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“Girls Hostel Security System Using IOT and Raspberry Pi”

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Abstract

Security in the hostel is one of the most persistent problems that organization needs to address. Nowadays security is a prime concern in every human beings life. To maintain daily attendance record is complicated and time consuming system for the hostel management. The numbers of existing systems are based on Biometric Scanner monitoring and making students attendance at school but having limitation. To avoid this entire problem hostel in/out management and monitoring system is proposed. The system makes automatically monitor entry/exit of student from hostel and send information to the warden. In this system each and every student has to store their finger print data base. Finger print is known to be the most natural ones, since that uses to identify students in hostel. Fingerprint identification also provides better performance. The system is based on the for the girl student one unique Biometric ID is assigned which finger print. It helps to avoid foreign entries or illegal entries. And student without finger print can't be enters and exit. All these event outgoing and incoming are inform to authorize persons via IOT. Raspberry Pi used as brain of the system. If number of student enter or exit in to the hostel by one id then camera capture images of unwanted person.

Key words: *Fingerprint Sensor, IOT, raspberry Pi.*

1. Introduction

Security in the girls hostel is one of the most persistent problems that hostel needs to address. Nowadays security is a prime concern in every human beings life. In today's fast life parents do not have time to visit the college hostel to know the student in/out time in hostel. Today students' attendance is become more important part for any organizations. Recording and monitoring of hostel attendance is an area of administration that can require significant amounts of time and effort in a hostel environment. The system having student name, roll no., branch, year, photo, figure print and parents mobile number stored in hostel database. The system is specially proposed for hostel management and monitoring. The system is based on the Raspberry pi, finger print scanner and connected with web. The system automatically takes information of student present in the hostel which is helpful for hostel management. In the proposed system the in/out monitoring of student is done by

using finger print scanner, raspberry pi and send alert warden via email using IOT about the authentication. If match found with the data base then the door will automatically open and the person will in and out from hostel. The Raspberry pi is heart of this project,

The human body has the privilege of having features that are unique and exclusive to each individual. This exclusivity and unique characteristic has led to the field of biometrics and its application in ensuring security in various fields with various embedded controllers and embedded computers. Biometrics have gained popularity and has proved itself to be a reliable mode of ensuring privacy, maintaining security and identifying individuals. It has wide acceptance throughout the globe and now is being used at places like airports, hospitals, schools, colleges, corporate offices etc. Biometrics is the study of identifying a person by their physical traits that are inherent and unique to only the person concerned. Biometric identification include fingerprint verification, palm geometry, face recognition, iris recognition, etc. The above mentioned techniques work with different levels of functionality and accuracy. Accuracy and reliability are the two most important parameters when it comes to biometric applications and that too with advanced embedded computers. Fingerprint verification is one of the oldest known biometric techniques known but still is the most widely used because of its simplicity and good levels of accuracy. It's a well-known fact that every human being is born with a different pattern on the fingers and this feature is exploited to

identify and differentiate between two different persons that is what the factor which helped to initiate the model.

2. Block Diagram

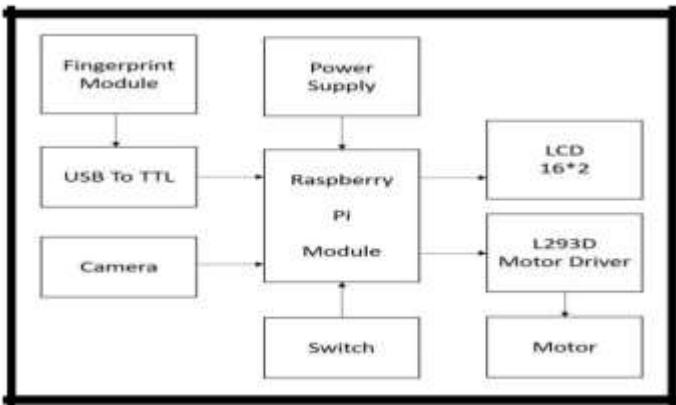


Fig.2 Block diagram

2.1 Description of Block Diagram

The above shows the block diagram of our system in which the raspberry pi is heart of the system. This performs the multiple and advance operations at once which has ARM 11 processor. The systems consist of camera for capturing the image of unauthorised person. The LCD display shows the status of the system. The motor driver section plays the important role to drive the motor and its important operation is to amplify the current. The fingerprint sensor is used for authentication purpose.

