Proceedings of "National Conference on Emerging Trends in Science and Advances in Engineering"
Organized by Phaltan Education Society's College of Engineering Phaltan, www.coephaltan.edu.in
International Journal of Innovations in Engineering Research and Technology [IJIERT]
ISSN: 2394-3696, Website: www.ijiert.org, July, 2023

IOT Based Solar Street Light Intensity Control System

[1]Mrs. Pallavi Jadhav
Department of E&TC Engineering, PES's College of Engineering, Phaltan, India
pallavichavan30@gmail.com
[2]Ms. Dipali Dattatray Jadhav
Department of E&TC Engineering, PES's College of Engineering, Phaltan, India
dipalijadhav12@gmail.com
Mr. Anup Kumbhar
Department of E&TC Engineering, PES's College of Engineering, Phaltan, India
kumbharanup.18@gmail.com

Abstract - This project presents the IOT based solar street light intensity control system. The Sunlight Tracker Solar Powered IOT Based Light Control System is the subject of this project's abstract. This idea aims to save energy and lessen pollution brought on by finite resources. Due to its low cost and open source nature, it is implemented using an Arduino Uno. The purpose of this system is to interact with the Arduino Uno board to control the lighting system while using IR sensors to detect human presence in the immediate area. The intelligent system operates in accordance with presence and sets up the lighting's dimmer and control system while also operating the solar tracker concurrently. By following the sun's path, the solar tracker receives sunlight more effectively than a traditional solar panel. Key words: LCD, IR emitter, and LDR.

I. Introduction

The project involves automating lighting systems that are powered by solar trackers for effective lighting system use. The current energy crisis is a serious problem because of the rising demand for electricity. Currently, smart lighting guarantees a decrease in energy usage. The IOT-based auto sunshine tracker driven light control system encourages the use of renewable energy in addition to reducing power usage through light management. We accomplish this by continuously monitoring ambient lighting conditions and human presence using IR sensors and LDRs. Compared to a standard solar panel that is stationary, the solar tracker is 30% more efficient. Using the solar energy captured by solar panels will also help us to solve that problem.

II. Methodology

The implementation of an IoT-based Automatic Street Lighting System is the primary goal of this project. As traffic gradually decreases during the late hours of the night, the intensity gradually decreases until morning in order to conserve energy; as a result, street lights turn on at dusk and automatically turn off at dawn. Every day, the procedure is repeated. Traditional HID bulbs are replaced with White Light Emitting Diodes (LED) in the street lighting system to include a dimming capability. The high intensity discharge (HID) lamp, which is typically used in metropolitan street lights, cannot be utilised to modulate the intensity. Because of their high lifespan and minimal energy use, LED lights are the lighting of the future. Due to the ability to alter intensity, LED lights are quickly replacing traditional lighting.

Block Diagram Description:

- Solar panels generate electricity during the day, which is then stored in batteries. Light sensor commands the Arduino controller from dusk to sunrise.
- When there is no motion beneath the streetlight, the programme is carried out, and the LED is turned on to 30% of its maximum intensity. Motion sensor turns on when a human or vehicle approaches a nearby streetlight, and then instructs the Arduino to increase brightness to 100%.

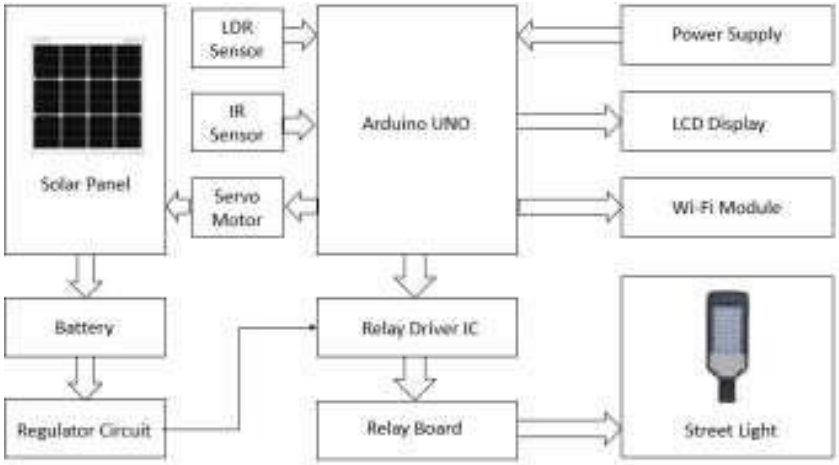

Fig 1 Block Diagram

- If there isn't any movement after a predetermined amount of time, the intensity progressively drops to 30%. When morning comes, LDR will instruct Arduino to turn off the street light.
- Typically, streetlights run on electricity that is stored in the battery. Because of the overcast weather, if the battery is not fully charged, the streetlight will shut off automatically.

