

IOT Based Girl Hostel Management System

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Abstract - The majority of Indian educational institutions adhere to strict guidelines when it comes to the management of their resources, particularly the hostel facilities. This project takes into account two main issues: energy conservation and hostel attendance monitoring. According to a 2015 survey, educational institutions currently use more than 2 billion units of electricity. The biggest solution to the rising cost of electricity may be energy conservation. Energy conservation is important in this sense, and it's especially important in hostels because some of the students leave their rooms without turning off their lights and fans. The attendance and check-in/check-out times of students are another problem with modern hostel maintenance. Conventional systems are equipped with cameras. However, numerous wretched incidents have befallen students, particularly girls, during their lengthy journey back to their homeland. In order to address these problems, a well-designed hostel administration system with a hospital emergency, PIR sensor, Finger print for attendance system, push buttons, and GSM is built to operate in two modes: manual and automatic.

Keywords: biometric attendance, hostel automation, security.

I. INTRODUCTION

In this era Indian educational institutions had greater development and brought education to the doorstep of publics. In India there had been a lot of educational institutions established over a decade. Maximum numbers of educational institutions are with the old conventional practices for supervising their resources specifically hostel facilities. These old methods with its inherent limitations have negative impact on the general organizational competence of this educational organization. Subsequently, it has improved knowledge and helps out to produce people of educated citizens who can effortlessly stand by the guidelines of civilized society and contribute meaningfully to the development of democratic governance. Almost all the educational institutions follow the conventional mode of managing the facilities provided by them. This conventional mode of administration leads to the wastage of resources of the management. In hostels, some irresponsible students failed to switch off the fans and lights

when they leave the rooms. In accordance with the survey in 2015 over 2 billion units of electricity is wasted by educational institutions in a single year. The Energy Management and Energy Proficiency is a fragment of government policy to decouple financial progress from development in energy consumption and decrease the energy intensity of the budget says Annual Ministry of Power (MoP) report 2015-16. Increase in energy requirement is another pressure for government and energy maintenance is the only solution for this problem. Another major concern in the conventional administration system is it increases risk factors in security provisions. Several dejected incidents have happened to the students particularly girls when they had a long travel to their home. Recording, monitoring and providing entering/leaving information to the parents is another major requirement of the educational institutions' management.

II. LITERATURE REVIEW

In (2014), Umar Farooq et al. [1] describes the RFID based security system for the use in the student hostels. This prototype combines the RFID technology and bio-metrics along with the 8051 Micro-controllers to accomplish the task. When the RFID reader which is installed at the entrance of hostel detects a number on the Identity Card, the system captures the user image and scans the database for a match. If both the card and the captured image belong to a registered user, access is granted; otherwise, the system turns on the alarm. Also, it makes an emergency call to the security van through the GSM modem, which is installed for better security. In this way, the suspicious persons can be caught. From this paper, we get to know about the use of RFID technology to automate various processes ranging from industrial sector to home control. Here, the security system is comprised of three modules which are Entrance monitoring, Exit monitoring and Mess monitoring. These modules communicate to the computer system through main controller. After the information from these modules is processed by the computer, the control commands are issued to the modules for granting or denying access to the user.

In (2016), D. Santhi Priya et al. [2] deals with face detection for an attendance recorder system for the purpose of

maintaining attendance details of the students using Raspberry Pi. The faces of the students are pre-stored in class databases. Raspberry pi camera captures the student face and compares it to the database image. If the image gets matched, it means that the student attendance registers with time. The absentee's faces will be sent to the authorized mail id. This method is secure enough, reliable and available for installing the system in the classroom. It can be constructed using a camera and computer. There is a need to use some techniques that can recognize the faces in veil to improve the system performance.

In (2017), Pradeep Kumar et al. [3] made use of Biometric Authentication. Now days, Bio-metrics is used in many real time applications. However, recognizing fingerprints in Linux based embedded computers (Raspberry Pi) is still a very complex problem. This entire work is done on the Linux based embedded computer called Raspberry Pi, in which database creation, fingerprint reader access, authentication, recognition and fine tuning has to be done to improve the accuracy of the system and developing the system for real time higher end application development using cloud created are done.

In (2018), N. Vaitheeka et al. [4] propose to use of RFID and IoT (Internet of Things). Both of them were combined due to which attendance can be taken automatically and there is no need to do it by lecturers manually. Here, the Cloud is used as the storage to enhance the performance. After detecting the RFID of student identity card, the data is stored. So that's why, they have used Wi-Fi adapter to connect to the Cloud. So, by using the adapter, the data is transferred from the reader to the Cloud. Using IOT and Cloud, the relevant data can be accessed from anywhere and anytime which will provide the users better ability and flexibility.

In (2018), Orji EZ et al. [5] designed an automatic RFID-based access control system using Arduino. This system combines RFID technology and Arduino to perform the required task. When the RFID reader installed at the entrance detects an RFID tag, the system captures the user unique identifier (UID) and compares it with the stored UID for a match. If the user UID captured match with any of the stored UID, access is granted; otherwise, access is denied. The results clearly show that the system is cheap, effective, and a reliable means of granting or denying access in a secured environment.

