



# IOT BASED SMART STAIRCASE LIGHT SYSTEM.

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**Abstract:** The Internet of things These Days Is Quite Popular in The Development of Different Low-Cost Systems with The Help of a Microcontroller. Smart lights Are Quite an Important Part of a City Because It Helps in Giving Better Vision Night Time and save power. These

Smart Lights Are Switched ON In the Evening and Are Switched OFF In the Morning. Between This Time, These Smart Lights Are Used at Maximum Intensity Even When Adequate Light Is Available. In Order to Reduce This Wastage of Electricity, We Need an Automated Smart Light Monitoring System Using IOT.

## 1.Introduction

Aim of The Internet of Things Is to Conserve Energy by Reducing Wastage of Electricity and Main Also to Reduce Labour Force or Manpower. Smart lights Are Quite an Important Part of a City Because It Helps in Giving Better Vision Night Time and save power. These Smart Lights Are Switched ON In the Evening and Are Switched OFF In the Morning. Between This Time, These Smart Lights Are Used at Maximum Intensity Even When Adequate Light Is Available. In Order to Reduce This Wastage Of Electricity, We Need An Automated Smart Light Monitoring System Using IOT. The IR sensor is used to accomplish this. Here, the light is turned ON or OFF dependent on the degree of ambient intensity using an IR sensor. We all know that one of the places where power wastage occurs most in homes and offices is at staircases. We usually turn on light at stairs and leave it in a hurry. In this project we are going to design a stair case lamp

which works on battery and only turn on the lights only when someone is present at there.

## 2.Literature Survey

The project is usually a multi-functional prototype that has a aptitude to get rid of the manual operation of the old lightning system by strategy of the self-automation.

It aims at designing and executing the advanced development in embedded systems for energy saving of street lights and their maintenance at reduced cost with modern development. Smart Lightning system has a feature as sensors are used which are IR Sensor.

We all know that one of the places where power wastage occurs most in homes and offices is at staircases. We usually turn on light at stairs and leave it in a hurry. In this project we are going to design a stair case lamp which works on battery and only turn on the lights only when someone is present at there.

The circuit works on two conditions - one is absence of light in its location and second is presence of human being, only when these two conditions are met, the controller turns the backup light ON.

These two conditions are tested by IR sensors. sensor detects the presence of a human being in its range. Whenever a human present in the sensing region of module, the sensor picks up IR changes as human body emits IR rays, so now these changes of IR picked up by module are filtered by electronics in the module and as of signalling the changes in IR, A pulse is generated by the module. This pulse is of duration 5sec by default. So whenever a human crosses the sensing region of module, it generates a pulse of 5 sec. So presence of human is detected by IR rays by this module.

### 3.Problem Statements

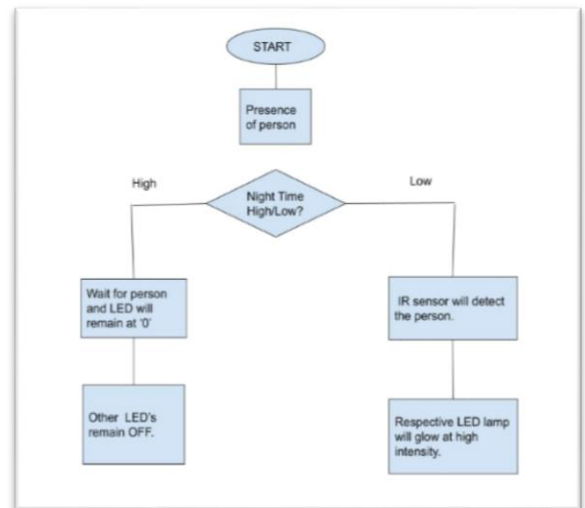
Statement 1: lights are on in the presence of sunlight.  
Statement 2: lights are on in the absence or pedestrian.  
Statement 3: These lights need a manual switching operation. It also needs man power. These lights are unnecessarily glowing with its full intensity in the absence of any activities on floor.  
Statement 4: High power consumption and waste of energy.

### 4. Proposed Approach / System Design

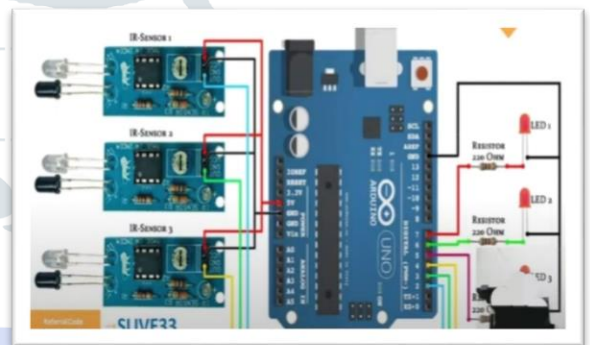
#### 4.1 Hardware Module Design

We all know that one of the places where power wastage occurs most in homes and offices is at staircases. We usually turn on light at stairs and leave it in a hurry. In this project we are going to design a stair case lamp which works on battery and only turn on the lights only when someone is present at there. The circuit works on two conditions - one is absence of light in its location and second is presence of human being, only when these two conditions are met, the controller turns the backup light ON. These two conditions are tested by IR sensors. sensor detects the presence of a human being in its range. Whenever a human present in the sensing region of module, the sensor picks up IR changes as human body emits IR rays, so now these changes of IR picked up by module are filtered by electronics in the module and as of signalling the changes in IR, A pulse is generated by the module. This pulse is of duration 5sec by default. So whenever a human crosses the sensing region of module, it generates a pulse of 5 sec. So presence of human is detected by IR rays by this module.

