SMART LIGHTING SYSTEM



By-

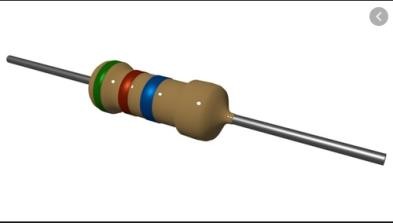
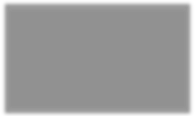
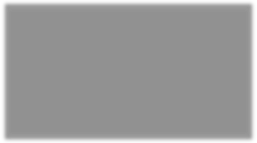
Anagha R

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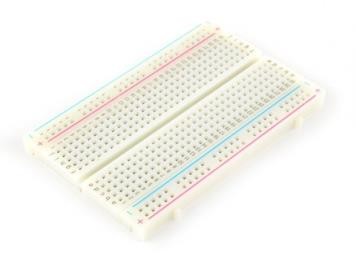
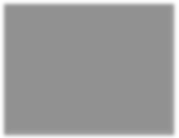
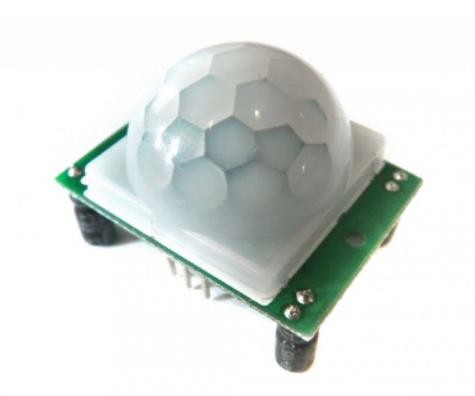
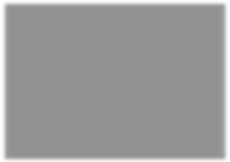
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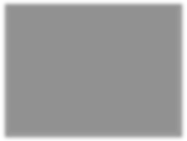
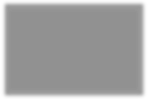
### ARDUINO: RESISTOR:



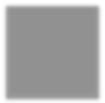
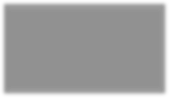
**PIR SENSOR: BREADBOARD:**



**LED: PHOTORESISTOR:**



**LCD: Jumper Wires:**



# CHAPTER 1:

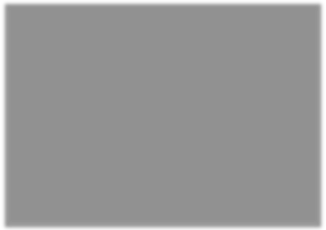
## INTRODUCTION:

* Smart lighting is a technology designed for energy efficiency, convenience and security.
* This may include high efficiency fixtures and automated controls that make adjustments based on conditions such as occupancy or daylight availability.
* Smart lighting enables households and users to remotely control cooling, heating, lighting, and appliances, minimizing unnecessary energy consumption, thus providing users better comfort levels and ease of usage of appliances.
* The concept of smart lighting also involves utilizing natural light to reduce the use of man-made lighting, and promotes energy conservation in line with the slogan of Electricity companies i.e. “a unit of energy saved is equivalent to a unit of energy generated”.
* The smart lighting ensures that the unlit areas of homes are illuminated only when required. The smart lights uses the sensors and intelligence (logic) builds into the circuit to power on the lights in the absence of natural lights or when a person moves in the unlit areas during night.
* Smart Lights can be used to dissuade the burglars looking for unoccupied houses, in this case the Light dependant resistors will trigger the lights to turn on during night and turn off during day, which makes burglars feel as if some one is present in the house. This can also be used to light up key access points like lobbies in apartments, hospitals and hotels by adjusting luminosity of lights when any one moves around, thereby conserving energy and saving money to the owners

# CHAPTER 2:

**PROBLEM STATEMENT:**

* In India, 55.43% of electrical energy is from Thermal power plants which predominantly use Coal as the fuel.
* Lighting applications represents 19% of the world's energy use and 6% of all [greenhouse emissions](https://en.wikipedia.org/wiki/Greenhouse_emissions).
* This is leading to global warming and erratic changes in environmental conditions resulting in widespread frequent natural calamities worldwide
* In developing countries, people don’t pay attention to energy conservation by unnecessarily keeping the lights on even when natural light is available in abundance
* This is predominantly seen in classrooms, Government offices, hospitals, railway stations etc
* Our project is a small step towards controlling wastage of electricity by automating the lighting systems which if deployed in large scale and with the backing of Government will lead to a cleaner and greener planet earth



