IOT BASED ENERGY PREDECTION AND THEFT PROTECTED AUTOMATIC SOLAR TRACKER SYSTEM

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Abstract - The *main control circuit is based upon Node cu micro-controller. Programming of this device is done in the mannerthat the LDR sensor, in accordance with the detection of the sun rays, will provide direction to the DC Motor that in which way thesolar panel is going to revolve. Through this, the solar panel is positioned in such a manner that the maximum amount of sun rayscould be received. In comparison with the other motors, DC motoris the simplest and the suave one, the torque of which is high and speed of which is slow enough. We can program it for changing thedirection not with standing the fact that it rotates only in one direction subject to exception as far as programming is concerned.1985, first time ever it was witnessed for production of the silicon solar cells with an efficiency of 20%.*

Key Words: modeling, automatic sun tracking systems, IoT, sensors, Proteus simulation

1. INTRODUCTION

Theft Protected Automatic Solar Tracking System using IOT (ASTS), an automated system that increases the efficiency of the solar panel by keeping the solar panel aligned with the rotating sun. Solar tracking is a mechanized system to enhance the efficiency of the solar cells to track the sun's 60% than the stationary system. The unique feature of this system is that, instead of the earth as its reference,
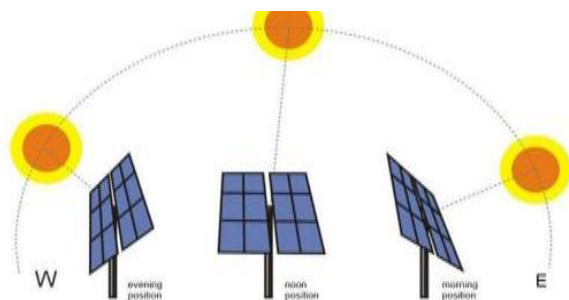

Fig.1 Rotation of panel with sun direction

Fig. 1.1 Basic Rotation Panel With Sun Direction

A GSM Module will be used to make the system as a theft secured. A SMS will be sent to the owner in case the device is tried to be stolen. Also, a Buzzer would be used to enhance the security. In the world of pollution, this system is an eco-friendly alternative, hence a valuable asset. When the ocean of pollution is encumbering every corner of life, this system would be able to create ripples of hope in the midst of this bustling civilization. The survivability of this system lies upon its workability. In the trend of comparison with other mind-boggling systems, it could be a trailblazer.

Though a hike in the efficiency of the solar panel had a handsome increase still perfection was a far-fetched goal for it. Below 40%, most of the panels still hover to operate. Consequently, peoples are compelled to purchase several panels in order to meet their energy demands or purchase single systems with large outputs. Availability of the solar cells types with higher efficiencies is on provided they are too costly to purchase. Ways to be accessed for increasing solar panel efficiencies are a plethora in number still one of the ways to be availed for accomplishing the said purpose while reducing costs, is tracking. Tracking helps in the wider projection of the panel to the Sun with increased power output. It could be dual or single axis tracker

2. LITERATURE SURVEY

This Solar Tracker system assures the conversion optimization of electricity from the source of sun energy by proper using of oriented photovoltaic panel in a manner conforming to actual direction of sun.

Sun energy is a considered to be one of most promising sources to address the world energy crises. Photovoltaic cell is one of the prominent sources of energy. The most important factors that affect the efficiency of solar cells are cell temperature, maximum power point tracking (MPPT) and energy conversion efficiency.

The optimization of these factors improves solar cells efficiency for more reliable applications. This study associated by means of the designing and manufacturing process of single axis tracker device by using photo voltaic conversion panels. This solar tracker system assures the conversion optimization of electricity from the source of sun energy by proper using of orientated photovoltaic panel in a manner conforming to the actual direction of sun. The input stage has two LDR module that is so arranged to form a voltage divider circuit, the microcontroller is programmed through the software named Arduino ide being decked up in the system and lastly the driving circuit that has the DC motor helps in rotating the solar panel. The motor driver is

embraced with three terminals- two for motor input/ output respectively and the third one for power input. The terminal for motor input is connected to 2 of the 14digital input/output pins of Arduino UNO and subsequently, the motor output terminal is connected to the DC motor. The two LDR sensor modules are annexed to the scaffolding with Node cu analogue inputs. The light dependent resistors are then affixed along the length, on either side of the solar panel.

