

# Energy Efficient Autonomous Lighting System

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**Abstract-** In the 21st century the demand for electricity disrupting the supply, in the most of the developing countries like India the energy efficient systems are getting boom as need of energy usage is increasing exponentially. So the future is of energy efficient system where energy is save to make power usage less and bills as much low as possible this project is designed to reduce power loss due to limited use that is we make this system on tag line “use as you need” In this project we aims to make use of energy as much less as possible and that use should be as precise as possible so we are hoping our system could play an important role in power management sector. We have implemented our system in domain of lightning system which can be applicable in home, colleges, industry and many more applications. Also we made this system as simple as possible for user giving three options as ALWAYS ON, ALWAYS OFF and AUTOMATIC.

**Keywords-** Autonomous, PIR sensor, Arduino uno board

## I. INTRODUCTION

The development of any country is now more reliable on sustainability of use of energy supply, recently many countries are facing power shortage issue and becoming global issue so this matters so much that how we are managing our power requirement their storage and efficiency of use of energy .in this project we had aimed to make an power efficient lighting system for our bright future along with lower light billing by limiting use of power.

**Some motivations for us to make this project are:**

1. Concerns for growing power supply usage
2. Concerns for increasing dependency on natural minerals and their highly usage
3. Growing use of natural fuels increasing pollution which leading to global warming and ozone depletion
4. Increasing prices of energy which leads to increase load on individuals pocket
5. Possible ways to tackle power loss as no use of them in majority time
6. Main point is our tag line which is “use as you need”.

## II. PROPOSED SYSTEM

### 2.1. What is our proposed system?

PIRsensor based automatic energy efficient lighting system is our proposed system which responsible for provide an edge on common lightning systems in market in case of power consumption and billing. this is autonomous system which is not manual switching, this system is based on PIR sensors which sense IR radiations as we know that our body that is human body emits IR radiations this system uses that phenomenon for application.

In this proposed system we have three different modes of operation of system which are always on, always off & automatic mode.in the always on mode power supply between is and battery get connected so led gets disconnected from PIR which is then out of influence of PIR sensor

In always off ode the circuit gets disconnected from power supply

And last in automatic mode circuit is like led ids connected to PIR sensor which detects motion and correspondingly on/off LED.

### 2.2. Features of this system

1. It is very cheap and affordable
2. Maintenance cost is minimal
3. It’s is efficient and portable
4. In future the system can be easily modified

## III. REQUIREMENTS

### 3.1 Functional requirements

5 Volt supply for hardware and lightning

### 3.2 Nonfunctional requirements

#### 1.Connecting wires

Connecting wires are used to link two components in the circuit

## 2.Led lightning

Led is used as to show we have placed led lightning system which is used to check power supply also



**Fig1.1 LED**

## 3. Resistors

Resistor play an important role in balancing the power supply as necessary to prevent next circuit from burning due to over voltage supply.



**Fig1.2Resistors**

## 4.Switches

Here we had implemented 3 different modes of operations which solely impossible unless and until we use switches.

Switch1 used to divert power supply in 2 parts that is to circuit and no power supply condition.

Then switch 2 again diverts power in two modes where we can use light always on or we can go to automatic mode.

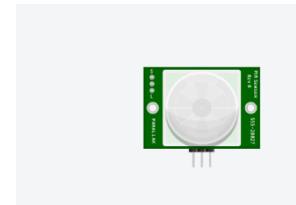


**Fig1.3 Switch**

Switch are enable us to give system with 3 different options of operation

## 5.PIR sensors:

Proximity IR sensor is known as PIR sensor. When human body radiates IR radiations the sensor senses and then function according to motion of body that is IR intensity

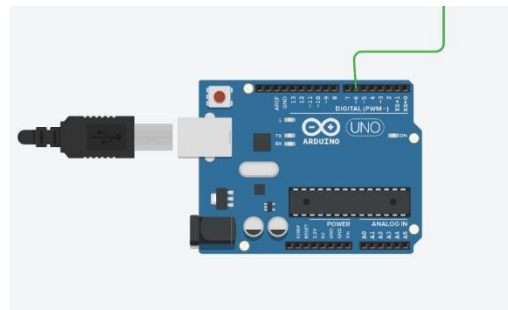


**Fig1.4 PIR Sensor**

Sensor used to sense motion of human being in particular area

## 6.Arduino uno board

It behaves as a CPU, connecting and commanding part of system. It is very important in this project as it holds the program which is developed to perform according our need.



**Fig1.5 Arduino uno board**

It is main part of this project which is performing a bridge like function between PIR sensor and led lightning

## IV. SYSTEM DESIGN

### 4.1 Circuit Description

In this proposed system Arduino plays an important role as it performs brain like operations, PIR sensor collects information and sends signals to ARDUINO which then on/off led lightning.

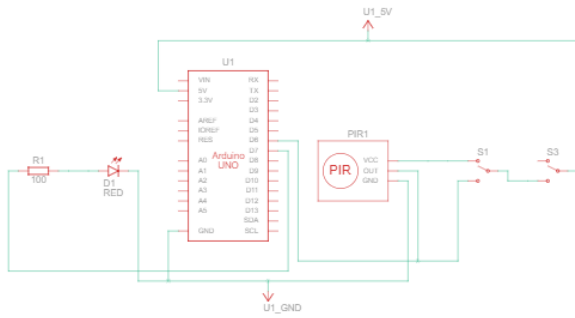
Here is a catch that we can run system in 3 ways as always on, always off & automatic using switches

Switches divide current so that it can used in different modes.

