VISVESVARAYA TECHNOLOGICAL UNIVERSITY

BELAGAVI-590 018, KARNATAKA

COMPUTER NETWORK MINI

PROJECT REPORT ON

"Automatic Room Light Controller"

<u>**PROJECT ASSOCIATES**</u>

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<u>**PROJECT GUIDE**</u>

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CERTIFICATE

This is to certify that **Anushree B K and Komal P J b**earing USN **4BD21CS020** and **4BD21CS062** respectively of **Computer Science and Engineering** department have satisfactorily submitted the mini project report entitled **"Automatic Room Light Controller"** for Computer Network **(21CS52)**. The report of the mini project has been approved as it satisfies the academic requirements in respect of mini project work prescribed for the year 2023-24.

<u>Project Guides</u>

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Signature of Examiners:

Date:

1) _____

Place: Davanagere

2) _____

ACKNOWLEDGEMENT

Salutations to our beloved and highly esteemed institute, **"BAPUJI INSTITUTE OF ENGINEERING AND TECHNOLOGY"** for having well qualified staff and lab furnished with necessary equipment's.

We express our sincere thanks to our guide **Dr. Santosh K C, Prof. Shwetha G, Prof. Shankar Sarji and Dr. Naseer R** for giving us constant encouragement, support and valuable guidance throughout the course of project without whose guidance this project would not have been achieved.

We express whole hearted gratitude to **Dr. Nirmala C R,** H.O.D of Computer Science and Engineering Department. We wish to thank her for making our task easy by providing her valuable help and encouragement.

We also express our whole hearted gratitude to our principal, **Dr. H B ARAVIND** for his moral support and encouragement.

We would like to extend our gratitude to all staff of **Computer Science and Engineering Department** for their help and support. Also, we have benefited a lot from the feedback, suggestions given by them.

We would like to extend our gratitude to all my family members and friends especially for their advice and moral support.

Vision and Mission of the Institute

Vision

"To be centre of excellence recognized nationally and internationally, in distinctive areas of engineering education and research, based on a culture of innovation and invention."

Mission

"BIET contributes to the growth and development of its students by imparting a board- based engineering education and empowering them to be successful in their chosen field by inculcating in them positive approach, leadership qualities and ethical values."

Vision and Mission of the Computer Science and Engineering Department

Vision

"To be a centre of excellence in imparting state-of-the-art technology in the field of Computer Science and Engineering education enabling the students to become professionally sound and ethically strong".

Mission

1. Adapting best in class teaching and learning methodology to mould the students to become industry ready.

2. Creating conductive environment for imparting quality education the facilitate research and Innovation.

3. Establishing industry relationship to bridge the skill gap.

4. Educating the students to be successful lifelong learners by inculcating ethical values and social responsibilities.

1. Program Educational Outcomes (PEOs):

PEO1	To provide students with adequate knowledge in mathematics, computer science and few interdisciplinary courses that gears them for advanced technology.
PEO2	To impart core knowledge in both hardware and software with problem solving techniques.
PEO3	To conduct effective training programs in order to explore and enhance their skills to synchronize with dynamic industry practices.
PEO4	To motivate students for higher studies and to involve in research.

2. Program Specific Outcomes (PSOs):

PSO1	Able to understand, analyse and develop simple to complex programs with the help off knowledge gained from the Computer Science and Engineering subjects.
PSO2	Ability to develop real time, secure and distributed applications related to industry and society with the knowledge of courses like Artificial Intelligence, Machine learning, Big Data, Cloud Computing, IoT, Cyber Security and Open-source Platforms.
	Course Outcomes: The students should be able to:
1	Use structured query language (SQL) for database creation and manipulation. Demonstrate the working of different concepts of DBMS.
2	Implement and test the project developed for an application.
	Course Objectives: This course will enable students to:
1	Foundation knowledge in database concepts, technology and practice to groom students into well-informed database application developers.
2	Strong practice in SQL programming through a various database problem.
3	Develop database application using front-end tools and batch-end tools of DBMS

ABSATRCT

The project of "Digital visitor counter" is based on the interfacing of some components such as sensors, motors etc. with arduino microcontroller. This counter can count people in both directions. This circuit can be used to count the number of persons entering a hall/mall/home/office in the entrance gate and it can count the number of persons leaving the hall by decrementing the count at same gate or exit gate and it depends upon sensor placement in mall/hall. It can also be used at gates of parking areas and other public places. This project is divided in four parts: sensors, controller, counter display and gate. The sensor would observe an interruption and provide an input to the controller which would run the counter increment or decrement depending on entering or exiting of the person. And counting is displayed on a 16x2 LCD through the controller.

