LIGHT AUTOMATION USING MOTION SENSOR

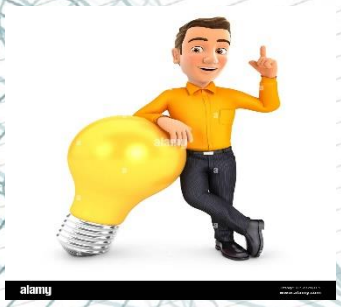
Course title

Internert of Things - 1

—

Course Leader

Dr.Jyothi A.P



Date : 15/10/2022

LIGHT AUTOMATION USING MOTION SENSOR

K K Akash Babu - 20ETIS411014
Nagraj Y R - 20ETIS411402
Bandayya Swamy- 20ETIS411005
Saniya Taj - 20ETIS411024
Rakshith Rao P R - 20ETIS411019

Students of ISE (Information science and engineering) CSE Dept,
M S Ramaiah University of applied sciences

ABSTRACT:

This paper represents automatic lighting design using PIR motion sensor. Using this sensor we can certainly minimize the consumption of electrical power. Power crisis is one of the most common problem. With the help of the sensors we can eliminate this shortage by minimizing the wastage of electrical power or saving our generated power. PIR is the type of sensor that gives us signal when anything crosses its rays. It is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. It is a low-cost device used to detect a change in motion in its surroundings within different range of radius. A PIR-based motion detector is used to sense movement of people, animals, or other objects. It can also be helpful in the security systems. In many offices there are pavements where lights kept switched on for the whole night and day. But if we use the sensor then only when it gets motion it will give signal and the lights will be switched on. The whole process can be controlled by using microcontroller. Using the received motion from any movements, the PIR sensor gives high signal to the microcontroller. So we can easily create a program for the microcontroller for setting up an alarm. So this project is very lower costing and also power saving. It also minimizes the electric bills of any office. Moreover it creates an opportunity for minimizing the load shedding in the cities and villages.

INTRODUCTION:

Motion detection using a PIR sensor circuit can be used for providing security to home, shopping malls etc, as the PIR sensor used in this system detects the motion of human around this circuit. With the help of buzzer, we can identify the motion of human which was detected by the sensor. This system

can be used at any place where security is needed. Security is needed by everyone in the society now-a-days to protect their property or confidential information from others which is sensor sense a human motion and then transmit the signal wirelessly. However, this project will relate to auto power ON light and fan system. When the sensor senses a human motion in the sensor's detection area, sensor will be triggered and then the room's light will automatically switch ON. It is useful for us when we cannot find the switch in the dark condition. For the fan's function, it is depends on the room temperature, when the temperature is higher, fan will run when the PIR had detect motion in the detection area. When the room temperature is low, fan will not run. Degree of temperature is measure by the temperature sensor and temperature will show on a LCD display (2x16). Light and fan will automatically OFF when the user was going out from the room. As long as PIR sensor does not detect motion in the detection area, light and fans are not function and the fan is depends on the room temperature. Once the sensor is triggered, system will have around 2 minutes to run the function. After 2 minutes and sensor does not detect any motion, light and fans will be switched OFF automatically.

REQUIREMENTS:

- Power supply (+5v) to the hardware circuit.
- An interrupt is given to microcontroller by PIR sensor when it detects the motion.

Components and Supplies:-

Arduino Nano R3

PIR Sensor

Relay Module

LED(generic)

LED Light Bulb, Frosted GLS

Single Turn Potentiometer

Component Description

Pyroelectric infrared Sensor:
Sensing systems for human movement detection and idengification collect a raw data set from the human body and extract distinguishable features to recognize the principal context that we mentioned previously: the object location, the direction of the movement, the speed of the movement and the identity of the object. Numerous sensing systems have been studied using various sensors, including cameras, motion sensors, pressure pads,

