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## Digital door lock system using OTP

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### ABSTRACT

*Today, the provision of a home security system has become an important study in adopting the latest technology to achieve this goal. Wireless network is one of the technologies used to provide remote monitoring and control of household items. This paper aims to propose a key departmental security system based on Raspberry pi technology where cameras, keypad and pi-lids are used to provide a terrific powerful system to notify the owner, and to inform visitors by giving them a User ID. For this reason, only authorized people will be allowed to enter the departments. The system works by capturing guests with a summary with a code and a camera mounted on the doors at the same time, such snippets will be sent to the owner. The proposed system could be expanded to accommodate various facilities and services such as banks and offices.*

**Keywords**— smart home; automatic home security; departmental program; Raspberry pi

### 1. INTRODUCTION

Nowadays, technology plays an important role in our lives when different areas of interest use technology. Recently, computers and smart phones have had a profound effect on our daily lives when more calculations and adjustments are made with such technology.

Home security has become one of the major problems facing many people. With the increased time to leave home for work, study and other activities, homes are at greater risk of several threats, especially burglaries. Apart from threats, there are various situations where finding or monitoring a home is as important as having older people or children with children. In this way, a home security system or so-called Home OS is proposed to provide more secure settings. Such an idea aims to

transform the home into a smart place where various activities, especially surveillance, can take place done far away. Monitoring and controlling other activities indoors will have the potential to provide maximum security [1].

Home automation system is a computer-based application that can connect various electrical devices for the purpose of monitoring and controlling household items. The automated home automation system is an area that has received a lot of attention from both academic and business fields. The first attempt at the home security system relied on local wireless networks but, due to the proper planning and construction activities required to provide a cable house, those efforts are often inadequate. As a solution to this problem, wireless connectivity has already provided a flexible platform where installation costs are much lower than cable. Therefore, it has been used in a variety of home safety systems to provide alarms for critical threats such as intrusion or other natural hazards such as gas leaks or fire [2].

Recently, electronic key systems have become one of the most popular security systems installed in many residents and business areas. A key feature of such programs lies in the credibility with which authorized persons can obtain access to departments throughout the secure system with interactive communication. A new system called Near Field Communication (NFC) door lock system has emerged [3]. Such a system is based on the technology of seeing a pattern in which people's faces are analyzed in order to identify their personality [4]. Such analysis takes various forms such as face-to-face analysis or video streaming. In addition, the size and shape of facial features are also considered in the analysis.

This paper aims to introduce a home network security system based on the Bluetooth network. The main purpose is that

## 2. RELATED ACTIVITIES

Several remote programs have been proposed whether they are for educational or business backgrounds. Such systems are designed to provide control and monitoring functions. For example, the system has been proposed by [5] based on Zigbee technology. The program is made up of several modules such as the adoption module (HDM) that aims to get the user to the door. This can be done using a camera module where photos are processed or video streamed. As a result, the results of the double-specified module will bypass the Zigbee module which will indicate validation individual user tag. In the event of a user's failure in terms of the zigbee verification tag, a speaker phone will be provided to the site owner.

The digital door lock in the home automation system provides proper control and monitoring of the home environment for the user. The system is proposed by [6] based on RFID technology that provides touch LCD monitor.

One program contains NFC smart phone building capabilities that can ultimately be the key to unlocking the door through a series of link control rules, corresponding to a set of user passwords to ensure that the user should be given permission or not [7]. Another program suggested by [7] is based on NFC which contains smart phone capabilities. Such a system uses the control of the conceptual link to identify the user identity permission.

In addition, the system proposed by [8] is based on the design of the GSM digital lock system using the PIC platform. 5-digit password is used to lock / unlock the door. If a user submits an incorrect password the system notifies the owner.

In [9] a system is created that contains sensors for obstruction, touch, heat, smoke, sound. The whole system is controlled by PIC microcontroller 16F76. It collects sensor information, makes a decision and sends an SMS to the corresponding number using the GSM modem. If a disturbance is detected, the PIC will send an SMS to the owner and another SMS to the Police Station. Similarly, with natural threats such as fire disturbances an SMS will be sent to the fire department and another will be sent to the owner [9]. This system requires additional hardware components such as Sensors, GSM Modem. Alerts are sent via SMS only.

In [10] a smart home security system that uses a sensitive background light model is shown. Such a system facilitates the tracking and detection of an intruder and is based on providing home security. For this purpose, the face recognition process is used to identify the intruder and when you find him, the image of the attacker is sent to the owner's post id for further action. The implementation of this plan involves the comparison of the various object tracking methods and the application of a clear understanding of the proposed security system model. But this program does not use a password to identify.

## 3. SUGGESTED METHOD

In this section, a brief description of the proposed system followed by the operation of the Raspberry pi module in our construction, lock keypad lock, and Camera pi module is provided.

Smart digital door lock is a system for monitoring and controlling multiple home devices. Our digital door lock system works via the Internet network using raspberry pi3.

