**SMART LIGHTING SYSTEM/IOT:**

**AIM:** A Smart lighting system which can be controlled Remotely from anywhere and also has person detection for automatic switching.

**Components Required for Automatic Room Lights using Arduino:**

1. ESP-32
2. IR sensor
3. LED lights
4. Relays
5. Arduino IOT cloud(Remote Access)
6. Arduino IDE(Person Detection)
7. ESP-32: ESP32 is a series of low-cost, low-power [system on a chip](https://en.wikipedia.org/wiki/System_on_a_chip" \o "System on a chip) [microcontrollers](https://en.wikipedia.org/wiki/Microcontroller" \o "Microcontroller) with integrated [Wi-Fi](https://en.wikipedia.org/wiki/Wi-Fi" \o "Wi-Fi) and dual-mode [Bluetooth](https://en.wikipedia.org/wiki/Bluetooth" \o "Bluetooth).
8. IR sensor: IR sensors are widely used in object detection.
9. LED Lights/AC Bulbs : Basic lights used in homes.
10. Relays: Relays are electrically operated switches that open and close the circuits by receiving electrical signals from outside sources.
11. Arduino IOT cloud: The Arduino IoT Cloud is a platform that allows anyone to create IoT projects, with a user friendly interface, and an all in one solution for configuration, writing code, uploading and visualization.

**APPPLICATIONS:**

1. College Automation: Includes library, classes,meeting halls,washroom etc.
2. Home Automation: Includes rooms,washrooms,garage etc.
3. Remote Access form anywhere.

**WORKING OF THE MODEL:**

1. The Automatic Room Lights using ESP-32 and IR Sensors is a project, where the lights in the room will automatically turn ON upon presence of a human and stay turned ON until the person has left.
2. It is placed near the entrance and is used to count the number of people in the room using 2 IR sensors.
3. There are two IR sensors which is used to detect weather the person is entering the room or leaving the room using which we count the number of people present in the room and control the lights accordingly.
4. First IR sensor is used to detect the entrance of the person and the second sensor detects the leaving of the person.
5. While entering the person crosses the first IR sensor which makes the people in the room count increase by 1 and the lights are turned ON and if another person enters the count is further increased.
6. While a person leaving the room crosses the second IR sensor which decreases the room person count by 1. Similarly if all the people leaves the room the lights are turned OFF as the people count is zero.
7. The Arduino IOT cloud platform is used to monitor and control the smart lights remotely from anywhere using Dashboards.

**CODE 1:**

Arduino IoT Cloud Variables description

The following variables are automatically generated and updated when changes are made to the Thing

CloudLight light;

int intensity;

Variables which are marked as READ/WRITE in the Cloud Thing will also have functions

which are called when their values are changed from the Dashboard.

These functions are generated with the Thing and added at the end of this sketch.

\*/

#include "thingProperties.h"

void setup() {

// Initialize serial and wait for port to open:

Serial.begin(9600);

// This delay gives the chance to wait for a Serial Monitor without blocking if none is found

// Defined in thingProperties.h

initProperties();

// Connect to Arduino IoT Cloud

ArduinoCloud.begin(ArduinoIoTPreferredConnection);

/\*

The following function allows you to obtain more information

related to the state of network and IoT Cloud connection and errors

the higher number the more granular information you’ll get.

The default is 0 (only errors).

Maximum is 4

\*/

setDebugMessageLevel(2);

ArduinoCloud.printDebugInfo();

}

void loop() {

ArduinoCloud.update();

// Your code here

}

/\*

Since Light is READ\_WRITE variable, onLightChange() is

executed every time a new value is received from IoT Cloud.

\*/

void onLightChange() {

// Add your code here to act upon Light change

if(light==1)

{

analogWrite(17,intensity) ;

Serial.println("LED ON") ;

}

else

{

analogWrite(17,0) ;

// Serial.println("LED OFF") ;

}

}

/\*

Since Intensity is READ\_WRITE variable, onIntensityChange() is

executed every time a new value is received from IoT Cloud.

\*/

void onIntensityChange() {

// Add your code here to act upon Intensity change

if(light==1)

{

analogWrite(17,intensity) ;

}

Serial.println("Intensity=") ;

Serial.println(intensity) ;

}

\

**Code 2:**

const int ir2=35 ;

const int ir1=22 ;

const int ledpin=17 ;

int count=0 ;

void setup() {

// put your setup code here, to run once:

pinMode(ir2,INPUT) ;

pinMode(ir1,INPUT) ;

pinMode(ledpin,OUTPUT) ;

Serial.begin(9600) ;

}

void loop() {

// put your main code here, to run repeatedly:

int a=0 ;

int s1=digitalRead(ir1) ;

int s2=digitalRead(ir2) ;

if(s1==0)

{

count++ ;

delay(1000) ;

}

if(s2==0)

{

count-- ;

delay(1000) ;

}

Serial.print(count) ;

if(count>0)

{

digitalWrite(ledpin,HIGH) ;

}

else digitalWrite(ledpin,LOW) ;

}

|  |  |  |
| --- | --- | --- |
| **IDEA** | **BRIEF** | **STATUS** |
| Smart lighting system which can be controlled Remotely from anywhere | Using Relays | Tested and Implemented |
| Counting the number of people in the room and switching lights  ON/OFF as desired | Using 2-IR sensors | Tested and Implemented |