III. PROBLEM STATEMENT

Hostel security is one of the most enduring issues that need to be addressed. These days, everyone's top priority in life is their security. Therefore, propose IOT based girls hostel management system is design and developed to provide a sustainable security at girl's hostel management system. This

provides work sheds emphasis on invention and technological advancements related to girl's safety and hostel management.

IV. OBJECTIVES

- To design and develop smart security system for girls in hostel.
- To minimize power consumption.
- To provide advanced security and facilities to girls in hostel.
- To develop a working model of a Security Access Control System using Fingerprint sensor Technology.

V. DESIGN AND DEVELOPMENT OF THE SYSTEM

ATMEGA 328, Fingerprint Module, push buttons, and PIR sensors, a GSM module, a buzzer, a relay, a power adapter, and other parts are the essential parts of this system.

We have been using the Fingerprint Module for attendance. Fingerprint of each girl staying at the hostel will be stored that will allow them to be recognized. A GSM notification on their absentee will be sent to their parent's mobile number if any fingerprint is not scanned then absent message will be send to the mobile number.

Using PIR sensor for light ON/OFF system. When the person enters in the room the light will be on and person leave the room light will be off.

There are two push buttons for emergency of hospital/hostel emergency when we on the button message will be send to the given mobile number.

We use DC motor for water management system .in this we give a button for the water pump when we start the button the water pump will be start in the given time and message will send to the given number.

When this all system is working the buzzer will be started.

Design and development of system as shown below:

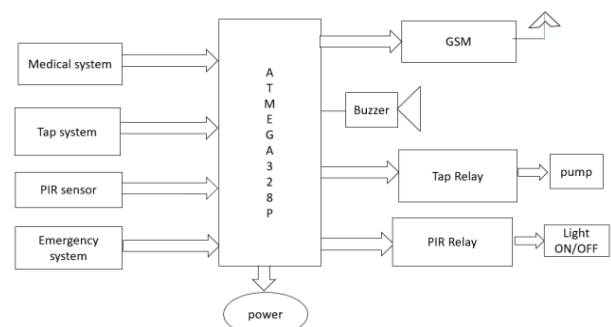


Figure 1: Block Diagram

VI. RESULT AND DISCUSSION

This work presents Girl's Hostel Management System and it is designed and implemented with ATMEGA 328 Microcontroller in embedded system domain. Experimental work has been carried out carefully. The result shows that higher efficiency is indeed achieved using the embedded system. For attendance, we used Fingerprint Module. Fingerprints of all the girls in the hostel are stored in system. If the fingerprint is scanned in specific time slot, then notification sends on their mobile number about their presented via GSM. PIR Sensor detects the motion. If motion is detected by PIR Sensor, it switches ON/OFF the Relay which is connected to the Bulb. There are two push buttons for emergency of hospital/hostel emergency when we on the button message will be sent to the given mobile number and Buzzer gets ON.

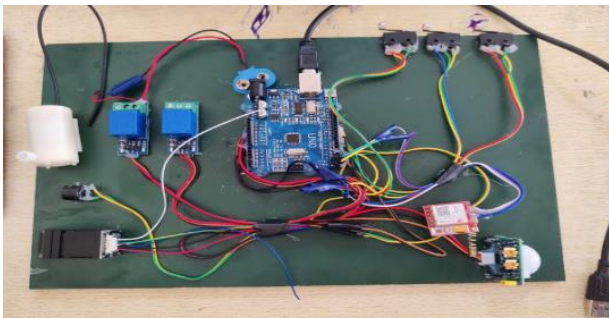


Figure 2: Hardware Setup

VII. CONCLUSION

This approach saves time and offers security for the hostel girls. The Real Time Security Management System, which this proposed system makes use of, makes security monitoring in large organizations simple and effective. Real-time status monitoring and intelligent messaging unquestionably increase the effectiveness and dependability of security management it is low cost, it is easy to use for users, it is safety and security for girls and it is reusable. The application of our work will be used in School, collages, hostel, hospital, etc.

VIII. FUTURE SCOPE

Enhanced Security Features: Implementing advanced security measures such as biometric access control, facial recognition, or even RFID tags for entry and exit can ensure the safety of residents.

Energy Efficiency: Integrating IoT sensors to monitor and control energy usage within the hostel can lead to cost savings and environmental benefits.

Smart Room Allocation: Developing algorithms that consider factors like preferences, compatibility, and safety to optimize room allocations for residents.

Health Monitoring: Utilizing IoT devices for health monitoring, such as wearable fitness trackers or sensors to detect environmental factors affecting health, can promote well-being among residents.

Resource Management: Implementing IoT sensors to monitor and manage resources like water and electricity usage can help in efficient resource allocation and conservation.

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