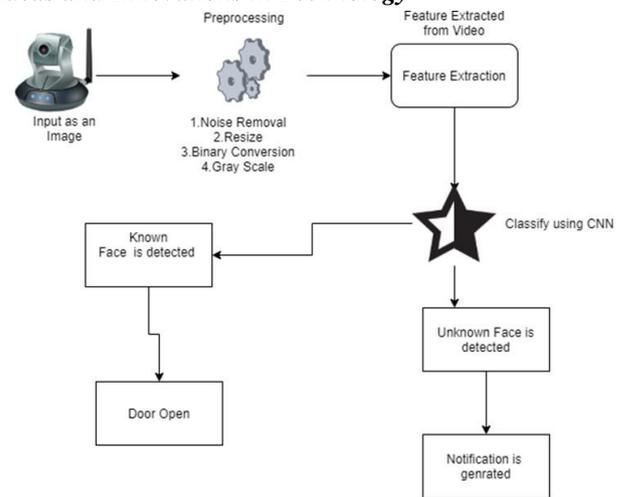


Figure 1. Program structure

As shown in Fig. 1, the structure of a plan consists of the following three phases: (i) input, (ii) processing and (iii) output.

The installation phase aims to insert a key with a new person and if the key works or the newcomer's image matches the image in the database, the door will be opened, otherwise the door will not be opened and OTP will be sent to the homeowner by email personal information is stored in a database. A person is granted access at any time by enabling password verification in their database or image.

### A. Communication model

In this proposed digital departmental program, the setup works with two communication modes: Gingerbread and Email modes, Raspberry Pi is a small computer keyboard running a Linux operating system that connects to a computer monitor, keyboard and mouse. The Raspberry Pi can be used in electronic building and network work, it can also work as a personal computer and Apache Webserver and MySQL can be installed on board.

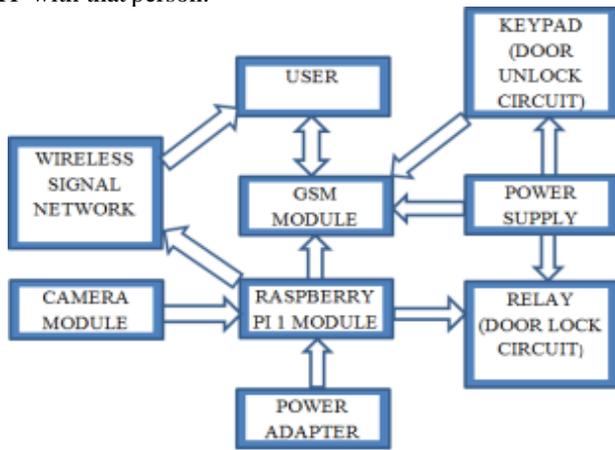
### B. Input and output models

The input into the control module is a user or guest keyboard. Module control and start the PI capture image and send the file to the database via email. The output includes inserting the user door to the door using leds (red and green). Includes message alarm and send the appropriate feed to the owner and let the owner about the Web cam is to install it in a raspberry pi module that takes a photo and compares the image stored in the database.

### C. Raspberry Pi Control module

It controls the camera lens, keypad and communication between the server and all the important processes performed by this module. The "Raspberry pi" control module is the center of the door lock system where the entire process cycle is performed. This module is a user id verification server and microcontroller. The camera is connected to the Raspberry pi3 surveillance objectives. All operations are performed by a control module that includes sending an SMS and photo to the owner's email, checking that the visitor is authorized to enter the house with a user image when entering and leaving the house. A web camera is an input to a raspberry pi module that captures an image and compares the image stored in a database. If it finds a person after comparing the data it will open the door otherwise it will send an authorized person with the OTP where the authorized person in charge of security if

the authorized person wants to give access to an anonymous OTP with that person.



**Figure 2. Block diagram**

Here We have used the Raspberry pi camera module to capture input in the form of video and photos. To detect eye area and mouth use CNN Algorithm. So, we used a python, in that OpenCV Library that will help take pictures with an in-depth reading model that detects whether the eye is open or not. Here it first takes a picture from the camera we used. Find a picture and check if the eye opens or not. Here the algorithm of Convolution Neural Networks (CNN) is used to provide high accuracy when photographing is taken. The CNN algorithm is a fully connected network. The algorithm has many layers. The CNN layer consists of a hidden layer, an input layer, and an output layer. Convolutional Neural Networks (CNN) has other layers namely integration layer, Fully Connected Layers, Receiving field, tools.

**D. Hardware Application**

Here we have used the following materials:

1. Raspberry pi module
2. GSM module
3. The raspberry camera pi
4. Keyboard
5. 16 \* 2 LCD display

**E. Software Use**

Here we have used the following software:

1. Python
2. OpenCV library

**4. OTP COMPLETION ALGORITHM**

1. Camera module capture user face.
2. verify database information.
3. The proposed project works with an automated system to detect and distinguish faces using a convolutional neural network algorithm. It consists of 3 phases, the first face detection from the camera module, the second operational convolutional neural network algorithm for the purpose of feature separation and extraction.
5. very useful features that do not differ from the face image and are removed from the feature removal section.

6. The face image is compared to the images from the database.
7. with the comparison result you will produce OTP.

**5. CONCLUSION**

Smart door lock is one of the most popular digital consumer devices due to its ease of use and affordable price. In fact, it replaces many common types of locks. This report seeks to propose an entry and monitoring management system consisting of various categories: Keyboard and pi-camera user Downloading information to verify user id.

Follow through on request

The low cost proven system based on the Raspberry pi3 system and face recognition makes the home automation system much safer and more efficient. These technologies can cause social change in crime rates.

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