Hardware Details

- Arduino Uno
- LDR Sensor
- LED
- Solar Panel
- Battery
- Wi-Fi Module
- Relay
- LCD Display

Software Details

1) **Arduino IDE**

All software development is done in the Arduino Integrated Development Environment (IDE). The Arduino IDE is free software that makes writing code and uploading it to the device straightforward.

2) Blynk App

Blynk is a platform that allows users to operate devices like Arduino, Raspberry Pi, and others remotely via iOS and Android apps. By simply dragging and dropping widgets, you may create a graphic interface for your project on a digital dashboard. You can start fiddling in less than 5 minutes after setting everything up because it's so simple. There is no board or shield that Blynk is bound to. Blynk will get you online and prepared for the Internet of Things whether your Arduino or Raspberry Pi is connected to the Internet by Wi-Fi, Ethernet, or this new ESP8266 chip.

III. Flowchart

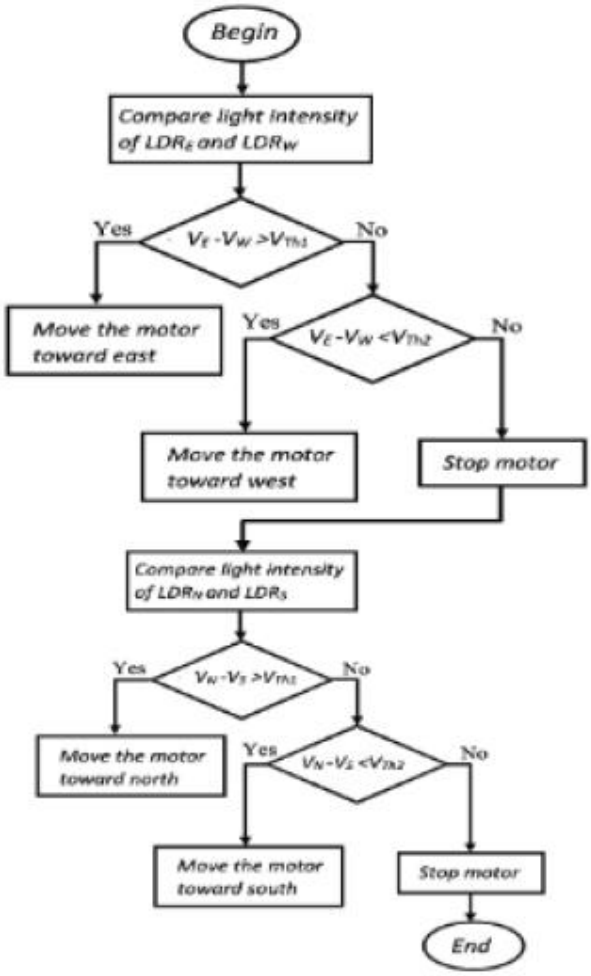

Fig 2 Flowchart

IV. Result

Fig.3 shows as the sun moves 45 degrees, LED brightness becomes high.

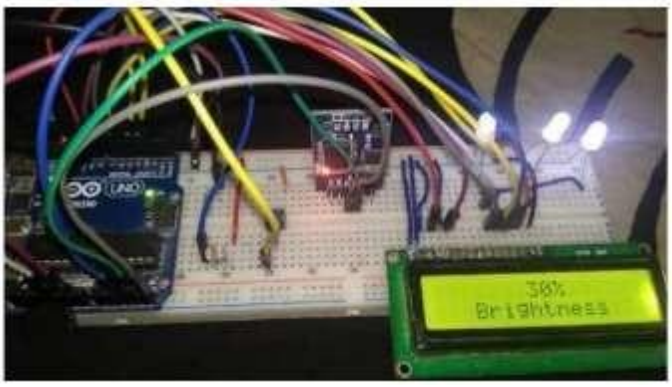

Fig.3. Overall System Implementation

Fig.4 shows output of project on ThingSpeak and on Mobile phone when the LED condition is high and low.