CONTENTS

CHAPTER 1

1.1INTRODUCTION

Initially when there is no one in the room the lights will be ON,and there will be unwanted energy consumption,so to reduce the unwanted energy consumption we are proposing a project. Automatic room light controller using IR sensor is an innovative and energy-efficient system that uses infrared light to detect the presence of a person in a room. The system works by detecting the IR signals emitted by the human body, thereby automatically switching the light on or off, depending on whether anyone is present or not. This technology is designed to conserve electricity and reduce energy by only illuminating the room when needed, as well as providing convenience and safety to the user. This system can be used in homes, offices, and various other environments where lighting is required, making it an ideal solution for those who value ease of use and sustainability.

1.2Problem Statement

The objective of this project is to make a controller based model to count number of persons visiting particular room and accordingly light up the room. Here we can use sensor and can know present number of persons. In today's world, there is a continuous need for automatic appliances. With the increase in standard of living, there is a sense of urgency for developing circuits that would ease the complexity of life. Also if at all one wants to know the number of people present in room soaps not to have congestion, this circuit proves to be helpful. This project "automatic room light controller with visitor counter using microcontroller" is a reliable circuit that takes over the task of persons/visitor in the room very accurately. When somebody enters into the room will be switched ON and when any one. The light in room will be only switched OFF until all the persons in the room go out. The total number of person inside the room also displayed on the seven segment displays. The microcontroller does the above job. it receives the signals from the sencers, and this signal is operated under the control of software which is stored in rom. Micron roller AT89S52 continuously monitor the infrared receivers, when any object pass through the IR rays falling on the receivers are obstructed this obstruction is sensed by the microcontroller.

1.3 Objectives

The primary objectives of automatic room light systems are as follows:

To improve energy efficiency by reducing unnecessary energy consumption. By Automatically controlling the lighting in a room based on occupancy and environmental sustainability.

To conserve electricity and reduce energy by only illuminating the room when needed, as well as providing convenience and safety to the user.

CHAPTER 2:

HARWARE AND SOFTWARE REQUIREMENTS

2.1 HARDWARE DESCRIPTION

Components
1. Arduino Uno Board
2. Single Channel Relay
3. IR sensor
4. Bread board
5. Connecting Wires

ARDUINO UNO BOARD

The Arduino UNO is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) via a type B USB cable. It can be powered by a USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts
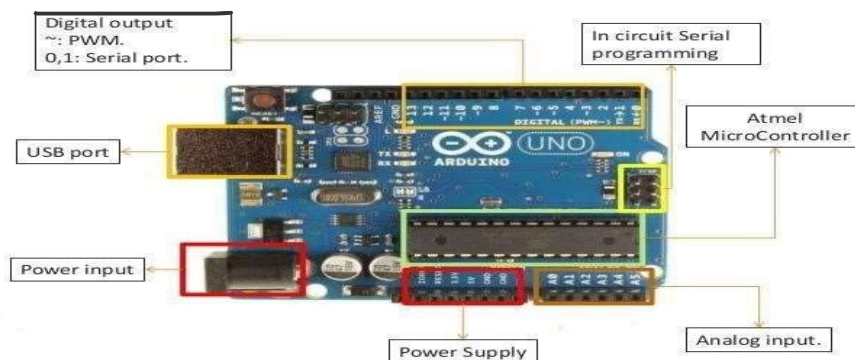

Fig :1. Block diagram of Arduino UNO

IR SENSOR

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

- There are two types of IR sensors: Active and Passive. Active IR sensors consist of two elements: an infrared source and an infrared detector. Passive IR sensors, on the other hand, do not use any infrared source and detectorAd1.

