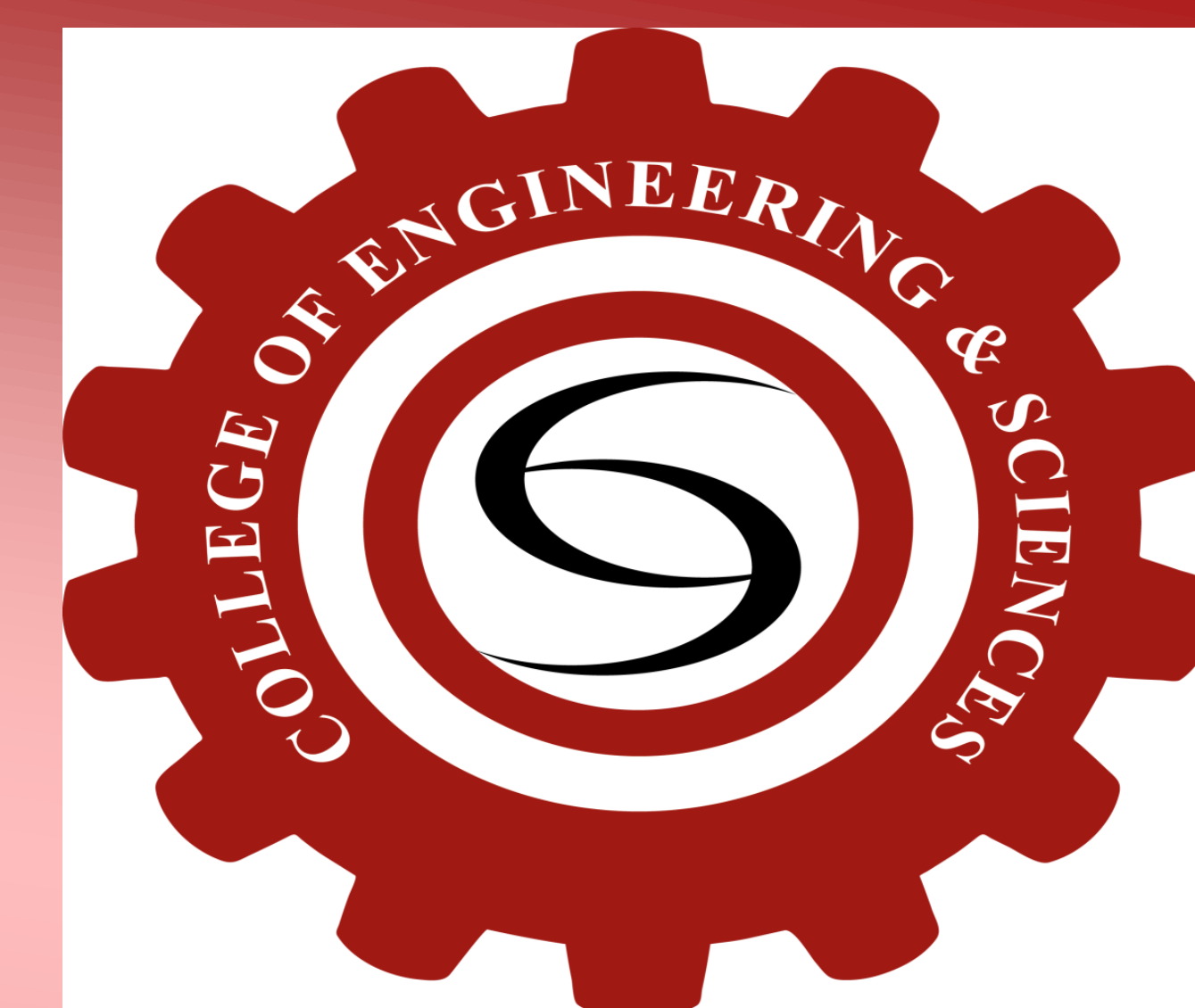




ELECTRICAL ENGINEERING DEPARTMENT

COLLEGE OF ENGINEERING AND SCIENCES

FINAL YEAR PROJECT



SUPERVISOR:
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PROJECT:
IoT Based Monitoring and Dual Axis Tracking of Solar Panel