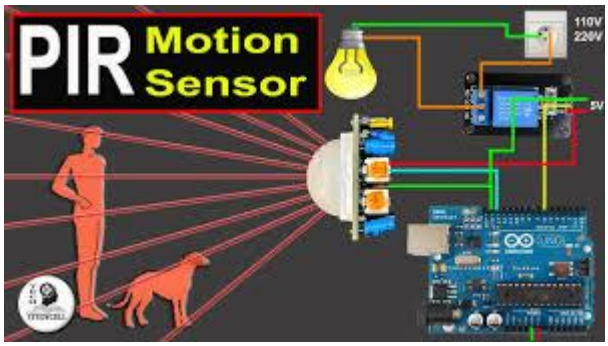


Fig 1 : PIR Sensor

radars, electric field sensors. Among them, in this paper, we focus on pyroelectric infrared (PIR) sensors as sensing systems to detect human body movement in an indoor environment.

Relay Module:

A Relay Module is a very useful component as it allows Arduino, Raspberry Pi or other Microcontrollers to control big electrical loads. We have used a 2-channel Relay Module in this project but used only one relay in it. The relay module used in this project is shown below.

Fig 2: 2 way relay module

In order to control a single relay on the board, we need to use three pins of the relay module: VCC, GND and IN1.

Arduino Nano:-

The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328 (Arduino Nano 3.x). It has more or less the same functionality of the Arduino Duemilanove, but in a different package. It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one.

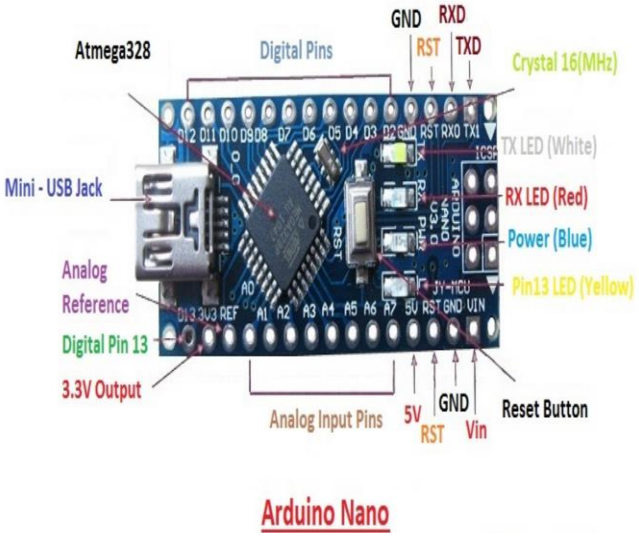


Fig 3 : Arduino Nano3

Single turn potentiometer:

Potentiometers are rarely used to directly control significant amounts of power (more than a watt or so). Instead they are used to adjust the level of analog signals (for example volume controls audio equipment), and as control inputs for

electronic circuits. For example, a light dimmer uses a potentiometer to control the switching of a TRIAC and so indirectly to control the brightness of lamps.

PROPOSED MODEL:-

With refernce to the cmponents mentioned above,the model switches on the light as soon as it detects some motion example:handwave .This movement is detected by the PIR sensor by mapping the surrounding where it is present.The led bulb glows when the sensor detects motion.After detection the signal is sent to the arduino nano3 which is programmed in the arduino ide to make the connection of the light as expected *code reference in implementation paper the light is connected to the relay module in order to handle the voltage diifernce in order to make the connection.The code shows us how the signal is generated and how implementation is done to achieve the desired result. Rasberry pi is used as a software to connect all these devices to make them work in order,The potentiometer in the circuit enables us to control for how long the light stays on and also as an on off switch .

The PIR sensor can be used to detect human movement of vrious spedds and ist to give signal 1 to the arduino node to make connection uptil the set time .This system can be scaled up to be used in places where not continous light is not required but required only for a short time .This project refers to all the other project papers reffered to in the references section.