- IR sensors are widely used in motion detectors, which are used in building services to switch on lamps or in alarm systems to detect unwelcome guests
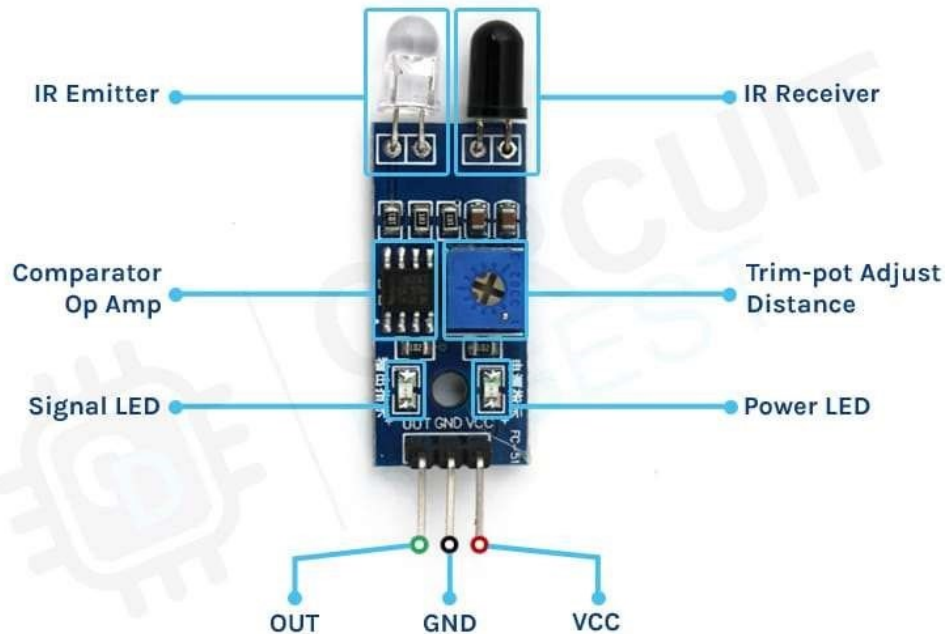

Fig 2: Block diagram of IR Sensor

DUAL CHANNEL RELAY

- A dual channel relay is a type of relay that has two separate channels, each of which can be used to control a different load.

- Dual channel relays are typically used in applications where two separate loads need to be controlled by a single signal.

- For example, a dual channel relay could be used to control a light and a fan in a room, or to control two different motors in a machine.

- Dual channel relays are available in a variety of voltage and current ratings, so they can be used to control a wide range of loads.

- They are also available in a variety of form factors, so they can be easily integrated into different types of projects.

4

- The channels can be controlled independently, so each channel can be turned on or off separately.

- The control signal can be a digital signal, such as a 5V or 3.3V logic signal, or it can be an analog signal.

- When the control signal is activated, the relay coil is energized, which closes the contacts on the relay.

- The contacts on the relay are connected to the load, so when the contacts are closed, the load is turned on.
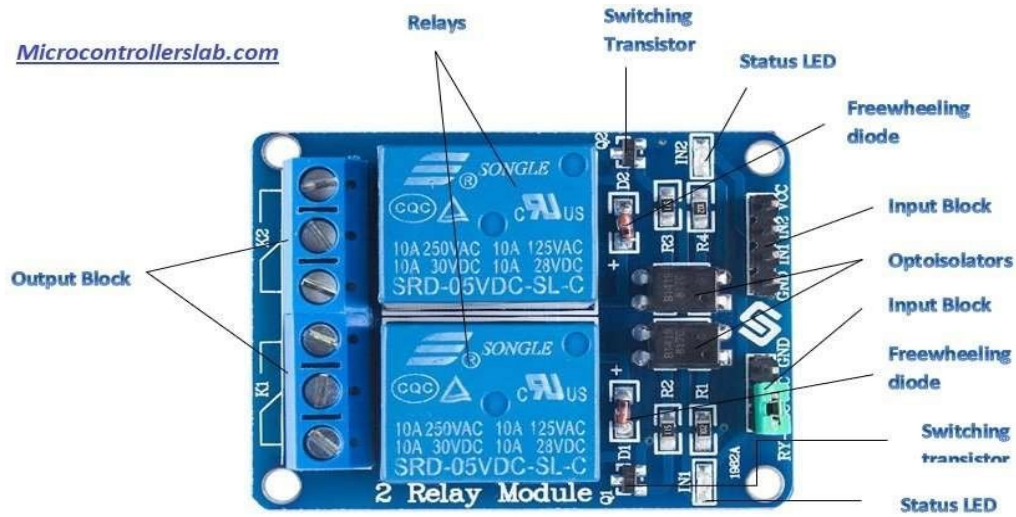