3. METHODOLOGY

The project called "Automatic Solar Tracking System" is produced through installation of the various nitty-gritty such as solar panel which provides 12 volts as output, an Node cu as MCU, a motor driver – with IC L293D, two LDR sensor module, a simple DC motor, a current sensor and a 9 V battery. Construction of the said project is being built out of the wooden base installed at
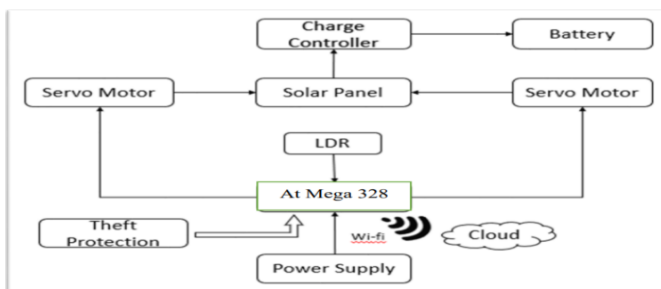

Figure 3.1. Block Diagram of Basic Solar Circuit

3.1   Concept of IOT:

The Internet of things (IOT) is the inter-networking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings, and other items—embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data.

"Things," in the IOT sense, can refer to a wide variety of devices such as heart monitoring implants, bio chip transponders on farm animals, electric clams in coastal waters, automobiles with built - in sensors, DNA analysis devices for environmental/food/pathogen monitoring or field operation devices that assist firefighters in search and rescue operations. Legal scholars suggest looking at "Things" as an "inextricable mixture of hardware, software, data and service". These devices collect useful data with the help of various existing technologies and then autonomously flow the data between other devices.

3.2 Predicting the Power Generated by a Solar Plant

Solar power forecasting is very use full in smooth operation and control of solar power plant. By using Mean and standard deviation we can be used to make predictions for solar panel voltage if we have a data set of past solar panel

voltage readings and we know that the readings follow a normal distribution. Here's an example of how we can use mean and standard deviation to make predictions. It's important to note that the assumption of a normal distribution may not always hold true for solar panel voltage readings, especially if there are external factors such as weather conditions or changes in sunlight intensity that can affect the voltage output. In such cases, more advanced statistical methods may be required to make accurate predictions.

3.3 Feature Extraction:

To identify emotions, we have employed face traits. Finding and extracting appropriate features is one of the most important components of an emotion recognition system. These elements were selected to represent the information that was wanted. After per-processing, facial features with high expression intensity are retrieved from an image, such as the corners of the mouth, nose, forehead creases, and eyebrows. Different aspects based on speech and facial expression are combined. In comparison to systems created

3.4 Classification:

Solar panel is connected with servo motor. Servo motor is interface with servo motor controller. 5-volt power supply is used provide power supply to micro-controllers.