### 4.2. Flow Chart



### 4.3. Block Diagram



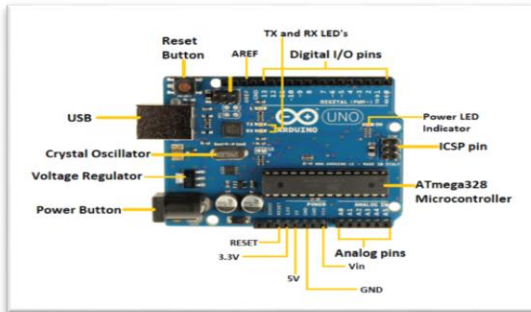
### 4.4. Table of Equipment Used

NAME	QUANTITY	COMPONENT
IR	5	IR Sensor
A	1	Arduino uno
L	5	LED
R	3	220kohm Resistor
BR	1	BREADBOARD
DI	1	Yellow LED
BAT	1	9V Battery

#### 4.4.1 Arduino Uno

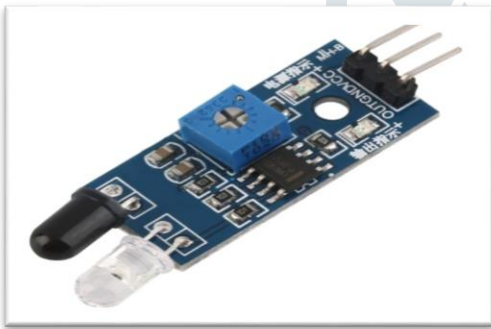
The Arduino UNO is a standard board of Arduino. Here UNO means 'one' in Italian. It was named as UNO to label the first release of Arduino Software. It was also the first USB board released by Arduino. It is considered as the powerful board used in various projects. Arduino.cc developed the Arduino UNO board. Arduino UNO is based on an ATmega328P microcontroller. It is easy to use compared to other boards, such as the Arduino Mega board, etc. The board consists of digital and Analog Input/Output pins (I/O), shields, and other circuits. The Arduino UNO includes 6 Analog pin inputs, 14 digital pins, a USB connector, a power jack, and an ICSP (In-Circuit Serial Programming) header. It is programmed based on IDE, which stands for Integrated Development

Environment. It can run on both online and offline platforms. We can program the Arduino UNO using the Arduino IDE. The Arduino IDE is the Integral Development program, which is common to all the boards. We can also use Arduino Web Editor, which allows us to upload sketches and write the code from our web browser (Google Chrome recommended) to any Arduino Board. It is an online platform. The USB connection is Essential to connect the computer with the board. After the connection, the PWR pins will light in green. It is a green power LED.

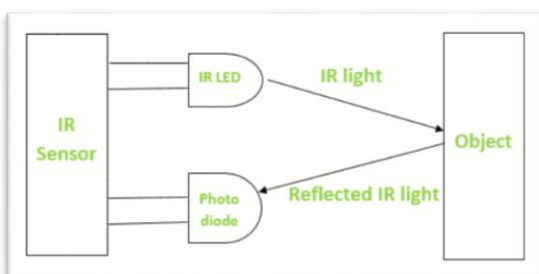


#### 4.4.2 IR Sensor

IR sensor is an electronic device, that emits the light in order to sense some object of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. Usually, in the infrared spectrum, all the objects radiate some form of thermal radiation. These types of radiations are invisible to our eyes, but infrared sensor can detect these radiations.



The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode . Photodiode is sensitive to IR light of the same wavelength which is emitted by the IR LED. When IR light falls on the photodiode, the resistances and the output voltages will change in proportion to the magnitude of the IR light received.



The emitter is an IR LED and the detector is an IR photodiode. The IR photodiode is sensitive to the IR light emitted by an IR LED. The photo-diode's resistance and output voltage change in proportion to the IR light received. This is the underlying working principle of the IR sensor.

#### 5. Conclusion

The constructed sensor based human detector for lighting purpose presents one of the simplest and effective ways of saving energy automatically in any room of a building or organization. This was achieved by the application of the ir sensor and the arduino as the major building blocks. In this ir sensor based human detector for lighting purpose on the stair case system, low power, low cost pir sensor that are easy to interface with other components was used. By using this system, power consumption was reduced and finally it can also be used in car parking lots and in street lighting system.

#### 6. References

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