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Automatic Corridor Lighting System

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Abstract: *The use of electrical energy increases day by day. And it is necessary to save electric power for a better future and environment. So we make an model which automatically turns ON lights when it is human or turns OFF when there is no one. In this documentation, we discuss an experiment implemented in the Electronics And Telecommunication Department's corridor of Dr. Daulatrao Aher College Of Engineering, Karad, Maharashtra, India. The main aim of our project is to reduce the wastage of electricity and make the corridor lighting system more efficient. This experiment is based on events that take place daily in our college routine. During the period the corridor lights are remained ON and after college, the lights in the classroom remain ON until someone turns them OFF manually. Also, we see in our daily routine when at night we go somewhere the street lights are continuously turned on till morning, perhaps there was no human being, so this is a huge waste of electricity. So to minimize problems like this we developed a model which turns OFF lights when no human is being so electricity must be saved and wastage of it avoided.*

Keywords: Corridor Lighting System.

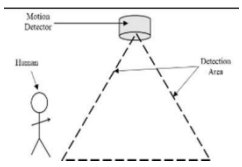
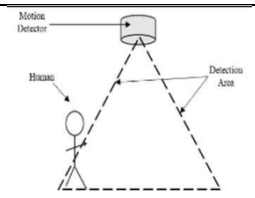
I. INTRODUCTION

Power shading is a major problem in today's world. The shortage of electric power is rapidly increasing day by day. So unnecessary wastage of electric power can make a greater contribution to it. We found that people forget to turn off lights and it does not affect them at that time but in the long period, it will cause a major problem. The smart lighting system provides automatic turn ON and OFF lights when movement is sensed.Generally in offices, public places, schools, colleges in corridors of houses, and on streets huge wastage of power takes place when there is no human being. So we noticed this and developed a model which is help to reduce the consumption of power and save electricity drastically and gives a major effect on minimizing electricity bills. We implemented this model in our college Electronics And Telecommunication Department's corridor.

1.1 Ease of Use

The Smart Lighting System model does not require manual operation. It will perform according to whether there is a need for lights or not. It will automatically turn ON when it is human And automatically turn OFF when there is no one.

TABLE 1. POSSIBILITIES OF HUMAN AND CIRCUIT

SR.NO	POSSIBILITIES	CIRCUIT	ACTION
1.			
2.			

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A. Key features

- We use low-cost PIR sensors for motion detection.
- In this model, there is no requirement for any type of micro controller or microprocessor.
- Power consumption is achieved to be 77.78%.

B. Motivation

The power crisis is a disaster for every country, for the growth of every country, it is necessary to have efficient appliances and awareness to deal with this problem. So, our motivation is that to show society, Some, awareness and use some tools we save a big amount of power.

Cost Estimation

SR. NO.	Components	Price (per/unit)
1.	PIR Motion Sensor	160
2.	Relay	50
3.	Voltage Regulator	50
4.	Transistor	10
5.	DC Adaptor	300
6.	SPDT Switch	30
7.	Wires	500
8.	Bulb	500

II. SYSTEM MODEL

This section will explain the connections and wiring diagram of this model. Firstly, we explain the external connection of the tube lights and sensors to the switchboard. The connections are shown in the

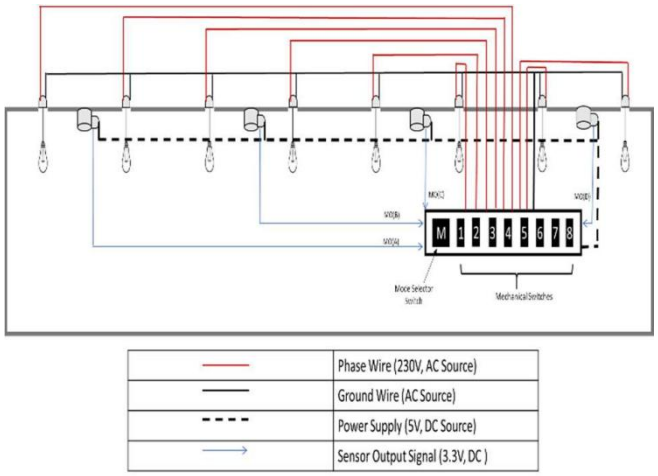

Figure 1: Wiring diagram of external connections.

As the figure shows, the ground wire of the AC source is common to all the lights, and all the lights have separate phase wires. The corridor has a wall mount switchboard which has eight mechanical single pole single throw (SPST) Switches and a single pole double throw (SPDT) switch. SPDT switch has two modes first is Automatic mode and the one is Manual mode. So, the SPDT switch is used for the selection of control mode according to the requirement. When Automatic mode is selected the lights are controlled by the sensors and when manual mode is selected the lights are controlled by its switch manually. All the electronics, like relays, DC adaptors, and voltage regulator circuit is fitted into the wall mount board and the connections and wiring diagram of an internal model. As the firstly we wired the switch panel, take hase wire from the AC source to SPDT, and split it into two directions, the first direction is the Automatic mode and the second direction is the manual mode. In the automatic mode direction, we share the phase wire

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to all four relays at the common terminal and use of DC adaptor. In the manual mode direction, we share the phase wire to all eight mechanical switches. In automatic mode, the control output is four which controls the section of lights. Sa, Sb, Sc, and Sd are the four sections in which output is taken from the Normally Open (NO). the terminal of the relay. In manual mode, the control output is eight, L1, L2, L3, L4, L5, L6, L7, and L8 are the eight outputs that are taken from the mechanical switch. MO(A), MO(B), MO(C) and MO(D) are the outputs from the motion sensor, the output voltage from the motion sensor is 3.3V DC.