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ABSTRACT

The Industrial Revolution accelerated the demand for electricity hence electricity was generated on a large scale throughout the globe which resulted the increase in climate crises. In the late 20th century the think tanks started discussing the importance of renewable energy which doesn't harm our planet. Along with the other types of renewable resources like wind and bio fuels the solar energy has also been used throughout the world. The solar energy is easily accessible and solar plants need less maintenance as compared to the other sources of energy. IoT-based solar system has been designed which gives approximately 30% higher efficiency as compared to the existing conventional solar panels and 6% higher efficiency as compared to single-axis tracking systems. Our system uses the dual axis tracking of the sun which enables it to give higher efficiency. It also monitors and keeps a record of the temperature, output voltage, and humidity. The project has a salient feature of portability which enhances the number of applications.

INTRODUCTION

- ❖ A solar panel is a technology that catches solar energy from the sunlight and converts it into electrical energy through the process of photovoltaic and stores it in a battery.
- ❖ Photovoltaic energy is the process of converting sunlight directly to electricity, using solar cells.
- ❖ It is a clean, non-polluting, sustainable resource that requires easy installation and little maintenance.
- ❖ Moreover, Internet of Things (IoT) technology is capable of sending and receiving data wirelessly without any of human involvement.
- ❖ Most solar panels are statically aligned, that is they are placed at a fixed position towards the sky and the position of sun keeps changing with respect to the solar panel thereby resulting to the low power output from the solar cell.
- ❖ Considering that, a dual-Axis solar tracker is introduced in this project which will move both horizontally and vertically according to the alignment of rays from the sun and catches maximum energy from the sun.
- ❖ Moreover, an IoT-based cloud monitors all the operation and stores the entire information into the database.

PROBLEM STATEMENT

- ❖ The increasing demand for renewable energy sources has led to the widespread adoption of solar panels as an effective means of harnessing energy from the sun.
- ❖ However, the efficiency of solar panels is heavily reliant on the optimal positioning and orientation of the panels towards the sun.
- ❖ To address this issue, the project aims to develop an IoT-based system for monitoring and tracking solar panels to optimize their position and orientation towards the sun.
- ❖ The system will collect real-time data and adjust the panels for maximum energy production, while being scalable and adaptable to different environments.
- ❖ The challenge is to develop a robust tracking system that can operate in varying weather conditions. Successful implementation can improve the efficiency and reliability of solar panels as a sustainable energy source.

PROJECT COMPONENTS

Hardware

Following are the components used to construct the project:

- Solar panel
- Arduino Nano
- Solar charger converter
- Buck converter
- Mg996r Servo Motor
- 20 x 04 LCD Display

Sensors

List of the sensors is given below:

- LDR Sensor
- DHT Sensor
- Rain sensor
- Voltage Sensor

Software

- C++ language is used to do programming of solar system.

Application

- Blynk IoT: It controls and monitor the electrical devices with the concept of IoT

