# REPORT OF MINI PROJECT

## On

# Smart Hostel Management and Security


**Department of Computer Engineering and Application**

**GLA University,**

**Mathura - 281406**

**Submitted by:**

Aman Singh(171500037)

Animesh Raghuvanshi(171500047)

Kartik Agarwal(171500155)

Mayank Gupta(171500186)

**Submitted To:**

Mr.Amir Khan

(Technical Trainer)

**Branch/Sec:**

B.tech-CSE/Sec-C

# ABSTRACT

As the name specifies “SMART HOSTEL MANAGEMENT AND SECURITY” is project developed for managing various activities in the hostel. For the past few years the number of educational institutions is increasing rapidly. Thereby the number of hostels is also increasing for the accommodation of the students studying in this institution. And hence there is a lot of strain on the person who are running the hostel and software’s are not usually used in this context. This particular project deals with the problems on managing a hostel and avoids the problems which occur when carried manually.

Identification of the drawbacks of the existing system leads to the development of IoT based hostel management system that will be compatible to the existing system with the system which is more users friendly and more sensors oriented. We can improve the efficiency of the system, thus overcome the drawbacks of the existing hostel management and security. Less human error, Strength and strain of manual labour can be reduced, High security, Easy to handle, Easy record keeping, Backup data can be easily generated.

# INTRODUCTION

## 1.1-Genaral Introduction:

Internet of Things, as we probably are aware today, had not been around for quite a while. It was not until 1999 that Kevin Ashton was considered as the previous of the idea of Internet of Things (IoT). From that point forward, the IoT has advanced immensely from the individual visitor space to the substantial plant floor by either utilizing conventional innovation, for example, Radio Frequency Identification (RFID), Wireless Sensor Network, Bluetooth or exploiting the Cloud registering offices accessibility. It has offered us a Smart City including keen home, savvy city and clean-living condition. The term of IoT is a straightforward idea that the Internet advances from a path for gadgets to be smarted and interconnected. These gadgets can accumulate prepared information and settle on choices fittingly.

Smart Hostel Management and Security is an IoT based project which comprises of many modules which will be required to make a smart hostel, managing it effectively and to have latest security features.

It will be a new idea of its kind which is believe to bring a lot of new features to the existing model of our hostel system which is becoming old-fashioned day by day.

The project undoubtedly, will deliver lot of new ideas which ranges from making a simple infrastructure to a fully automated system. The project will ensure to have all the latest trends, technologies and equipment which will definitely make this idea to be implemented on real ground.

The need of the hour is to realize the importance of an emerging technology i.e. IoT and its vast-varying applications. The project after completion will ensure a new sighted change and will help today's generation with all the ease of having a smart hostel, managing it on prior basis, security and maintenance.

The benefits of this project will definitely be a helping hand to all the hostel inmates, wardens and staff members which on priority are the first and last beneficiary of it.

The conclusion of the project is to make it a less human interference one and to rely more on our current technologies. This will ensure to have large scale impact on the current use of the hostel system.

## 1.2-Area of Computer Science:

Internet of Things (IoT) is the networking of physical objects that contain electronics embedded within their architecture in order to communicate and sense interactions amongst each other or with respect to the external environment. In the upcoming years, IoT-based technology will offer advanced levels of services and practically change the way people lead their daily lives. Advancements in medicine, power, gene therapies, agriculture, smart cities, and smart homes are just a very few of the categorical examples where IoT is strongly established.
Over 9 billion 'Things' (physical objects) are currently connected to the Internet, as of now. In the near future, this number is expected to rise to a whopping 20 billion.

There are four main components used in IoT:

1. **Low-power embedded systems –**
   Less battery consumption, high performance are the inverse factors play a significant role during the design of electronic systems.
2. **Cloud computing –**
   Data collected through IoT devices is massive and this data has to be stored on a reliable storage server. This is where cloud computing comes into play. The data is processed and learned, giving more room for us to discover where things like electrical faults/errors are within the system.
3. **Availability of big data –**
   We know that IoT relies heavily on sensors, especially real-time. As these electronic devices spread throughout every field, their usage is going to trigger a massive flux of big data.
4. **Networking connection –**
   In order to communicate, internet connectivity is a must where each physical object is represented by an IP address. However, there are only a limited number of addresses available according to the IP naming. Due to the growing number of devices, this naming system will not be feasible anymore. Therefore, researchers are looking for another alternative naming system to represent each physical object.