III. DESIGN DETAIL AND COMPONENTS

1. Motion detector

We use a PIR sensor as a motion detector. PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensor's range.

2. 5V DC Power Supply

We have relays that are working on 12V DC supply and motion the sensor needs a 5V supply, so we need two types of supply (12V and 5V) which makes our system costly. But we buy only onepower supply of 12V and 3Amps DC adaptor and by using ofvoltage regulator IC, we create a 5V DC supply.

3. 5 Pin Relay

We use four 5-pin 12V DC electronic relay

4. DC adaptor

We use a 12V, 3Amp DC adaptor to power the electronics

5. Transistor

The output from the motion sensor is 3.3V but the activation of the relay needs 12V. So, we use a transistor as the switching circuit to fulfill this requirement

IV. WORKING

This model can be worked into two different modes, the first automatic mode and the second manual mode. In manual mode, which lights are controlled by the mechanical switches On the other hand automatic mode, in which light sections are controlled by human presence. For a good understanding, we discuss the condition which is given in the fig

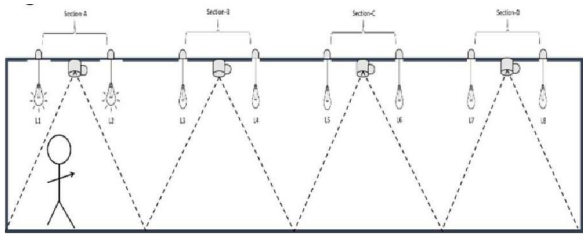

Figure 2: Corridor condition-I.

In this condition, a human move from one end to another end. At this time, humans are situated in the section-A, so the lights of section-A are turned ON which means L1 and L2 lights are turns ON and other lights are remains turn OFF. Now consider another condition which is given in the Fig

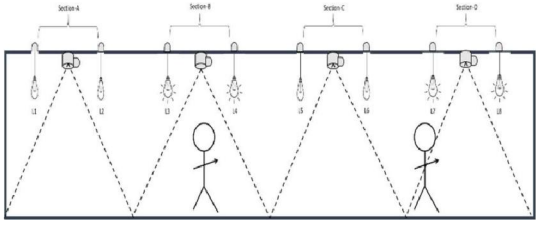

Figure 3: Corridor condition-II.

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In this condition, there are two men are moving in the same direction. The first man is present in Section B and the second man is present in section- D. So, the lights of section-B and section - D turns ON which means L3, L4, L7, and L8 lights are turned ON and other lights are remains turn OFF. Now consider one more condition which is given in the fig

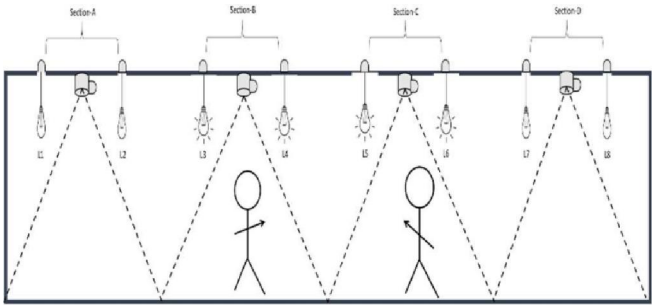
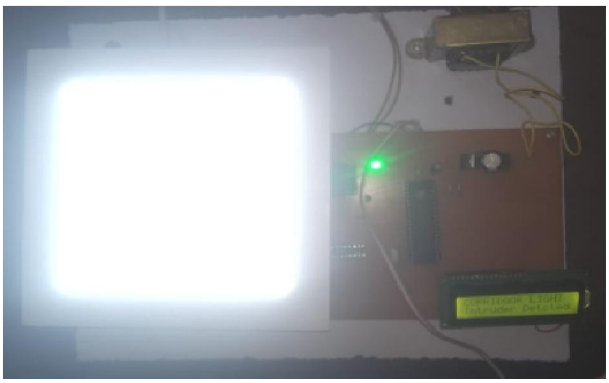


Figure 4: Corridor condition-III.

In this condition, two men are moving toward each other. The first man is present in section B and the second man is present in section-D. So, the lights of section B and section -D are torn ON it means L3, L4, L5 and L6 lights are turn ON and other lights remain OFF.

V. RESULT



VI LIMITATIONS

We have tried to make the model as perfect as possible, but this model has some limitations. These are discussed below: PIR motion sensor senses the radiation by moving objects of a certain temperature. So, this model cannot differentiate two objects with having same temperature and radiation. So, this model could be used by other than humans.

This model only detects moving radiation. So,the object must be movable. The standing objectunder the sensing area of the sensor emits only constant radiation not moving radiation. This condition is also a limitation. For this type of use, we provide a mode selector mechanical switch on the wall mount board. It will change it to manual mode then every light should be ON and OFFmanually.PIR Motion Sensor is temperature sensitive. So, for long time uses, the sensor heats up which makes the deviation in sensing range and decrease the efficiency.

VII CONCLUSION AND FUTURE WORK

7.1 CONCLUSION

This model is based on designing automatic corridor lights by using a motion sensor. We discussed all the possible factors and aspects which were faced in designing this model. We also show how effectively to save power by using this model. This model reduces the power consumption to 77.78 percentage in the corridor. So, this work is only for spreading awareness of efficient appliances and real-time projects. Earlier many countries faced the problem of shortage of power. Because of it, this is an effective and demanding project for everyone.

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7.2 FUTURE WORK

We use alarm instead of light, this model works as a security system. We also use this technique for the lights of the web cam.

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