

# Energy Saving System for Classroom

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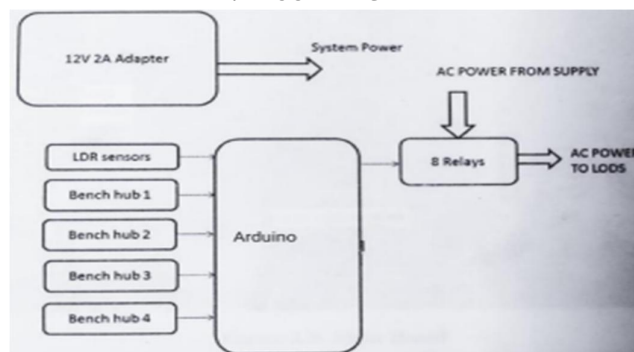
**Abstract:** Saving energy has become one of the most important issues these days. The most waste of energy is caused by the inefficient use of the consumer electronics. Particularly, a light accounts for a great part of the total energy consumption. Various light control systems are introduced in current markets, because the installed lighting systems are outdated and energy-inefficient. However, due to architectural limitations, the existing light control systems cannot be successfully applied to home and office buildings. Therefore, this paper proposes an IOT based classroom system considering energy efficiency and user Satisfaction. Now a days saving energy has become one of the most important issues. The maximum waste of energy is caused due to inefficient use of the consumer electronics Particularly lights and fans accounts for a great part of the total energy consumption.

**Keywords:** Saving energy, Classroom Project, IOT based Project, Lighting System

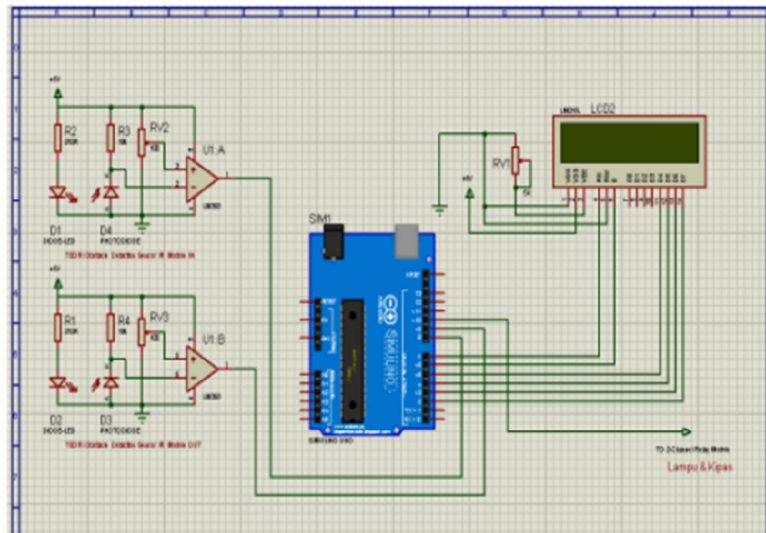
## I. INTRODUCTION

Energy saving have become very essential in recent years because of environmental issues such as climate change and global warming. Environmental problems are largely caused by the excessive use of energy in electricity production So need of hour is to reduce the wastage of energy and use it efficiently. A light account for approximately 20 percent t of the world's total energy consumption and out of which half of energy is wasted. To reduce the wastage of energy, people follow different lifestyles and habits. But still, in between the daily rush, we forget few things like switching off lights and fans and they lead to the wastage of energy. Hence to prevent such things, the proposed system will do the usually forgotten things automatically. Many systems already exist in the market regarding this subject but they are not that efficient and are also so bulky So in this system we have tried to overcome this drawback of the previous systems. The existing systems use LDR sensors and IR sensors implemented in the rooms. These methods need few changes in existing infrastructure for implementation. Hence the proposed system focuses on implementing the sensors at micro level to increase the efficiency. The main objective is to reduce wastage of electricity consumed by classroom appliances. When we say classroom appliances, we mean lights and fans. Several times the lights and fans are remained ON even when no one is in the classroom. IR sensors are used to detect the person in classroom and LDR sensor to detect the light in the classroom. Further this data is sent to the hub. Hub is basically a centre which receives the data from the group of benches. Through manual mode it can also change the status of the appliances like lights or further this data is sent to the micro controller which will make the system to response accordingly

