Hostel Room Door Security System:

IDEA:

While making a project on home automation, the most important thing to keep in mind is security. So, our first aim was to make our hostel rooms digitally secure. Although, the old tradition of the key-lock mechanism exists, but it has many drawbacks, like, key getting lost because of its small size, etc.

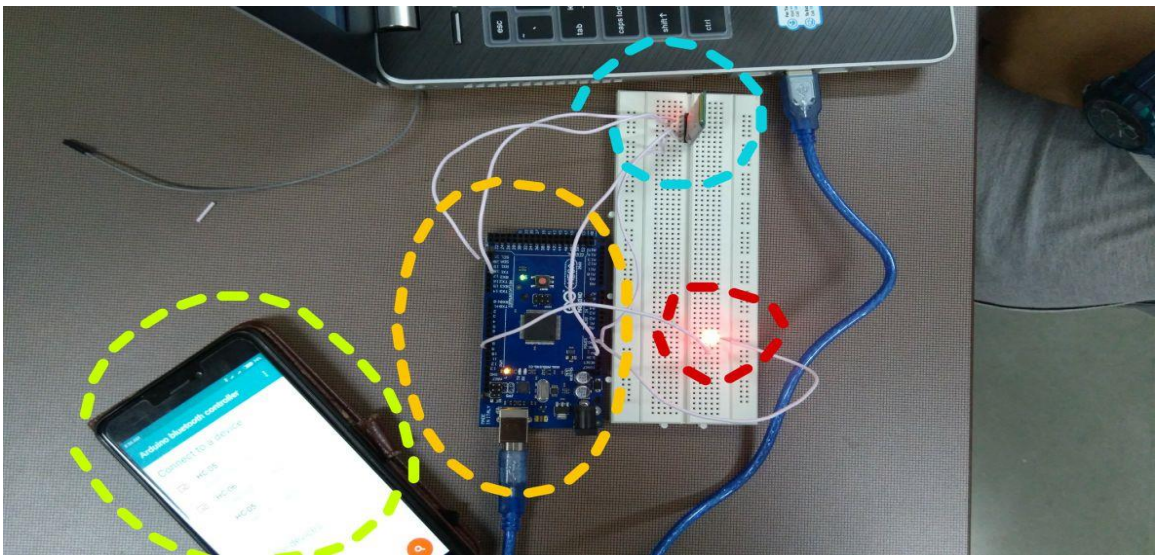
We have tried to make a locking system for hostel room doors which can be unlocked by our smartphones, easily.

COMPONENTS USED:

- **ARDUINO Mega**
- **HC:05 Bluetooth Module**
- **LED (representing the ON/OFF of locking mechanism)**

WORKING:

- In this project, we have created a simple mechanism using Arduino Mega and a Bluetooth module(HC-05). And with the help of Bluetooth SPP, we can unlock the doors with the help of Bluetooth of the smartphone.
- The app that we use is Arduino Bluetooth Controller, by which we connect to the Bluetooth module with terminal mode method in which we enter the password and send.
- The Arduino will do the processing and if the password matches with that specified in the Arduino code (this can be changed too!), then the door opens.



This above is the picture of our 1st phase of our project.

- Orange: Arduino Mega
- Blue: Bluetooth Module
- Yellow: Smartphone with Arduino Bluetooth Controller
- Red: LED (showing us that whether the Door is Locked or not)

Here we have used an LED to show the output of the locking mechanism. Here, instead providing the correct password (in our case "0") will allow the LED to glow indicating that door is unlocked and similarly to lock it providing the correct password(in our case "c")will switch OFF the LED.

While applying in practical situation, we will connect an Spring locking mechanism instead of an LED which works based on the input provided by ARDUINO.

BENEFITS:

- There will be no such headache of losing keys which is very common instance now-a-days. So, we don't need to handle this situation.
- Even if battery one's phone goes off, then also the person will be able to unlock his/her room with help of his friends' mobile as the requirement id only a simple app.
- This Automation solution can be extended to cupboard doors also making the whole room much more secure.

Hostel Room Electrical Devices Automation: **(SMART TUBELIGHTS)**

IDEA:

The other most important aspect which we kept in mind while working on Hostel Room Automation was conservation of Energy and on the same hand making the life of students' more comfortable. So, the second phase of our project deals with automating electrical devices od the rooms such as Tube lights.