**1.3-Hardware and Software Requirement:**

## Software Specification:

- **Technology Implemented** **:** IOT
- **Language Used** **:** Embedded C,Python
- **Database** **:** MySQL, Cloud
- **User Interface Design** **:** Full Stack, MIT AI2
- **Web Browser** **:** Chrome, Explorer, Firefox etc.
-

## Hardware Requirements:

- **Processor** **:** Core i7
- **Operating System** **:** Windows, Linux
- **RAM** **:** 8 GB
- **Hardware Devices** **:** Node MCU,D6T Sensor, Servo Motor,MQ2 Sensor, MQ135 Sensor, Relay, LED, Resistors, Pyro Electric, Sound Sensor, Camera Module, Raspberry Pi
- **Hard disk** **:** 1 TB, Graphic Card
- **Display** **:** Laptop Screen

# Problem Definition:

In recent times, we have seen that there has been the great amount of loss in terms of electricity wastage. In hostels we have seen that students often leave their room/hostel without viewing that they have not switch off the fans and lights.

The current hostel system does not take care of some of the very important aspects which is needed to be taken care of. In this series, the first issue with current ongoing system is improper utilization of electricity, students often in hurry to attend classes, left the power switch on which leads to wastage of the electricity. Fans, CFLs, Cooler etc. remain on even if there is nobody in the room. This leads to improper power consumption.

In addition to this sometimes students also leave the gate of their room open. This may lead to theft activities of the belongings of the inmates. After this one had to go to the warden to look for the CCTV footage to find the culprit, the effect of which is seen among the students as they are always worried instead of focusing on their studies in the class as well as warden has to keep wandering in the hostel for biometric attendance which is a complete wastage of their precious time.

| Smart service | Problem | Solution |
|---|---|---|
| Smart Security | Theft due to open room door. | Sensor based locking of room door. |
| Smart power control | Appliances turned on without us | Sensor based auto control of appliances in room. |

# Objectives

There will be a dynamic use of the project w.r.t the above problems in the existing model of the system. The project will cover all the modules in step by step manner and will combine each and every module used to make it as a whole project.

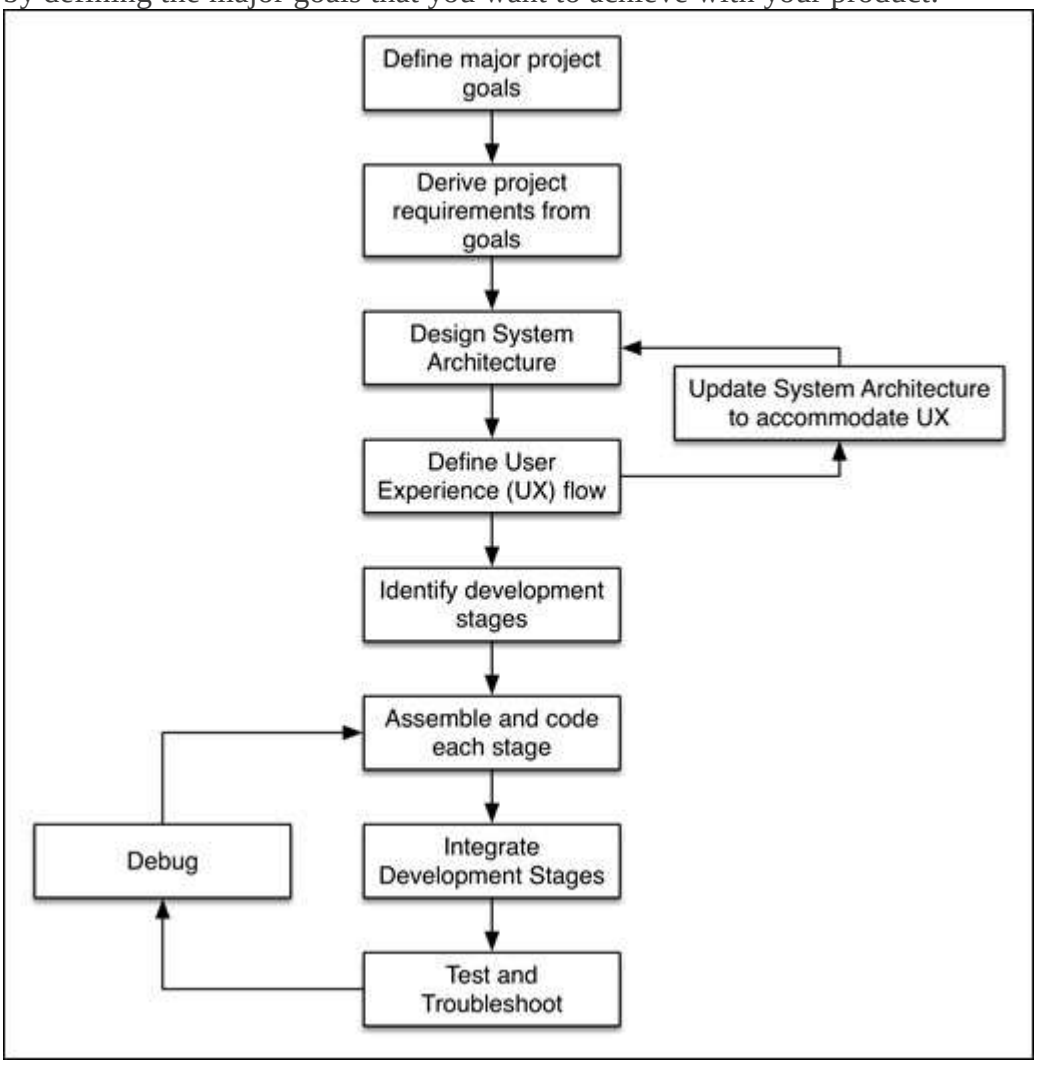
There will be a module covering the electricity wastage and its effect. This section will cover how to stop the electricity wastage which is done in various cases like sometime students forgot to turn off the switches, fans, MCBs,etc.