Fig 3: Block diagram of Dual Channel Relay

SOFTWARE REQUIRMENT

Arduino IDE

- The Arduino software is an open-source integrated development environment(IDE) used to write and upload programs to Arduino boards.
- It is available for windows, macOS, and Linux. The Arduino software includes a text editor for writing code, a compiler for converting the code into machine language, and a serial monitor for uploading the code to the Arduino board and viewing output. o The Arduino software is a powerful tool for anyone interested in learning about electronics and programming. It is easy to use and can be used to create a wide variety of projects, from simple LED blinkers to complex robots.
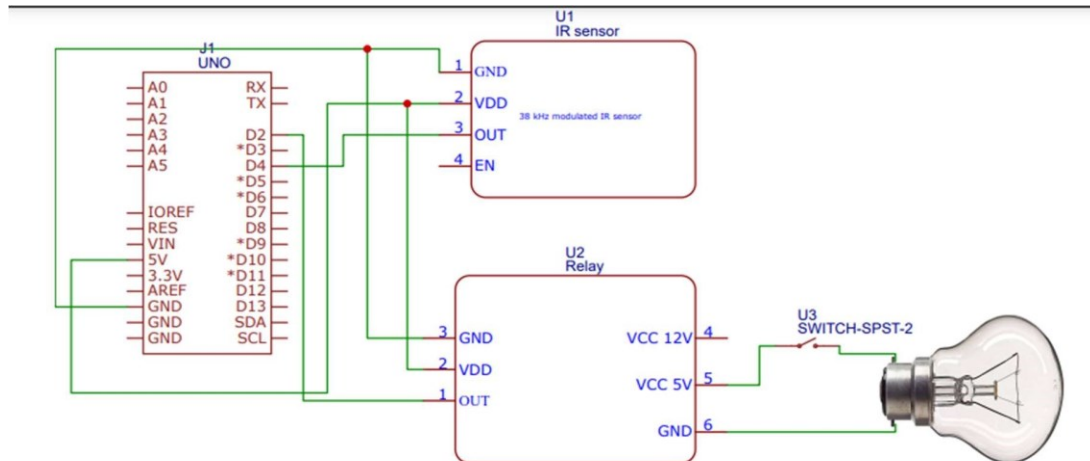

Fig 4: Arduino IDE

SCHEMATIC DIAGRAM

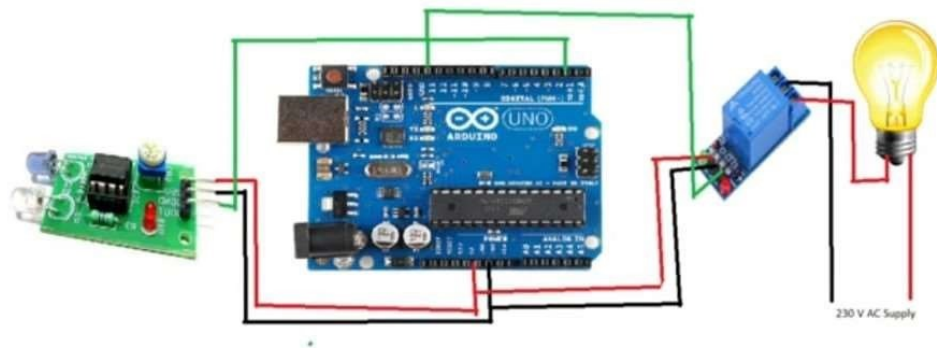Fig 5: Schematic diagram of Automatic room light Controller