Students usually forget to switch OFF the Tube lights during the day time at which there is ambient light conditions which doesn't require the Tube light at all. And as a result a lot of energy gets exhausted/wasted unnecessarily.

Secondly, Students often forget to switch OFF the Tube lights when they leave for the class and this is also a major concern regarding the energy conservation. So we have automated the 2 Tube lights provided in every hostel to get switched ON/OFF as when required analyzing the outer lighting conditions as well the presence of people in the room.

COMPONENTS USED:

- **ARDUINO Mega**
- **PIR Motion Sensor**
- **H:05 Bluetooth Module**
- **LDR Module**
- **`2 LEDs (each one representing one of the tube lights)**

WORKING:

We have used ARDUINO Mega board and made a little sophisticated circuit using light sensors and motion detectors. First of all, the LDR module is connected to the ARDUINO board which helps sending data regarding the intensity of the light. Now, we made connections of the 2 LEDs (representing 2 Tube lights) with ARDUINO Board. Then through coding part we made tried to make a system that:

1) If the light conditions outside the room is ambient, then both the LEDs will get turned OFF, as there will be no requirement of lights

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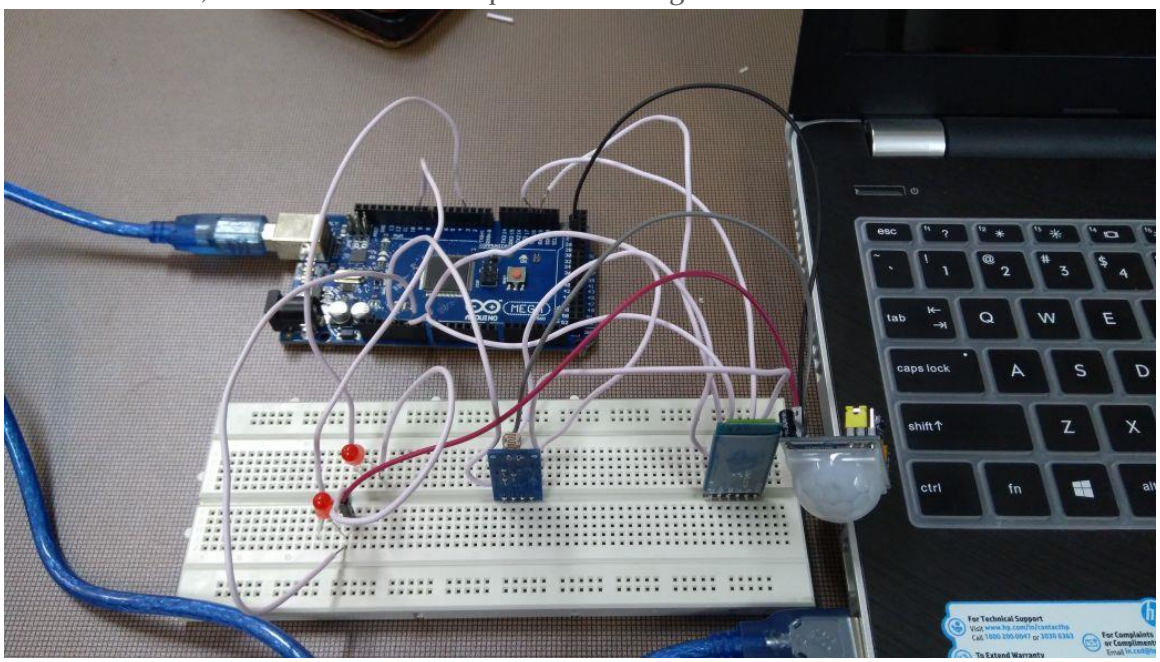
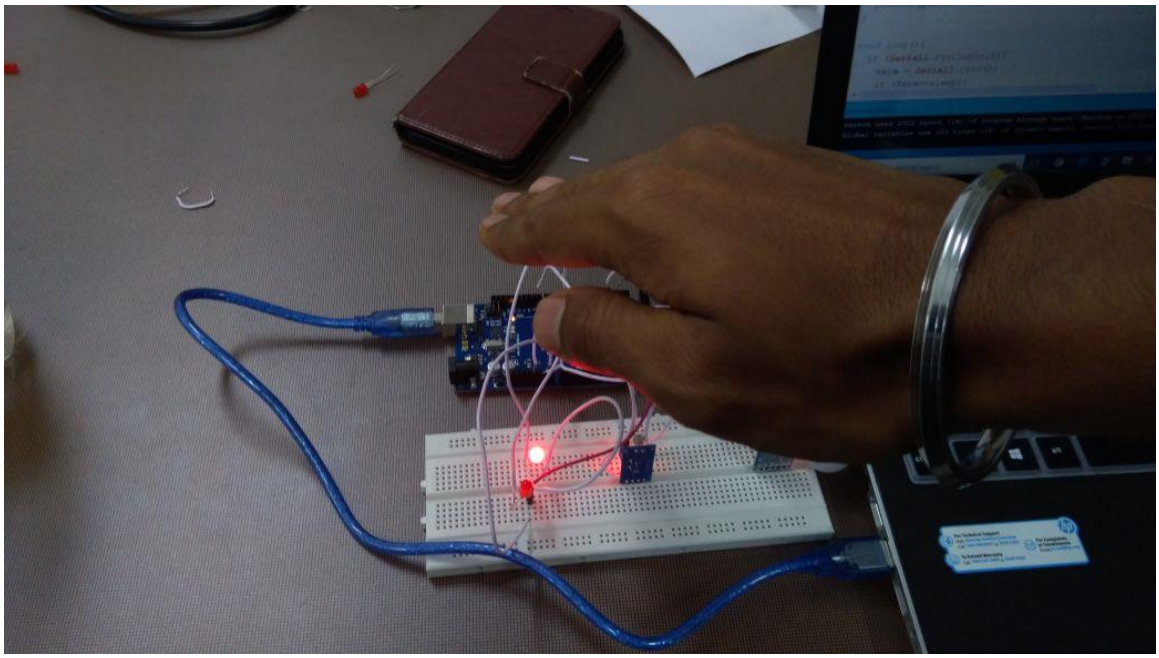
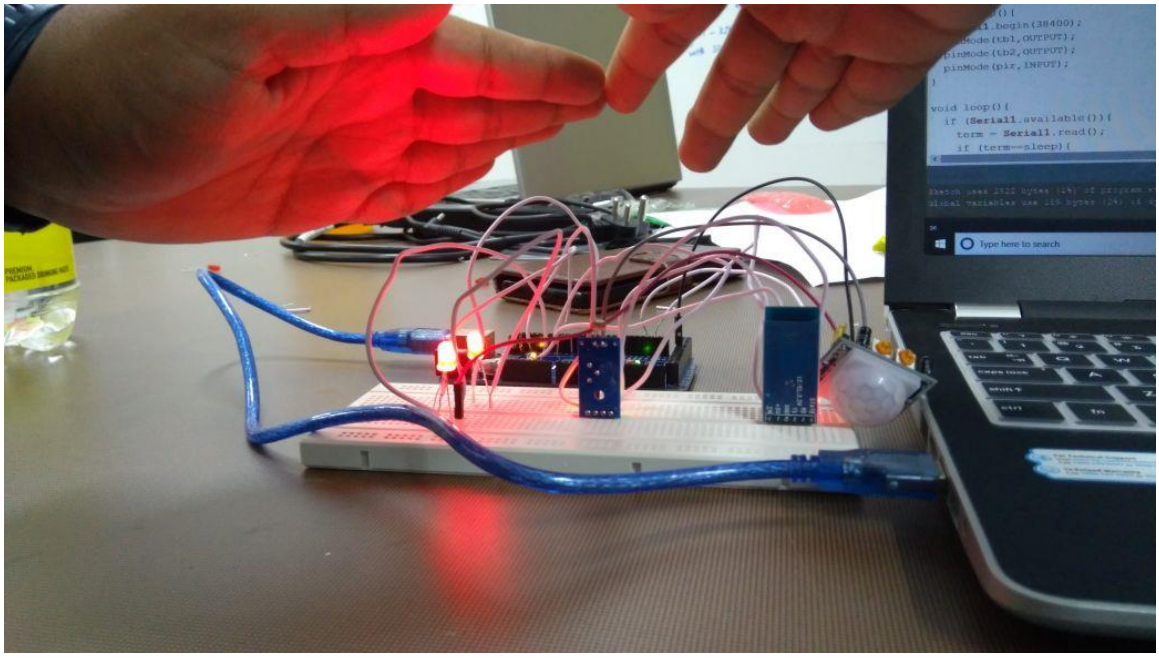


