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Charging E-Vehicle by Using Solar Panel Based on Atmel Microcontroller

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ABSTRACT

Our project involves using a solar panel to charge an electric vehicle module. An IOT device is used to monitor the power availability, and an MPPT (maximum power point tracking) controller is used to track the solar panel's maximum output. The entire system is linked to an Arduino microprocessor, and an LCD displays the battery level as well as information on how much battery is generated and distributed. To receive an alarm message for any systemic power decrease, a GSM modem is employed. The quantity of power supplied to the charging module, the availability of the charging station location, and the availability status of the charge are all presented on a web page. This project's major goal is to cut back on fossil fuel use and greenhouse gas emissions.

1. INTRODUCTION

Rising fossil fuel and burning fuel such as coal, global warming and severe weather conditions have compelled many nations to look for alternative sources to reduce reliance on fossil based fuels. Solar energy is one of the most promising renewable sources that is currently being used worldwide to contribute for meeting rising demands of electric power.

Solar Panels are a form of active solar power, a term that describes how solar panels make use of the sun's energy: solar panels harvest sunlight and actively convert it to electricity. Solar Cells, or photovoltaic cells, are arranged in a grid-like pattern on the surface of the solar panel. Solar panels are typically constructed with crystalline silicon, which is used in other industries (such as the microprocessor industry), and the more expensive gallium arsenide, which is produced exclusively for use in photovoltaic (solar) cells.

This project are focus on measure the solar power using Arduino [10]. This design project are to measured parameters: light intensity, voltage and current and temperature using multiple sensor. The main part in this project are the solar panel, the light sensor, the temperature sensor, a voltage divider, the current sensor and the LCD screen to display.

2. LITEATURE SURVEY

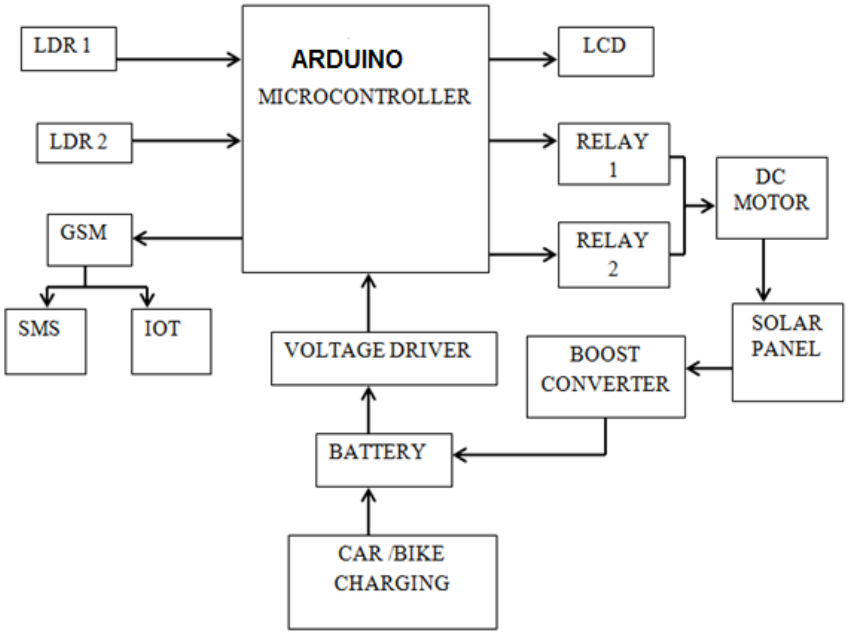
[1] Rasika Vishal Pujari et. al (2018) These parameters as the input value for the Arduino and the output was display at the Liquid Crystal Display (LCD) screen. The LCD screen display output of the temperature, the light intensity, the voltage and the current value. The purpose of Arduino to convert the analog input of parameter to the digital output and display via LCD screen. Other than that, this project also involve with a design to ensure that device case are easy to be carry around.

[2]Arindam Bose et. al (2016) A solar tracking system is a generic term used to describe devices that orient various payloads toward the sun. Payloads can be photovoltaic panels, reflectors, lenses or other optical devices. This paper describes a potential solar system using two stepper motors, light sensor and a concave mirror. This method not only improves power collection efficiency by about 65% by developing a system that tracks the sun to keep the solar panel at perpendicular to its rays but also decreases the overall cost of production. This solar tracking system is designed, practically implemented and experimentally tested,

[3] P.P. Ray et. al (2017) Internet of Things (IoT) envisages overall merging of several “things” while utilizing internet as the backbone of the communication system to establish a smart interaction between people and surrounding objects. Cloud, being the crucial component of IoT, provides valuable application specific services in many application domains. A number of IoT cloud providers are currently emerging into the market to leverage suitable and specific IoT based services.