## II. BLOCK DIAGRAM



### III. CIRCUIT SCHEMATIC



### IV. WORKING

The classroom divided into sections. Any number of sections can be made depending upon the need. So, if classroom is big then number of sections can be increased. In this case we have considered four sections. So, the classroom is divided into four sections. Now for each section we have allotted one fan and one light. In every section we have kept four benches and these four benches of each section is connected to the hub. For each section we have different hub. This is just to reduce the bulkiness of the system so that the system should not become so bulky. Each bench has IR sensors with short range to detect the presence of students. Here the sensors are connected in such a way that when a student will come and sit it will detect the presence of the student and will send the signal to the hub connected to it. Here one thing is to be noticed that when the student enters into the classroom and he is just standing there then no appliances will be on till he goes near the bench where his presence will be detected by the sensor. Now when students' presence is detected sensor will send this data to controller and there processing and further action will be taken. Since by default system is in auto mode so based on the presence of student action will be performed i.e., according to the data receive from the sensor lights and fans will be switched on or off the above paragraph explain the all about the auto mode of the system which is also by default mode of the system. But to make it more user friendly we have also provided the manual mode so that user can access and control the system easily. Now for the manual mode we have made a website through which user can see the current status of the system as well as can control it. In manual mode, users can select the light and fans to be turned on or off. In Normal mode, the light and fans are turned on for all the sections where students are present. System also automatically sets itself into the auto mode after a particular interval from the time it is configured into the manual mode. The hub has the OR gate. It takes the signals from all the benches and if any one of them is High, It gives the output as high. This eliminates the task of controller to scan all the benches to find the benches with students. Hubs Provide this information to the main controller. As shown above the section is divided in this way. The best thing about the system is that it can be accessed and controlled from anywhere and at any time. Once the user gets the access, he can manage the appliances from anywhere through website. Further the LDR sensors will continuously monitor the light in the classroom. So it will check two conditions i.e., first it will ensure that if student is present or not. If that student is present then it will ensure if there is enough light in classroom or not and only after getting that it will switch it on. Up to here we have understood the general working of the system. If we summarise in brief then here data obtained from sensor is transmitted to hub from there it goes to controller where it is processed and through relays to appliances.

### V. ALGORITHM

- Step 1: Start

- Step 2: Connect IR sensors to Arduino
- Step 3: Connect relays to Arduino
- Step 4: Read status of IR sensor.
- Step 5: If status of IR sensor 1 is high, make relay 1 high.
- Step 6: Else make relay 1 low.
- Step 7: If status of IR sensor 2 is high, make relay 2 high.
- Step 8: Else make relay 2 low.
- Step 9: If status of IR sensor 3 is high, make relay 3 high.
- Step 10: Else make relay 3 low.
- Step 11: If status of IR sensor 4 is high, make relay 4 high.
- Step 12: Else make relay 4 low.
- Step 13: Read value of LDR.
- Step 14: If value is less than 300, make relay 5 high.
- Step 15: Else make it low.
- Step 16: Read value of LDR.
- Step 17: If value is less than 300, make relay 6 high.
- Step 18: Else make it low.
- Step 19: Read value of LDR.
- Step 20: If value is less than 300, make relay 7 high.
- Step 21: Else make it low.
- Step 22: Read value of LDR.
- Step 23: If value is less than 300, make relay 8 high.
- Step 24: Else make it low.
- Step 25: Stop

#### **VI. ADVANTAGES**

1. Energy can be saved in more efficient way by avoiding unnecessary wastage.
2. System is enough flexible that it can be moved from one place to another.
3. The system is user friendly and affordable

#### **VII. LIMITATIONS**

1. Since it does not have any temperature sensor so it automatically switches on the fans based on motion only even if it is not required.
2. For the large classrooms the system can be bulky and complex.

#### **VIII. RESULT**

In the model, as we have placed IR module on the back side of the bench. So basically, the working of this model is that, each bench has IR sensors with short range to detect the presence of students. Here the sensors are connected in such a way that when a student will come and sit it will detect the presence of the student and will send the signal to the hub connected to it. Here one thing is to be noticed that when the student enters into the classroom and he is just standing there then no appliances will be on till he goes near the bench where his presence will be detected by the sensor. Now when students' presence is detected sensor will send this data to controller and there processing and further action will be taken.

#### **IX. CONCLUSION**

Energy saving is energy creation. The proposed system focuses on saving sufficient amount of energy and implementing the sensors at micro level to increase efficiency of the system. It will allow us to use the energy in more efficient way and will contribute to reduce the huge amount. The proposed system met our expectation and can contribute in saving huge amount of wastage of energy.

#### **X. FUTURE SCOPE**

Energy saving is energy generating. Huge amount of energy can be saved using this system. But this of course can not eliminate wastage of energy completely. However there is scope of further modification of this project. This can be done by using temperature sensors which will sense the temperature of the room and if the temperature is normal then it will not switch on the fans.

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