3.2 CIRCUIT DIAGRAM

Fig 6: Circuit diagram of Automatic room light Controller

FLOWCHART

Flowcharts are visual representations of the logical flow of a program. They use symbols and arrows to represent different program components and the sequence in which they are executed. Flowcharts help in understanding the program's logic, identifying potential issues, and communicating the program's structure to others.
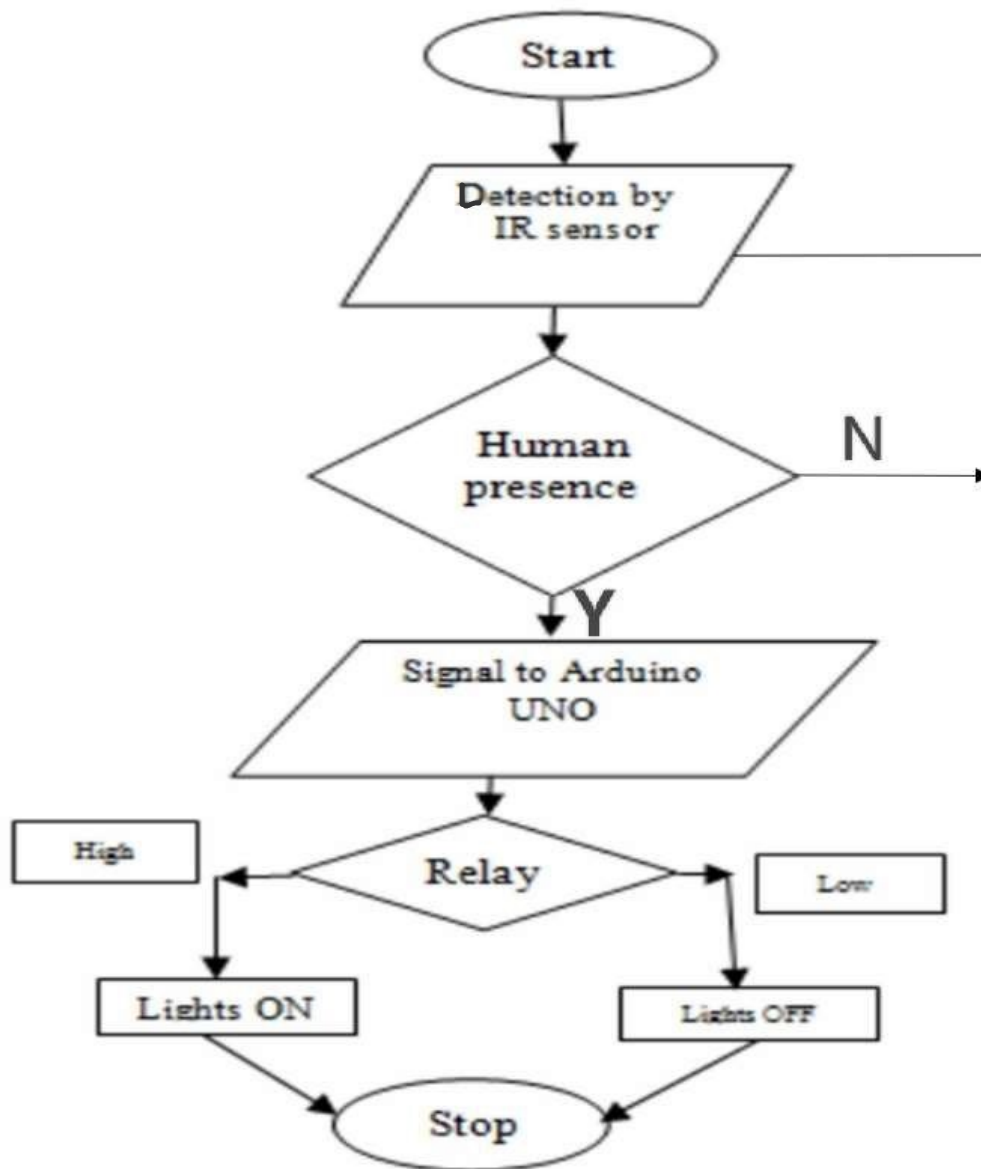
CHAPTER 4: IMPLEMENTATION CODE

```
const int IR_PIN = 4;// the Arduino pin connected to output (middle) wire of sensor const int
RELAY_PIN = 2;// the Arduino pin which is connected to control relay

void setup() {
 Serial.begin(9600);// setup Serial Monitor to display information
 Serial.println("Automatic");
 Serial.println("HC-SR501 sensor with relay");
 pinMode(IR_PIN, INPUT);// Define SENSOR_PIN as Input from sensor      pinMode(RELAY_PIN,
 OUTPUT);// Define RELAY_PIN as OUTPUT for relay
 }

 void loop() {

 int motion = digitalRead(IR_PIN);// read the sensor pin and stores it in "motion" variable

 // if motion is detected   if(motion == LOW){
 Serial.println("Motion detected");
 digitalWrite(RELAY_PIN, LOW);// Turn the relay ON      delay(5000);
 }   else{
 Serial.println("No Motion detected");
 digitalWrite(RELAY_PIN,HIGH);// Turn the relay OFF
 }
 delay(1000);
```