# CHAPTER 3:

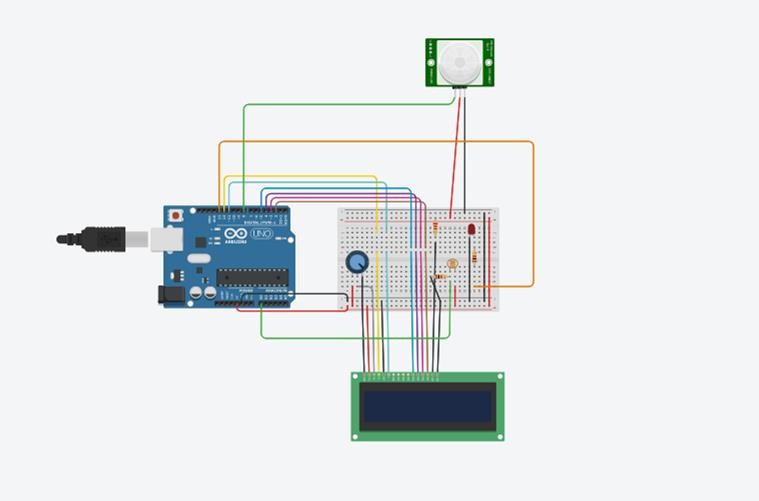
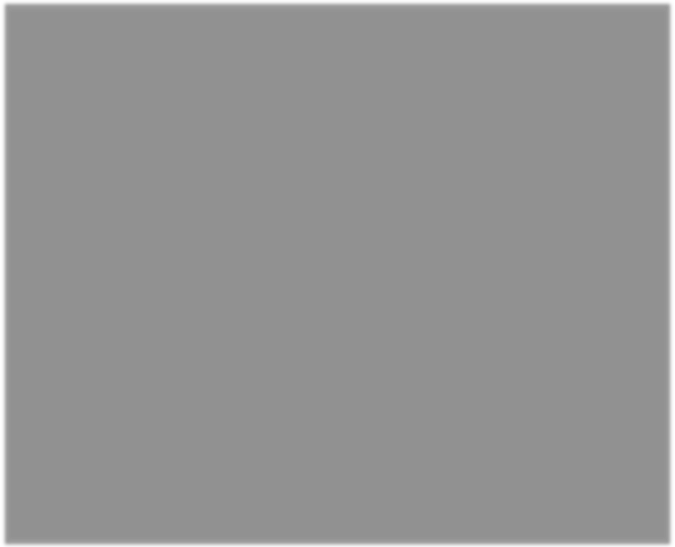
**HARDWARE AND SOFTWARE REQUIREMENTS:**

### Software:

**Tinkercad:** It is a free, online circuit designing platform that runs in a web browser, known for its simplicity and ease of use.

### Hardware:

* **Arduino: It** is an open source electronic platform which has 14 digital I/O pins,6 analog I/O pins.
* **PIR Sensor:** A passive infrared sensor is an electronic sensor that measures infrared light radiating from objects in its field of view.
* **Photoresistor:** (acronymed LDR) is a passive component that decreases resistance with respect to receiving luminosity on the components sensitive surface.
* **Breadboard:** A breadboard is a construction base for prototyping of electronics.
* **LED**: A Light emitting diode is a semiconductor light source that emits light when current flows through it.
* **LCD display:** LCD’s are available to display arbitrary images (as in a general purpose computer display) or fixed images with low information content**.**
* **Resistor:** Resistor is a passive two terminal component that are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements



# CHAPTER 4: CIRCUIT DIAGRAM:

**CONSTRUCTION :**

* PIR Sensor consist of 3 pins GND(Ground), Power(Vcc or +5V) and Signal pins. Where GND and power are connected to gnd and Vcc respectively. Signal is connected to D8 of Arduino(digital).
* D13 of Arduino is connected to terminal 1 of Resistor[1KOmh](1) while terminal 2 is connected to anode of LED and cathode is connected to GND.
* D12 of Arduino is connected to Resister Select pin of LCD.
* D11 is connected to Enable pin of LCD.
* D5 is connected to DB4 of LCD.
* D4 is connected to DB5 of LCD.
* D3 is connected to DB6 of LCD.
* D2 is connected to DB7 of LCD.
* Vcc and GND pin of Arduino(power) is connected to terminal 2 of Resistor[1KOhm](2) while terminal 1 is connected to LED cathode of LCD. LDR terminal 2 is connected in parallel to resistor (2) terminal 2.
* Anode of LED is connected to Resistor [220 Ohm](3) terminal 2 and terminal 1 is connected to GND.
* Terminal 1 of Potentiometer is connected to Vcc while terminal 2 is connected to GND and the Wiper is connected to contrast pin of LCD.