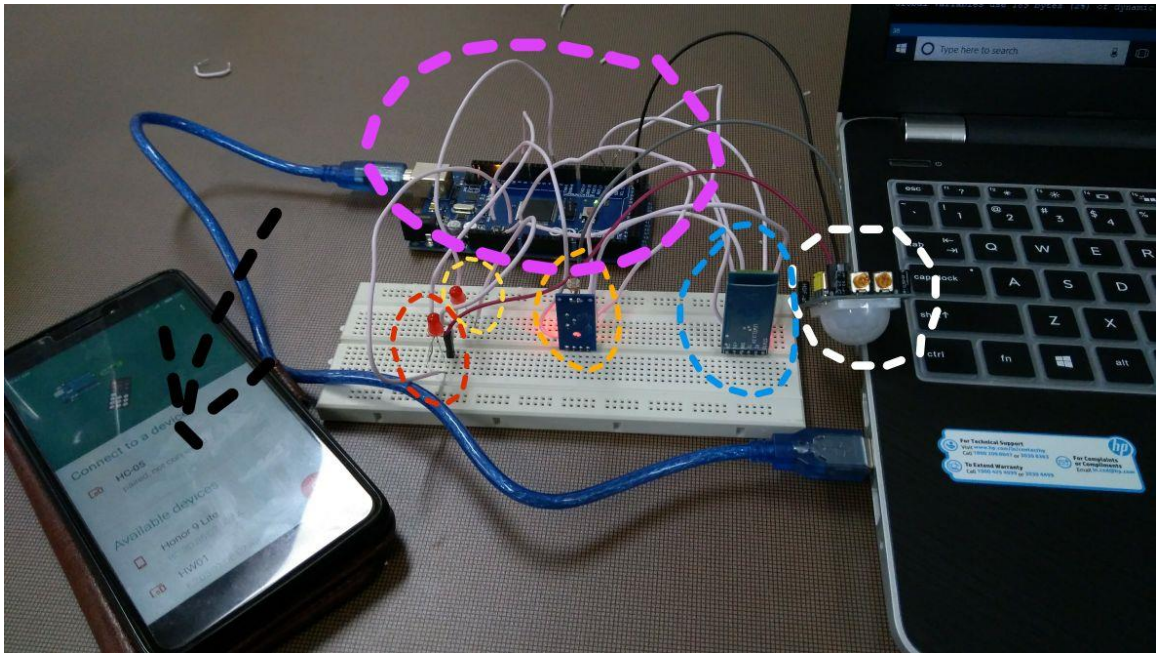
2) If the light conditions are intermediate then only 1 LED will glow making proper lighting conditions in the room



3) If the light intensity goes below certain level than both the LEDs get turned ON



Then we also have connected the whole circuit to a PIR Motion Sensor which helps in detecting the motion in the room. If it detects that there is motion in the room then it allows the whole system consisting of sensors and LEDs to work. Otherwise (in case of leaving the room without switching OFF the lights) it shuts down the whole system which in turn helps in ultimately reducing the power consumption.



The above shown figure is the second phase of our project (Smart Tube lights)