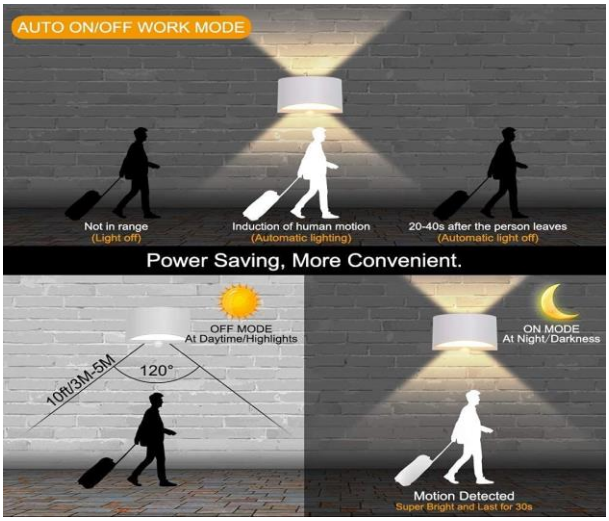


Fig 4 : Model

MERITS:

- Energy Savings – This system is very efficient as it automatically switches off the luminaires when there is no presence detected (for a predefine time). As a result, the end-user saves on electricity consumption.
- Convenience – Turning on the lights will be as easy as walking inside the room. No need to search for the switch on the wall. The lighting system will automatically turn off the lights when it does not sense any movement for a certain period of time.

- Acts as a Deterent – This device also acts as a deterent from intruders as it will be harder to do unlawful activities after business hours. The security team or people in the community will be able to pinpoint areas that may have unusual activities.

DEMERITS:-

- The sensors of the motion-sensored lighting system need to detect presence or movement in order to activate. If there are only a few occupants in an area, this device will require them to periodically activate the sensor (subject to the hold on time set) by moving within the detection zone.
- There is a possibility that the luminaires' lifespan can be shortened due to the frequency of the switching. This will occur if the motion detectors are located in areas of high activity. Strategic placement of the sensor and appropriate selection of the model for the area can mitigate this problem.

CONCLUSION:

Hereby we come to an end of or project "LIGHT AUTOMATION USING MOTION SENSOR". This project gives us an idea to detect the motion. This project can be used anywhere either at home or offices. This is also cost efficient. Thus by this attempt of ours circuit can be used as protecting device and can be used for security also. It can be used as a kind of antitheft device. It is very much cost efficient and can be used easily and efficiently.

ACKNOWLEDGEMENT:

This project is the output of the togetherness work of the team members.This project is outcome of the effort implemented by the group members under the guidance of Dr.Jyothi mam for which we are very thankfull for the support.The dedication of the group members gives out this fruitful worthy project,thankyou for the effots and support.

REFERENCES:-

[1] www.beprojectidea.blogspot.com

[2] A great page on PIR sensors from GLOLAB (http://adafru.it/aKn)

[3] NYU sensor report (http://adafru.it/aKo)

[4]http://learn.adafruit.com/pir-passive-infrared-proximity-motion-sensor

[5] Lee W. Method and Apparatus for Detecting Direction and Speed Using PIR Sensor. U.S. Patent 5291,020. 1994 Mar 1;

[6] Hao Q., Hu F., Xiao Y. Multiple human tracking and idengification with wireless distributed pyroelectric sensor systems. *IEEE Sens. J.* 2009;**3**:428–439. [Google Scholar]

[7] Tao S., Kudo M., Nonaka H., Toyama J. *Constructing Ambient Intelligence*. Springer Berlin Heidelberg; Berlin, Germany: 2012. Person authentication and activities analysis in an office environment using a sensor network; pp. 119–127. [Google Scholar]

[8] Sun Q., Hu F., Hao Q. Mobile target scenario recognition via low-cost pyroelectric sensing system: Toward a context-enhanced accurate idengification. *IEEE Trans. Syst. Man Cybern. Syst.* 2014;**44**:375–384. [Google Scholar]

[9] Stauffer C., Grimson W.E.L. Learning patterns of activity using real-time tracking. *IEEE Trans. Pattern Anal. Mach. Intell.* 2000;**22**:747–757. [Google Scholar]

[10] Whatmore R.W. Pyroelectric devices and materials. *Rep. Prog. Phys.* 1986;**49**:1335–1386. [Google Scholar]

[11] Milde G., Häusler C., Gerlach G., Bahr H.-A., Balke H. 3-D modeling of pyroelectric sensor arrays part ii: Modulation transfer function. *IEEE Sens. J.* 2008;**8**:2088–2094. [Google Scholar]