BLOCK DIAGRAM

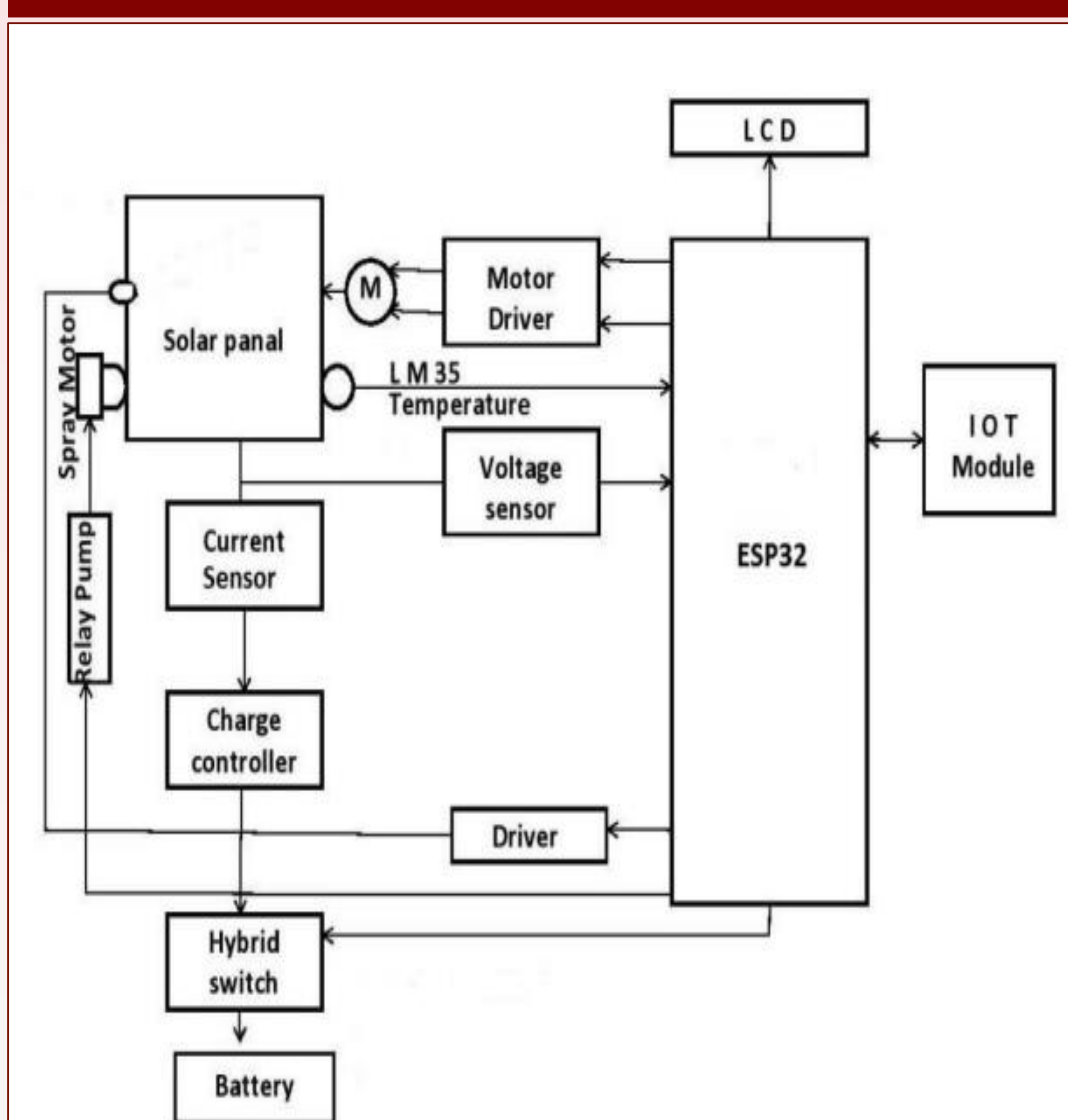


Figure 1: Block Diagram of the Solar System

IMPACT & RESULTS (SDGS, CEPS)

- ❖ **Depth of Knowledge required:** The dual axis tracking of solar panels requires the knowledge of both hardware and software in order to run the project smoothly after completion. The IoT based monitoring was also the part of the project
- ❖ **Depth of analysis required:** The monitoring of the Parameters is important the higher production level because it helps to determine the factors that are affecting the production of electricity.
- ❖ **Familiarity of issues:** For the real time need of efficient energy the project was design to combat the needs of clean and affordable energy.



SDG GOAL 7 & 13