2.2 Circuit Diagram

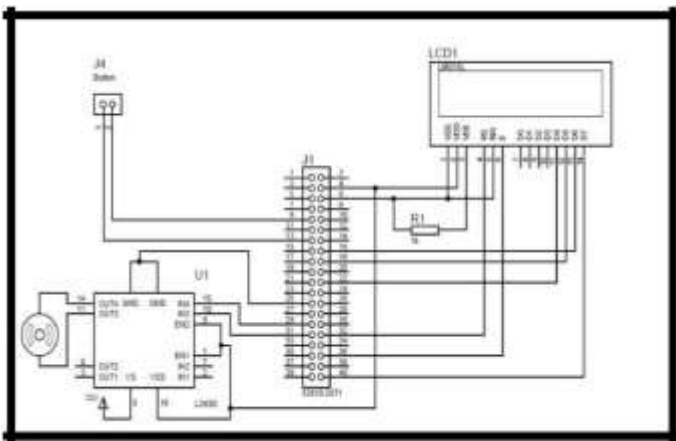


Fig.2.3 Circuit diagram

3. Working

In hostel security there is two section are in transmitter side and another receiver section. In transmitter side there is finger print sensor at the entrance gate of hostel when girls enter in to the hostel first they scan there finger if finger match with database then door open automatically. The details regarding student update on college website. And it is seen by only authorized person.

When number of student try to enter into the hostel then camera interface with Raspberry pi capture image of unknown student try to enter into hostel. This image sends to the warden's email id.

Similarly when student want to exit from hostel. First scan finger if the finger match then door open automatically. The student name and attendance timing send on college website. That only access by authorized person. Then main controller of the system is the raspberry pi. Raspberry pi used for monitoring and controlling the data.

4. PCB Layout

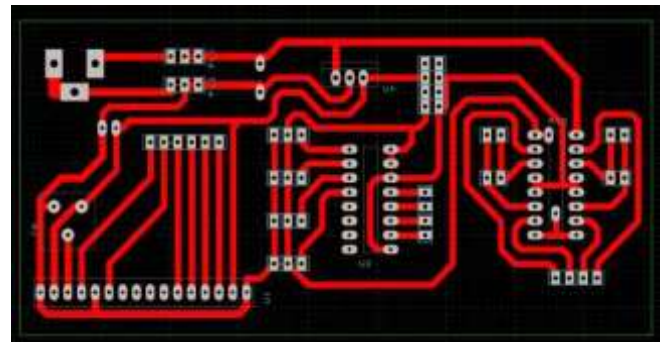


Fig. 3 PCB Design Of System

4.1 Designing Methods

PCB was basically design as an interconnection method suitable for mass production. This scheme is reduced with size and weight of equipment and also helped to reduce the wiring errors. PCB design is very essential to make products that are reliable and competitive in market. The following check list uses the major areas of concern in process of PCB design:

- Optimum size and shape of board should be ensured.
- The substrate should be selected properly by taking into considerations its cost, mechanical properties and electrical properties.
- Layout of conductor pattern should be taking care of from cross talk, leakage shielding, number of jumpers required and their placements.
- Selection of conductor width, thickness and spacing should be done after analysing their placement.
- Single sided board, the single sided PCB's arte mostly used in entertainment electronics where manufacturing cost has to be kept minimum.
- Double sided PCB's can be made with or without plated through holes.

The production boards with plated holes are fairly expensive. Therefore plated through whole board are only chosen where the circuit complexity and density does not give any other choice.

5. Raspberry Pi 3 B:

Raspberry pi is a small credit-card sized computer capable of performing various functionalities such as in surveillance systems, military application, industrial application, Home application etc.