The system consists of two servo motors mounted at the end of solar panel for rotation of solar panel according to the intensity of sun light. As the intensity of light at the LDR 1 is more than the resistance of LDR 1 decreases and the current through LDR 1 increases thus servo motor rotates towards the LDR 1 and vice versa.
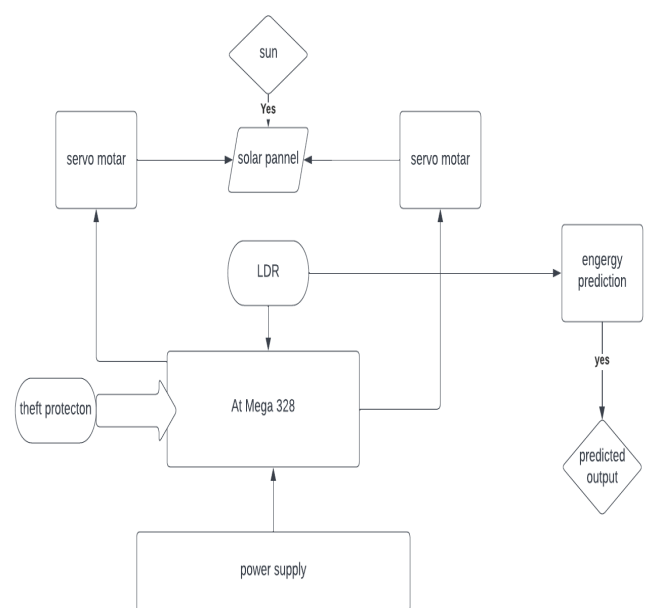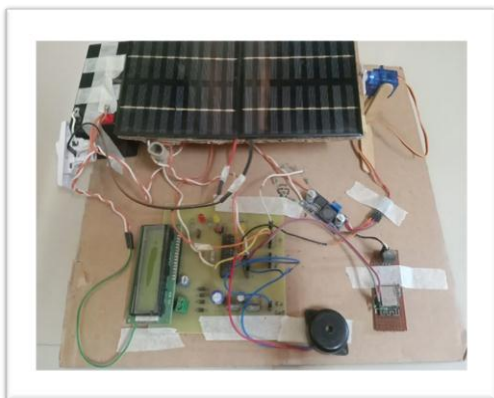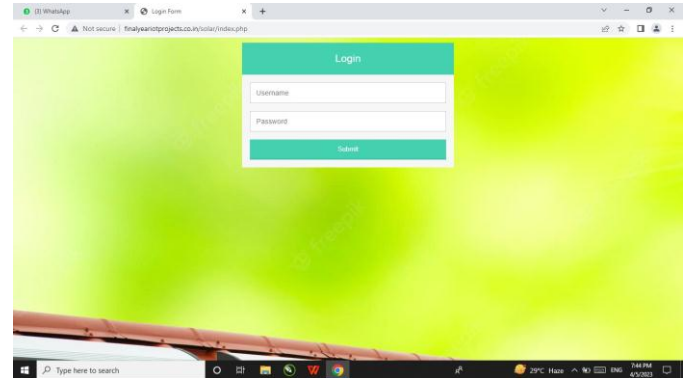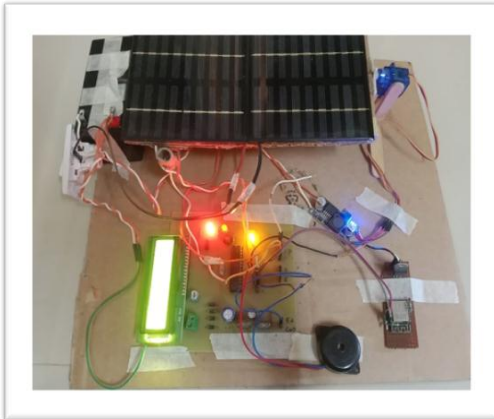