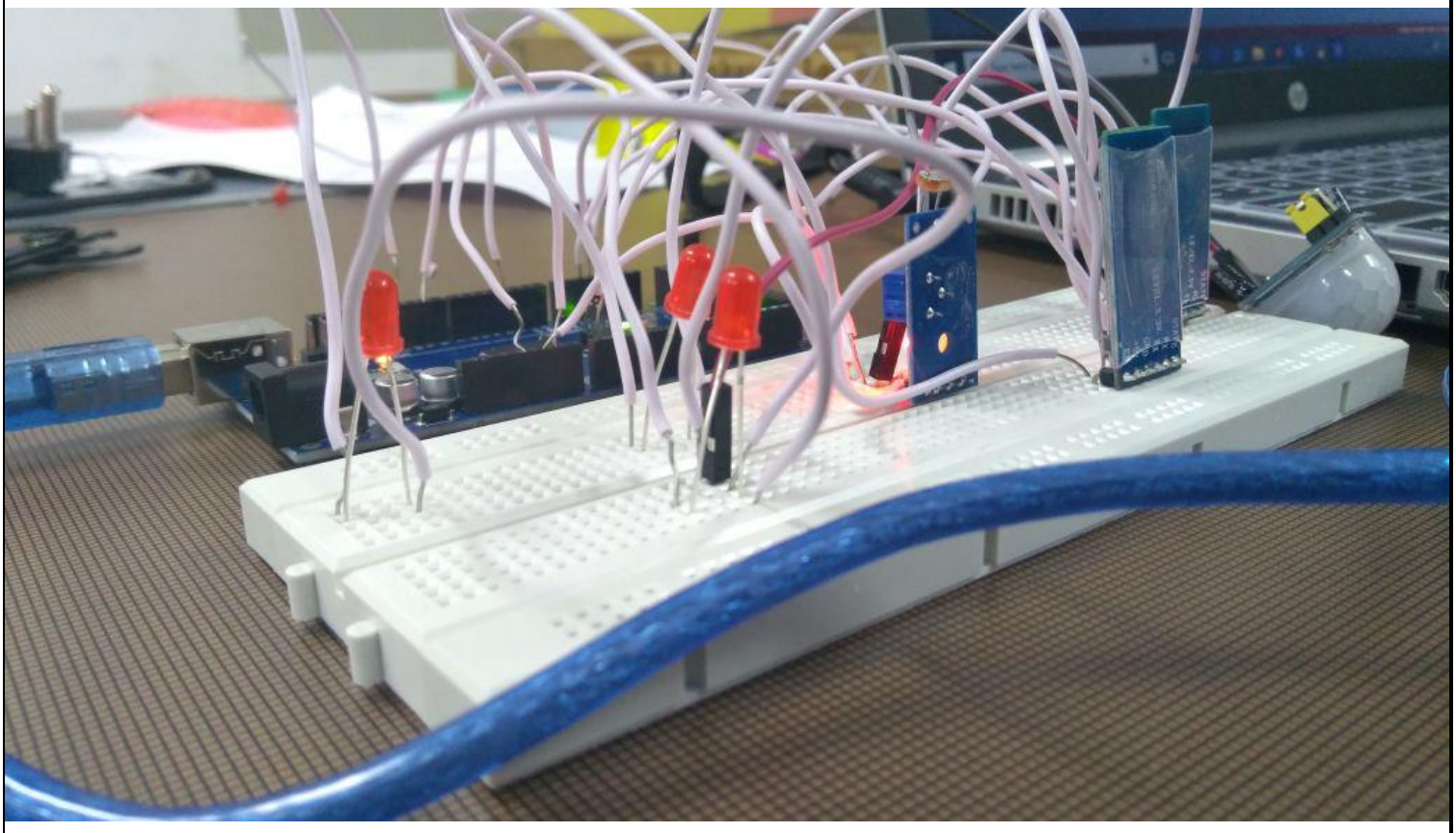
- Yellow: LED – 1 (First Tubelight)
- Red: LED – 2 (Second Tubelight)
- Orange: LDR Module
- Blue: Bluetooth Module(HC:05)
- White : PIR Motion Sensor
- Black: Arduino Bluetooth Contoller app running in a smartphone

GOLDEN FEATURE:

These LEDs can also be controlled with the help of a smartphone with the help of Arduino Bluetooth Controller for which we have installed an Bluetooth Module to the ARDUINO Board. So in case if your are feeling sleepy, so you can just switch OFF the LEDs leaving the control of PIR motion sensor on Tube lights, because during night because inactivity while sleeping the PIR may necessarily shut the whole system down.

BENEFITS:

- Automated lights which switch ON/OFF according to light conditions. So you don't need to do any work, just be on your bed and enjoy the technology.
- Highly efficient as it tries to reduce the power consumption in both situations whether a person is in the room or not.
- Easy to install as we just have to put the LDR module outside the room window
- Being able to operate from smartphone, this is one of the very nice benefit of this system as it provides the opportunity to contribute towards the development of IOT along with keeping the aspect of conservation of energy .



Picture representing our complete project (phase 1 + phase 2)

Further Improvements:

- In our door Security system, we would make it more secure and faster by introducing fingerprint as a password in smartphone rather than a textual one as now-a-days most of the smartphones are coming with inbuilt fingerprint sensors.

- Similar to that of LDR Module, we would introduce Temperature Sensor which will help in regulating the speed of the fan as when required by sensing the temperature of the room. So, it would also lead a hand in reducing the power consumption

- We would also introduce the Wi-Fi module and would connect it to AC Sockets by which we will have the power to control our appliances to that sockets sitting anywhere in our campus.