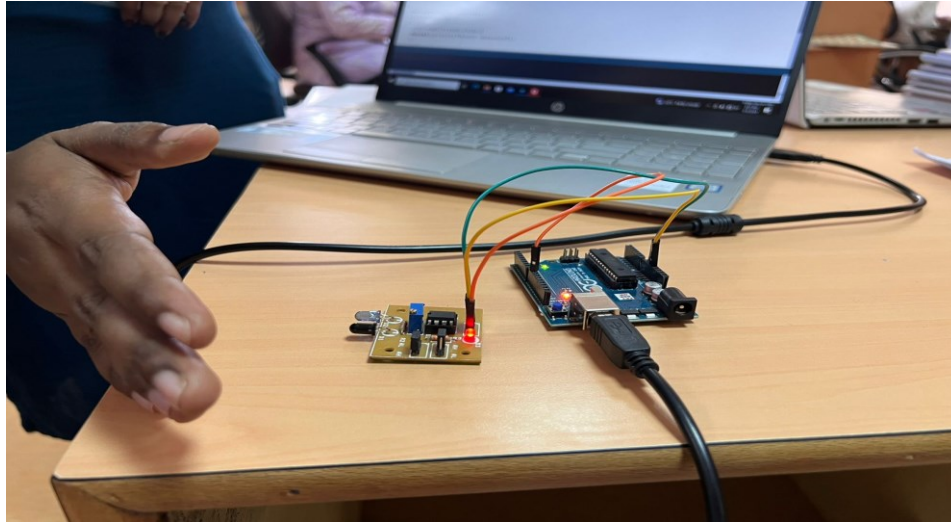# CHAPTER 5: SNAPSHOTS

Fig 7: project model ss

.Motion Detected: The figure below ideally shows detection of motion by human hence there is a glow or turning ON of lamp.

Fig 8: Circuit diagram of Motion detecte

ANNEXURE

Anushree. B. k
4BD21CS020
Komal. P. Jadimath
4BD21CS062   CS&E - Students
5th sem 'A' section
Computer Science And engineering
BIET, Davangere   02/02/2024

The Head of the Department
    Electronic and Communication
    BIET

Sub :- Permission to issue the laboratory components

Requested Madam.

        Courteously, My name is komal of branch CSE.
I am writing this letter to issue the some laboratory
components. The purpose of using the lab components is
to make project on automatic light detection. I have
attached the list of the components which are required.
I request you to kindly provide us the components.
we will return the components as soon as our project demo
                                              completion.
Thank you.

    Yours faithfully
    Komal
    (Jynath)   HOD sign

Components
1] Ardhino board Uno board — ①   spu to issue the
2] Duel channel relay — ①   Specified Components.
3] IR sensor — ①   GU
4] PCB Breadboard — ①   02.02.24.
5] Battery ✗
6] connecting wires ✗   (P.T.O)

* Arduino Uno Board with USB cable
* 8 one channel relay
* PR sensor
* Bread board.

Received the above components.

Name : komal. P. J   V, (A sec)
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Name : Anushree .B. k   V sem.
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REFERENCES

[1]Richu Sam Alex, R Narciss Starbell "Energy efficient Intelligent Street Lighting System using Sensors", International Journal of Engineering and Advanced Technology (IJEAT), Vol-3, Issue 4, April 2014

[2]Daeho Kim, Junghoon Lee, Yeongmin Jang and Jaesang Cha. "Smart LED lighting system implementation using Human tracking US/IR sensor" 2011 IEEE (ICTC 2011)

[3]Raja R, Dr. K. Udhaya kumar "Development in Smart Sensor Network for Energy Saving" International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 3, Special Issue 2, April 2014.

[4]Michale Mango, Tommaso Poloneli, Luca Benini "A Low Cost, Highly Scalable Wireless Sensor Network Solution to Achieve Smart LED Light Control for Green Buildings" IEEE Sensors Journal, vol. 15, no. 5, May 2015

. [5] B. Iyer, N. P. Pathak and D. Ghosh, "Dual-Input Dual-Output RF Sensor for Indoor Human Occupancy and Position Monitoring," in IEEE Sensors Journal, vol. 15, no. 7, pp. 3959-3966, July 2015, doi: 10.1109/JSEN.2015.2404437.

CONCLUSION

In this digital world of Technology is very advanced and we prefer things to be done automatically without any human efforts. This project also helps to reduce human efforts . Also it is very usefull to conserve resources. It is very usefull in schools, hospitals, malls, offices, auditoriums etc. In any big hall if we want to count number of individuals it is very difficult as it results in congesion and disturbance to the whole class. This project becomes helping hand in such situation because it gives the count on LCD display. Also it controls the lighting system automatically according to how many individuals are there in a room. Turning ON lights will increase with increase in a room. Turning ON og lights will decrease with decreasing the individuals in a room.