**Problem Statement**: Electrical appliances are switched on in many cases even not required.

**Proposed solution:** In this framework, we are proposing a deployment of an infrared sensor which can detect the presence of the person in the room. If the person is not available in the room, then appliances will be switched off automatically. Also, we can deploy a sensor at the entrance which can detect the entry and exit of a person based on which we can predict whether a person is present in the room or not. We will also deploy a temperature sensor which will detect the room temperature and appliances like fan, cooler, AC etc. will be adjusted based on user requirement.

# Methodology

The process of developing a complex product that tightly couples hardware devices with high-level software services requires an additional level of planning. For this project, we will exercise a proper product development approach to help you get familiar with the process of creating real-world hardware projects. This method can then be used to plan your own projects and take them to the next level. The following diagram describes a typical prototype development process, which always begins by defining the major goals that you want to achieve with your product:




# Implementation Details

A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. PIR sensors are commonly used in security alarms and automatic lighting applications. PIR sensors detect general movement, but do not give information on who or what moved. For that purpose, an active IR sensor is required.

PIR sensors are commonly called simply "PIR", or sometimes "PID", for "passive infrared detector". The term *passive* refers to the fact that PIR devices do not radiate energy for detection purposes. They work entirely by detecting infrared radiation (radiant heat) emitted by or reflected from objects.

By using this sensor we have noticed that LEDs automatically turned off when there was no detection of the movement.

An actuator is a mechanism for turning energy into motion. Actuators can be categorized by the energy source they require to generate motion to play an important part in the Internet of Things (IoT).By using actuators we are now able to close the door automatically and our objective is attained.

# Contribution Summary

The team is doing a fantastic job for making this project. The credit of the work completed till now goes to each and every member of the team. Their commitment and devotion towards the work will definitely make this project a great one.

The work done by each member is as followed:

**Animesh Raghuvanshi:** is responsible for making all the necessary arrangements for this project. This include the work like making arrangement for all the apparatus like Node MCUs, wires, LEDs,Actuaors etc.

**Aman Singh and Mayank Gupta:** have made all the necessary connection for this project which includes like making a appropriate connections in Node MCUs, with the actuators and sensors and have checked they are working in a proper manner.

**Kartik Agrawal:** is responsible for all the programming aspects of the project which includes making changes in the code as per the conditions or situations provided to us. He is responsible for making the code related to Node MCU,MIT AT2.

# Progress till date and Remaining work

Till now we have worked on the following aspects of the project which has been completed till date. This includes:

1. We have successfully made the module for avoiding wastage of electricity in the hostels using PIR and Thermal Sensor.

2. The automatic door locking system has also been created successfully and is showing positive results with actuators used in the project.

Remaining work:

1. Implementation of smoke avoidance.

2. Implementation of alcohol usage.

3. Inculcate the value of IOT among the students.

# References


1. https://www.geeksforgeeks.org/
2. https://www.researchgate.net/
3. Wikipedia
4. https://subscription.packtpub.com