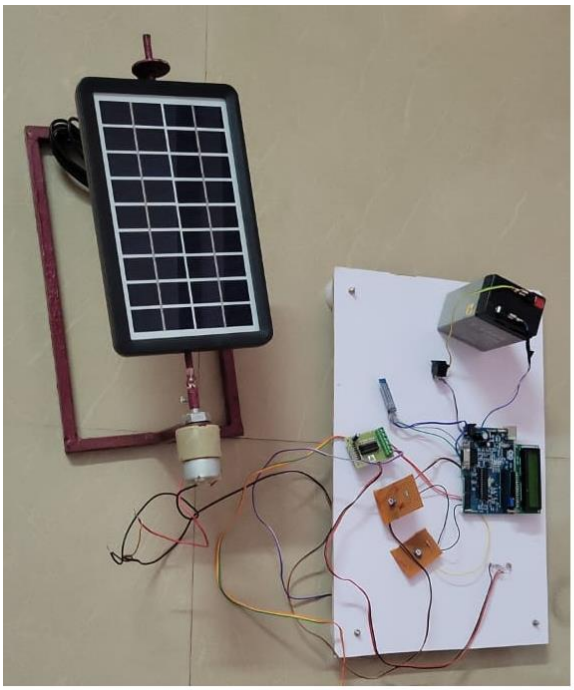
3. PROPOSED SYSTEM

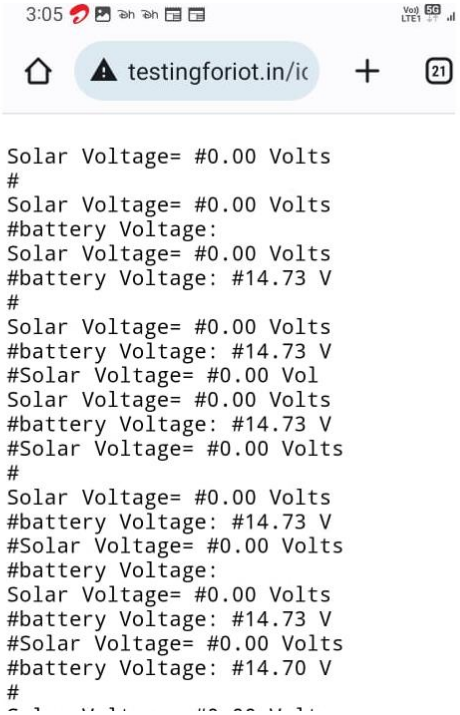
This proposed presents the process of solar tracking with the help of LDR sensors and attains maximum efficiency. Sensor unit sends information to the microcontroller which controls the speed and direction of the dc gear motor attached to the solar panel. The solar energy stored in the battery and electric supply given to the load. If there is any detect in a particular solar cell it will send information to the microcontroller through voltage sensor which send the message to the LCD. share the information through IoT.



4. WORKING PRINCIPLE

The designed project measures different solar cell parameters like light intensity, voltage, current and temperature by using multiple sensor data acquisition. The project uses a solar panel to monitor sunlight and Arduino board which has ATmega family microcontroller attached to it. The project requires an LDR sensor for measuring light intensity, a voltage divider to measure voltage and a temperature sensor to measure the temperature. These measurements are then displayed by the microcontroller to a LCD screen. Thus this system allows user to effectively monitor solar parameters using this system Single axis trackers: -single axis solar trackers can either have a horizontal or a vertical axle. The horizontal type is used in tropical regions where the sun gets very high at noon, but the days are short.. Illustrates the Experimental setup of a solar power monitoring system based on IoT. This setup includes a HC-05 microcontroller, Sensors such as a Current sensor module, a Battery Charger module, a Battery, an LDR, adigital temperature sensor, and a solar panel that measures parameters.The Node MCU is responsible for live streaming current, voltage, power, light intensity, and temperature, as well as sending sensor data to the server via the Wi-Fi module. The sensors are connected to the microcontroller (Node MCU), which is powered by an external power supply.The values of the sensors are read by NodeMCU, and the data is sent to the cloud server by this microcontroller. Extra power will be stored in the battery for later use via the Battery Charger Module. As a result, the user can monitor the above- mentioned parameter. The practical circuit setup of the proposed system





5. CONCLUSION

Implementing Renewable Energy technologies is one recommended way of reducing the environmental impact. Because of frequent power cut it is important to use renewable energy and monitoring it. Monitoring guides the user in analysis of renewable energy usage. This system is cost effective. The system efficiency is about 95%.This enables the efficient use of renewable energy. Thus it is reducing the electricity issues.

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