camera is also switched on and it takes the image of the person who has interrupted. The user is alerted by sending an SMS with the link using GSM modem. The image can be viewed by clicking on this link. In the absence of a person the fans and lights will automatically be switched off. Now a days, The world is experiencing a vast implementation of home security. And automation plays a vital role in the day to day life.

[6] This paper presents a fingerprint based door opening system which provides security which can be used for many banks, institutes and various organizations etc.There are other methods of verifying authentication through password, RFID but this method is most efficient and reliable. To provide perfect security to the bank lockers and to make the work easier, this project is taking help of two different technologies viz. Embedded System and Biometric. Unauthorized access is prohibited by designing a lock that stores the fingerprints of one or more authorized users. Fingerprint is sensed by sensor and is validated for authentication. If the fingerprint matches, the door will be opened automatically otherwise the buzzer connected to an audio amplifier will be activated so that the people near the surroundings will get an alert.

Generally passwords, identification cards and PIN verification techniques are being used but the disadvantage is that the passwords could be hacked and a card may be stolen or lost. The most secured system is fingerprint recognition because a fingerprint of one person never matches the other. Biometrics studies commonly include fingerprint, face, iris, voice, signature, and hand geometry recognition and verification. Many other modalities are in various stages of development and assessment. Among these available biometric traits fingerprint proves to be one of the best traits providing good mismatch ratio, high accurate in terms of security and also reliable.

[7] This paper discusses the design and implementations of an electronic door lock/unlock compact system using the arduino platform. These security systems enable to lock/unlock the door using three different modes i.e. Keypad, Bluetooth and

Global System for Mobile (GSM) modules. These three modules operate on a 4-digit password. We can open or close the door by using keypad, bluetooth application from smart phone and also by using 4 digit message from GSM phone. If any unknown person does the three consecutive unsuccessful attempts to enter the password in any one of the system, then arduino controller will send a warning message to preset owner GSM mobile number and also initiate the buzzer alarm as a warning of unauthorized intrusion. We have got the good experimental results and promising analysis in all these three modules.

B. Hardware Requirements
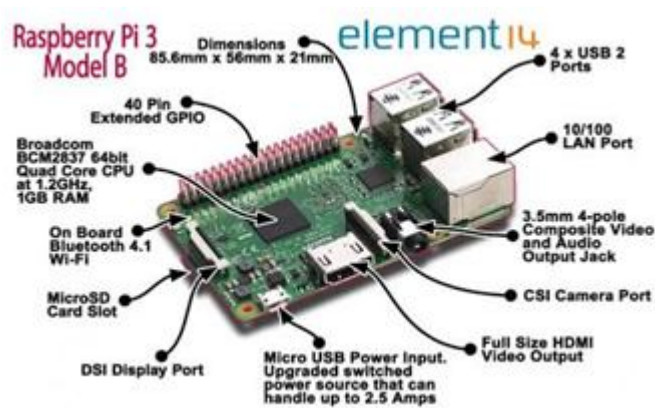
1] Raspberry Pi 3b:-

Figure (a)

The raspberry pi is a small single board computer developed in United Kingdom by Raspberry pi foundation. Raspberry pi features a Broadcom system on chip (SoC) with an integrated ARM compatible central processing unit (CPU) and on chip graphics processing unit(GPU).

Raspberry Pi 3 specification:
Processor:- BCM2837
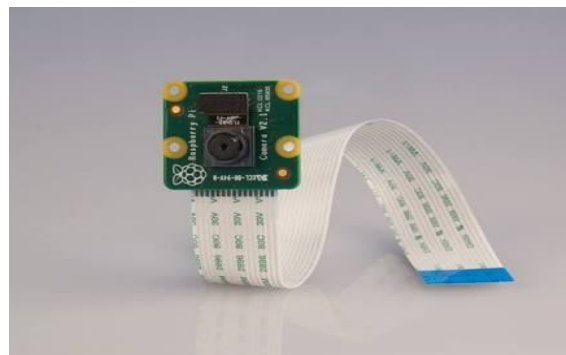CPU:- Quad Cortex A53 1.2GHz
Instruction set:- ARMv8-A
RAM:- 1GB SDRAM
Storage:- micro SD
Wireless:- 802.11n/ Bluetooth 4.0

2] Pi camera:-

Figure(b)