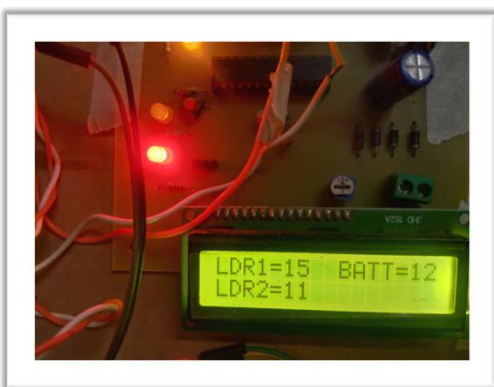*Fig. 3.2 System Design Flowchart*

4. IMPLEMENTATION FOR ENERGY PREDICTION

4.1 Working

1. Hardware

2. Software

I. Login page-
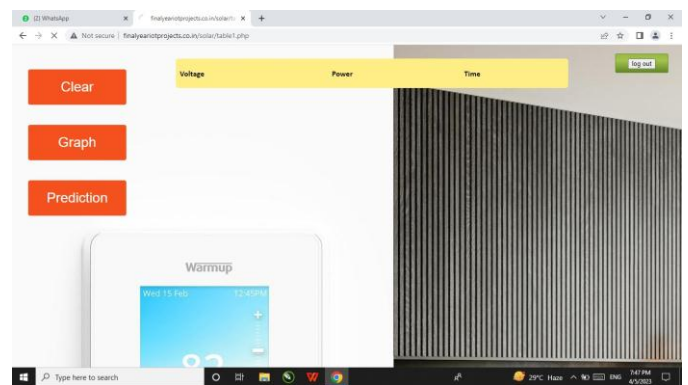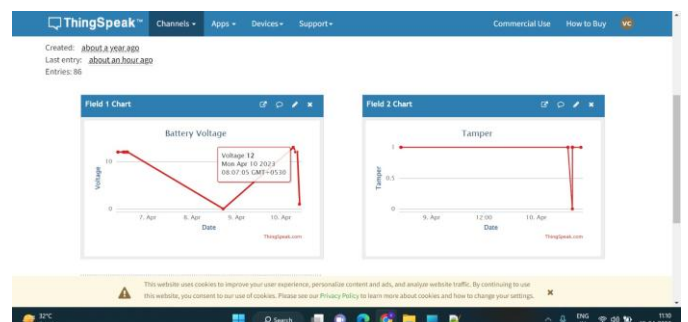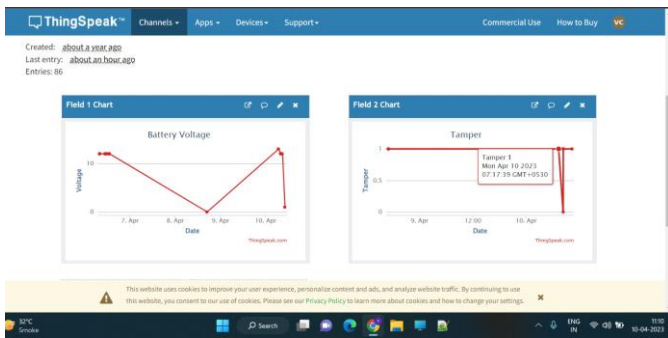

II. Home page-
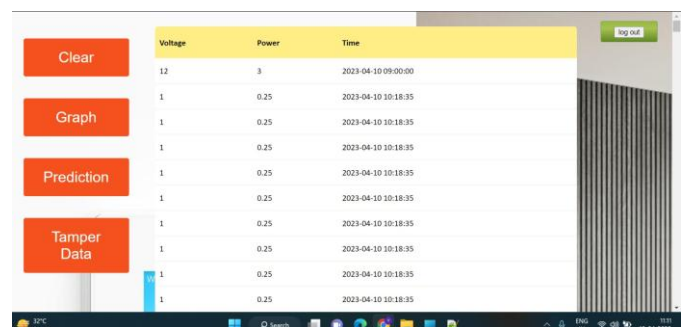
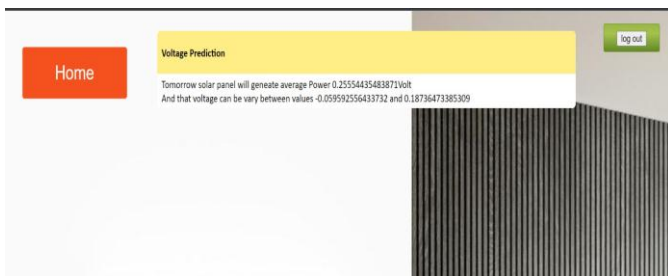III. When click clear button-

IV. Graph-

V. Prediction-

5. CONCLUSION

Today, in the world of rampant productivity, energy is the fundamental source upon which the whole civilization is based upon. As it is said that energy can neither be created nor be destroyed and, in that response, it can be signified that it can somehow be stored. The attempt towards making such goal substantiated, this project has been endeavored towards unravelling the path of such objectivity. It is quite natural that constant utilization of energies somehow opens the door of scarcity as per as earthly sources are concerned. Sun, in the stand of which, the tallest source, spiked over for age's right from the origin of the whole universe, through which life has been conceived, is the basic and the mother source of all the energies. Considering the very fundamental from the viewpoint of storing such energy, the project has been unrevealed. Energies other than from the Sun, are the process from which such are been produced through the burning of various materials, involving emission of a large amount of pollution, causing the environment and the atmosphere sick day by day.

6. FUTURE SCOPE

This project is focused to design and build the prototype of solar tracking system that would be a starting point to build therealistic solar tracking system. Therefore, this prototype will cover the scope as followed. Move 30° each and total movement that this system can do is 180°.Using microcontroller at mega328 Using Servo motor. Using Light Dependent Resistor (LDR)or Photoresistor as a sensor. Using 6 sensors (photoresistor) to detect and compare the solar intensity of light. Using LCD to show the direction/angle of solar panel.

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