# CODE:

#include <LiquidCrystal.h> #define led 13

#define Pir 8

LiquidCrystal lcd(12,11,5,4,3,2); void setup()

{

pinMode(led, OUTPUT); pinMode (Pir, INPUT);

lcd.begin(16, 2);

}

void loop()

{

int ldr=analogRead(A0); int pir=digitalRead(Pir);

if(ldr<100 && pir==HIGH)

{

digitalWrite(led,HIGH); lcd.println("obj detected"); delay(1000);

lcd.clear();

}

else

{

digitalWrite(led,LOW); lcd.println("obj not detected"); delay(1000);

lcd.clear();

}

if(!(ldr<100) && pir==HIGH)

{

digitalWrite(led,LOW); lcd.println("obj detected"); delay(1000);

lcd.clear();

}

else

{

digitalWrite(led,LOW); lcd.println("obj not detected"); delay(1000);

lcd.clear();

}

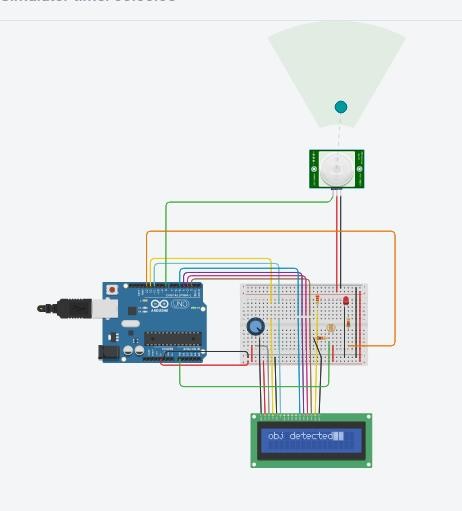
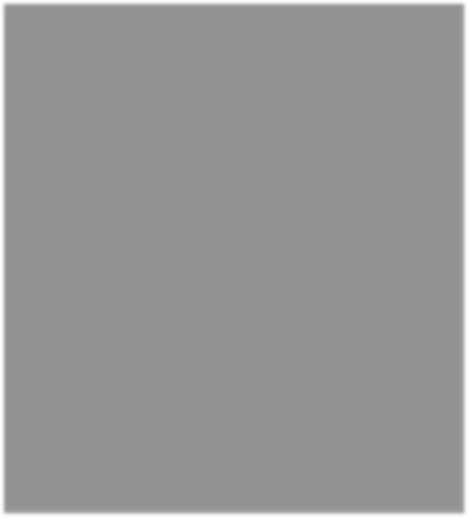
}

# CHAPTER 5:

**RESULT:**

Initially, at night when there is no human movement, the PIR Sensor’s Output pin stays LOW. When a person comes within the sensor range, the change in infrared radiation is detected by the PIR Sensor. As a result, the output of the PIR Sensor becomes HIGH. Since the Data OUT of the PIR Sensor is connected to Digital Pin of Arduino, whenever it becomes HIGH, Arduino will turn the Light ON which stays as long as there is movement in front of the sensor and the respective output is printed on LCD.

If any movement is observed in the daylight, the lamp doesn’t turn on due to the presence of photoresistor, which increases the resistance in the circuit when the surrounding light is ambient, thereby doesn’t turn the lamp ON.



# CONCLUSION AND FUTURE ENHANCEMENTS:

In addition to being able to deliver light more efficiently at a reduced cost compared to other types of light sources, LEDs are easily controlled, networked and embedded with sensors; these make them a key enabler of a quickly growing number of opportunities in the Internet-of-Things (IoT).

Safety and liability is a huge concern for the smart lighting system project. This system is very beneficial for consumers who are looking for smart lighting. This system turns the lights off when nobody is using them, and someone forgets to shut them off, which saves a lot electricity and money. With the automatic mode on the system, consumers can create the illusion that they are home, when in fact they are on vacation, thereby extending a safety feature to their homes.

In future we plan to enhance this project my making it self sustainable by plugging in a solar panel that will promote renewable energy sources, reduce dependency on conventional energy source, thus take a small step towards energy conservation and reducing carbon foot print as well as help in reducing global warming.