The raspberry pi camera module is a custom designed add on for raspberry pi. It attaches to raspberry pi by way of one of the two small sockets on the board upper surface. This interface uses the dedicated CSI interface, which is designed especially for camera.
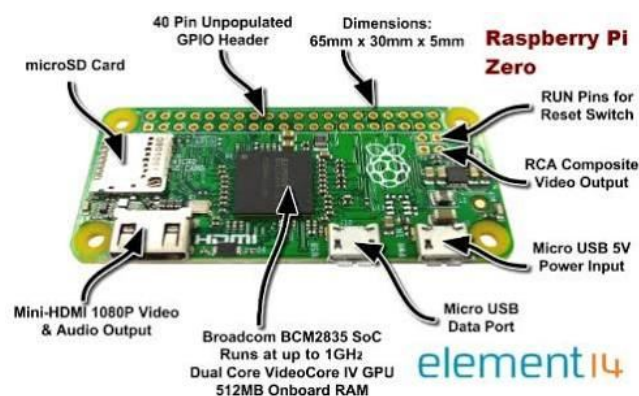
Specifications:-
Resolution:- 8 Mega Pixel
Video Module:- 1080p30, 720p60 and 640*480p60/90
Sensor:- Sony IMX219

3] Raspberry Pi zero

Figure(c)

Specification:-
1 GHz, single-core CPU
512 MB
Mini HDMI and USB on the go ports
Micro USB power
HAT compatible 40 pin header
Composite video and reset headers
CSI camera connector
802.11n wireless LAN
Bluetooth 4.0

4] Softwares required:-

Raspbian OS

Arduino
Keil
Proteus

III. CONCLUSION

All security systems like face recognition, password based, door lock system are explained in the paper. These papers discuss about the various algorithms, interfaces and other parameters required in the view of security purpose. The accuracy of the systems can be improved according to the need .Some of the drawbacks of each systems are also studied and by overcoming those drawbacks more efficient system can be developed.

REFERENCES

[1] Mahesh Karanjkar1, Shrikrishna Jogdand2,"Advanced Security System Using Facial Recognition",1Prof. & HOD, Dept of ETC, Shri Tuljabhavani College of Engineering, Tuljapur, Maharastra, India.2PG Scholar, Dept of ETC, Shri Tuljabhavani College of Engineering, Tuljapur, Maharastra, India.

[2] lkyu Ha Kyungil, ”Security and Usability Improvement on a Digital Door Lock System based on Internet of Things”, Republic of Kore,08 May 2015.

[3] Ilkyu Ha, Ohsung Doh,"A Digital Door Lock System for the Internet of Things with Improved Security and Usability", Advanced Science and Technology Letters Vol.109,2015

[4] Ying-Wen Bai & Yi-Te-Ku, “Automatic Room Light intensity detection & control using microprocessor and light sensor, 21 October 2008.

[5] Hteik Htar Lwin, Anug Soe Khaing ,”Automatic Door access system using Face Recognition”, International Journal of Science and Technology Research, volume 4, 6 June 2015.

[6] A. Aditya Shankar, P.R.K.Sastry, .A. L.Vishnu Ram,4.A.Vamsidhar,"Finger Print Based Door Locking System",Volume 4 Issue 3 March 2015, Page No. 10810-1081

[7] S.Umbarkar,G. Rajput, S. Halder, P. Harname and S. Mendgudle,"Keypad/Bluetooth/GSM Based Digital Door Lock Security System", Department of Electronics Engineering, RAIT, Nerul, Navi-Mumbai: 400706

[8] P.Vigneswari, V.Indhu, R.R.Narmatha, A.Sathinisha and J.M.Subashini, "Automated Security System ",29 March 2015, Vol.5, No.2

[9] Vemula Mahesh,T. Chandra Shekhar Rao,”Design and Development of Advanced Security System”, Dept of ECE, Loyola Institute of Technology and Management, Guntur, JNTUK, AP, India,03 July 2015.

[10] Chutung,Taiwan ,”Face recognition security entrance system”, Opto-Electronics & system laboratories ,27 July 2000

[11] P. O. Otasowie and E. Oni, "Design and Development Of A Password- Based Door Lock Security System" Department of Electrical and Electronic Engineering,University of Benin, Benin City, Nigeria.