5.1 Features

- The Raspberry Pi is a low cost, **credit-card sized computer** that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python. It's capable of doing everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spread sheets, word-processing, and playing games.
- What's more, the Raspberry Pi has the ability to interact with the outside world, and has been used in a wide array of digital maker projects, from music machines and parent detectors to weather stations and tweeting birdhouses with infra-red cameras. We want to see the Raspberry Pi being used by kids all over the world to learn to program and understand how computers work.



Fig. 5.1 Raspberry Pi

5.2 GT-511C3 Fingerprint Scanner

Fingerprint scanners are awesome. Why use a key when you have one right at the tip of your finger? Unfortunately, they're usually unreliable or difficult to implement. Well not anymore! We've found this great fingerprint module from ADH-Tech that communicates over TTL Serial so you can easily embed it into your next project.

The module itself does all of the heavy lifting behind reading and identifying the fingerprints with an on-board optical sensor and 32-bit CPU. All you need to do is send it simple commands. To get started, just register each fingerprint that you want to store by sending the corresponding command and pressing your finger against the reader three times. The fingerprint scanner can store different fingerprints and the database of prints can even be downloaded from the unit and distributed to other modules. As well as the fingerprint "template," the analysed version of the print, you can also retrieve the image of a fingerprint and even pull raw images from the optical sensor!



Fig.5.2 Finger Print Sensor

5.3 USB Webcam:

A webcam is a video camera that feeds or streams its image in real time to or through a computer to computer network. When "captured" by the computer, the video stream may be saved, viewed or sent on to other networks via systems such as the internet, and email as an attachment. When sent to a remote location, the video stream may be saved, viewed or on sent there. Unlike an IP camera (which connects using Ethernet or Wi-Fi), a webcam is generally connected by a USB cable, or similar cable, or built into computer hardware, such as laptops.



Fig. 5.3 USB Webcam

6. Result Analysis

The picture shows the initial scanning process of finger print scanner which is shown on LCD display.



The Picture Shows the result of Scanned authorized Person with its database information which is shown on LCD Display.



The Picture Shows the result of Scanned authorized Person with its database information and door opening process which is shown on LCD Display.



After Completion of all above process the door gets automatically closed which is shown on LCD Display.



The following picture shows the database of authorized by hostel which is presented on web server all the information is true or false is manipulated by the database

Time & Date	Name (ID Number)	Room ID Department	Status
2018-04-01 11:31:06	Dipali Hedau	804 Science (B)	Out
2018-04-01 11:33:00	Dipali Hedau	804 Science (B)	Out
2018-04-01 11:33:04	Dipali Hedau	804 Science (B)	Out
2018-04-01 12:00:00	Dipali Hedau	804 Science (B)	In
2018-04-01 12:00:27	Dipali Hedau	804 Science (B)	Out
2018-04-01 12:04:30	Bookend (Administrator)	804 (A)	In

7. Conclusion

The main aim that is to provide security measurement in hostel. As we have seen from the last few years there is gradual increase in student migrant and mostly of them are girls due to which need of hostel increases and for hostel owner first preference is safety of their hostel student and does

not allowed any other person to enter in the hostel and it's not possible for single person or warden to keep watch on all student, hence for all these problem there is only one alternative i.e. electronics or another name for this is Finger Print Base Security System. Finger print provide a best security and also reduces the number of case that are increasing day by day. There are many other application in which finger print sensor is used to provide security.

8. Future Scope

The implemented system is an elementary system. There are several other features those will be integrated in the future aiming to solve many problems and advancements. The features to be integrated in future is an impact detection sensor, which is capable of detecting any kind of physical impact made on the door and raising an alarm on the admin's mobile device. The person who will have the administrative rights for a door can share the door's key with other people for a given time period. There will be sensors that will work on real-time to unlock the door when an authorized person is 1feet near the door. The super-admins of a workplace will have access to all doors. Users can add new doors or remove them accordingly. It eliminates the hassle of carrying several keys and more importantly the problems of losing keys. Further the scope of this system is not only meant for doors, it can also be implemented on several other electronic appliances for automation and ease.

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