We are using appropriate resistor also to make sure that current is in range of led.

Further we can develop this system to use as security alarm system, street lightning system and many more.

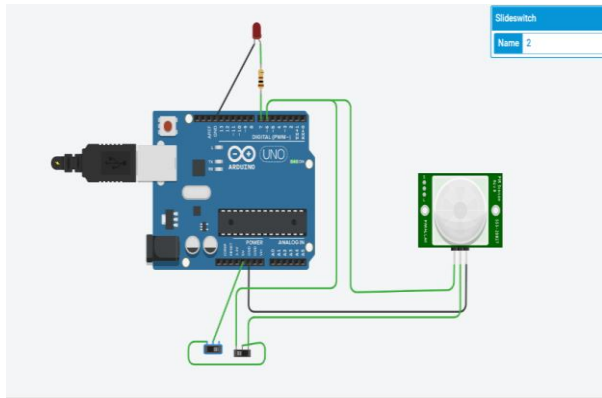
**4.2 Circuit Diagram**



**Fig2.1 Circuit Diagram**

**V. OUTPUTS AND RESULTS**

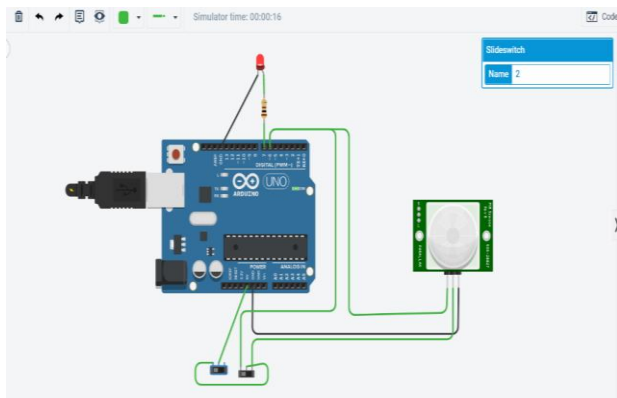
**5.1 When System Is In Always Off Mode**



**Fig3.1 Result Output 1**

In this mode light is always off irrespective of person is in proximity of PIR sensor or not.

**5.2 When System Is In Always On Mode**

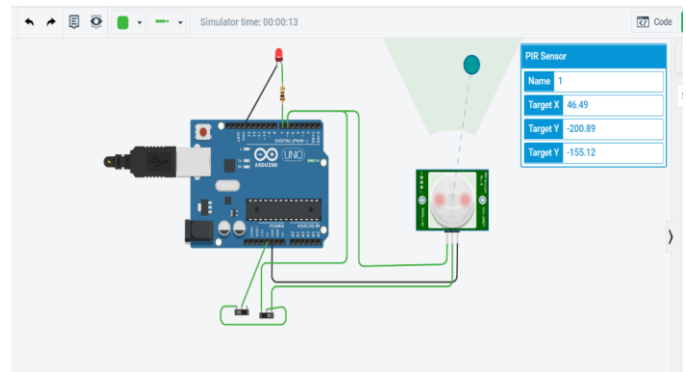


**Fig3.2 Result Output 2**

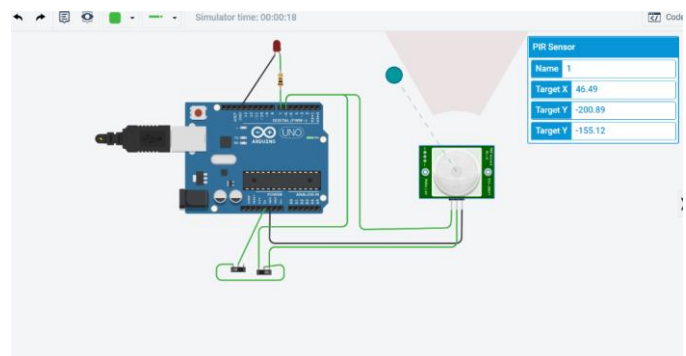
In this case light is always on, here switch directly connects led to power supply disconnecting PIR sensor from led

**5.3 When System Is In Automatic Mode**

System in automatic mode PIR sensor senses motion in its range and then it turn on the light in Fig 3.3. When object or person is out of PIR sensor range it senses nothing like Fig 3.4.



**Fig3.3Result Output 3**



**Fig3.4Result Output 4**

**VI. CONCLUSION AND FUTURE SCOPE**

**6.1 Conclusion**

- We have to come at the conclusion that this system is enhancing life of lightning system by optimal use.
- This project fulfilled its aim of energy efficient system
- This project accountable for savings on billing and reduces non fruitful us of Applications.
- This project makes lightning system automatic so no human intervention is needed and lot of time is saved.

**6.2 Future Scope**

1. We can implement to big scale like multinational companies, colleges and many more

2. The roads where traffic density is very less or time bound In this case we are implementing the circuit such as PIR sensor is placed before led so it will on led next to vehicle so vehicle would get enough time to reach to the led and vehicle get to pass on to next sensor.
3. Airports or shipping ports Very less traffic or scheduled traffic is there so we can implement scheduled red light system or led system on requirement on the motion sensors signaling
4. Enhanced electronics for future use In next project we can implement other components to make some changes in applications such as security system along with light system.
5. IOT based applications also added to make system more popular such as smart home system.

### **REFERENCES**

- [1] <https://www.ijedr.org/papers/IJEDR1605022.pdf>