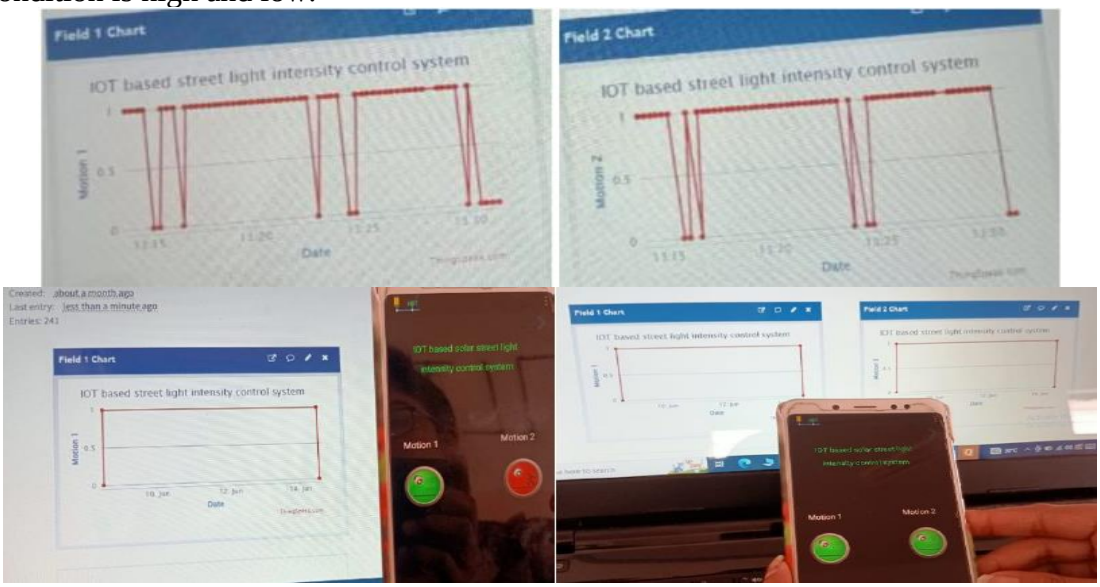

Fig. 4. IOT Based Solar Street Light Intensity Control System Output

V. CONCLUSIONS

Solar tracking systems work by detecting the sun's position and connecting the panel to sunlight in the opposite direction. This project depicts a smart road lighting framework utilizing LED provided by sunlight based energy and with a control system for effective administration. These elements turning ON the lights just when needed, expanding the energy saving and lamp's lifetime.

ACKNOWLEDGMENT

We would like thank our guide Prof. Dr. N.G. Narve for his guidance. We would also like to thank Head of the Department Prof. D.D. Jadhav for his constant motivation and Support. We would also like to thank our principal Dr. N.G. Narve who encourages us.

REFERENCES

[1] Ms. M. Kokilavani, Dr. A. Malathi "Smart Street Lighting System using IOT" Government Arts College, Coimbatore, Tamilnadu.
[2] K.Tamilselvan, K.S. Deepika, A.Gobinath, S.Harhini, S.Gokhulraj "IOT Based Street Light Monitoring System" Nandha Engineering College, Erode, Tamilnadu.
[3] Nithyashree CM, Vinutha TS, M. Dakshayini, P. Jayarekha "IOT-Smart Street Light System" BMSCE, Bengaluru, Karnataka, India
[4] Jessin Mathew, Riya Rajan, Rangit Varghese "IOT Based Street Light Monitoring & Control With loRa/LoRaWAn Network" Mount Zion College of Engineering, Kadammanitta, Kerela, India.
[5] Dr.A.S.C.S.Sastry, K.A.S.K.Bhargav, K.Surya Pavan, M.Narendra "Smart Street Light System using IOT" K L E F, Andhra Pradesh, India.