E-Vehicle Charging Station Using PV Cells With IOT

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Abstract

Conventional energies like coal, natural gas, oil, solar power etc used by many researchers to design and develop the some electrical systems. The main objective of this paper is to build up a module which gives the force from sun powered PV cells to the e-vehicle charging station where the power is stored and e-vehicles are recharged through this. The whole system is monitored using the IOT. The most extreme measure of intensity is produced by utilizing the sunlight based PV cells. The greatest force accessible is checked by the IOT gadget, and the most extreme force created by the sun based PV cells is followed by utilizing MPPT controller. This entire arrangement is associated with the arduino UNO R3, the power generated, battery level, power distributed is viewed by using an LCD. If the power reduction occurred in the system, the GSM modem is utilized to get an alarm message.A webpage is used to check the location of charging station availability of charge and the measure of intensity moved to the charging module. The fundamental reason for this paper is to decrease the fossil fuel and greenhouse gas emission.

Keywords: *Solar panel, Light Dependent resistor (LDR), MPPT Solar Charge controller, Arduino UNO, Battery, Servo Motor.*

1. Introduction

Now days, the demands of conventional energies like coal, natural gas, oil etc is increased. because of this the researchers are attracted towards the design and development of renewable resources. In last few years, there is lots of increase and decrease in the prices of petro and fossil fuels. The more and more discussions around regarding the petrol and fossil fuel prices welcomed the emphasis of specialists on to interchange drive train advances. In 1800s electric vehicle had driven out. Robert Anderson, a British scientist presents first unrefined electric carriage. The potential for elective innovations in cars, for example, electric-vehicle (e-vehicle), which is first effectively found by William Morrison, a scientific expert in the US. This electric vehicle was designed for six-passengers and which is capable to reach the speed of 14 miles for each hour. In upcoming years we will find more solar

energy based e-vehicles due to the following causes: 1) Decrease of outflow of petroleum and non-renewable energy source to separate the force from inexhaustible assets like solar energy. 2) Brilliant consistence to electronic necessities that support the checking and observing the utilized and accessible force utilizing IOT. 3) Sun's radiation following all through a period through light dependent resister (LDR) [1]. The electric vehicles draw the current from the rechargeable battery, which is charged using the charging station [9]. The following are the kinds of electric-vehicles: Half breed electric vehicle (HBEV), Plug-in cross breed vehicle (PCBEV), Battery electric vehicle (BEV) and Extended territory electric vehicle (ETEV) [1]. The principle target of this venture is to produce the force from sun powered PV cell and move it to the charging station, where the power is stored[6]. From this charging station the electric vehicles can be charged using rechargeable battery. The accessibility status of intensity in charging station can be checked whenever required utilizing the IOT.

2. Conventional Method

The e-vehicle charging method using EV cells is become controversial just because of the uncertainty of the required power, charging time and the location. The time required to charge the battery can be reported in the next developments.

Jose P. Martins et al. propounded a reporting system in case of e-vehicle charging module use the solar panel. In this module the e-vehicles are charged by using the solar power and a mobile app is used to handle the user authentication process to initialize the EV charging process. But the presence of charging station in congested areas and not analyzing the voltage level of charging battery. Hence in this proposed module for the proper authentication of user to the charging station the RFID is used and the information like location, power level, time required to charging the vehicle battery all are uploaded to the webpage for user access.

3. System Description

The system description of this proposed methodology is as presented in the following figure 1.

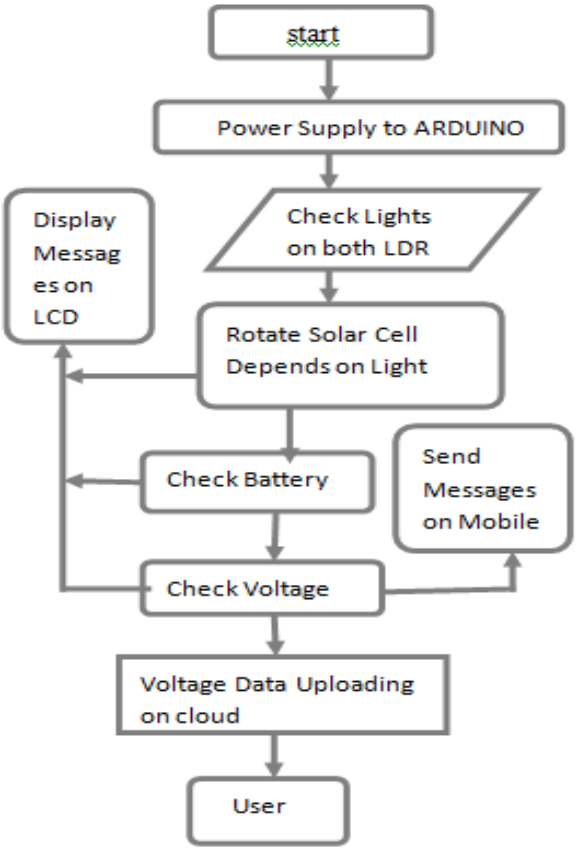

Figure.1: Schematic diagram of system architecture

4. Proposed System

In this proposed system the microcontroller Arduino uno is powered by the DC supply. The Solar panel is made up of PV cells, these cells are acts like a semiconductor gadget this ingests the vitality when the sun powered radiation hits the gadget [1]. As per the atmosphere, in day and night the precise situation of the sun is changes. The LDR (Light Dependent Resistor) is utilized to detect the nearness of light and a servo engine is associated with the two LDRs, LDR left and LDR right. The servo engine pivots the sunlight based board towards the course of daylight. The LDR is also called as the photo resistor, light sensitive device. The electric resistance of the light dependent resistor is relies upon the force of the light which is falling on it.

Arduino UNO R3 is a sort of microcontroller board. This depends on the ATmega328. It comprise of 14 computerized input/yield pins with 16MHZ precious stone oscillator. The operating voltage of Arduino UNO R3 is about 32KB and RAM is 2KB, where as EEPROM is 1KB. The 16X2 LCD display is utilized to show the status of the e-vehicle charging station

like availability of power and value of LDR [9]. Here the signal-conditioner controls the simple sign so that it meets the necessities of the following stage. It pick ups the sign and convert it into a more elevated level of electric signals. The RFID is used for the automatic identification and data capture [7].

A dc-dc converter is an electromechanical gadget or electronic circuit, this translates the immediate current (DC current) from one voltage level to the other voltage level. Here this acts as an electric power converter. The figure 2 presents the schematic block diagram of the proposed system.

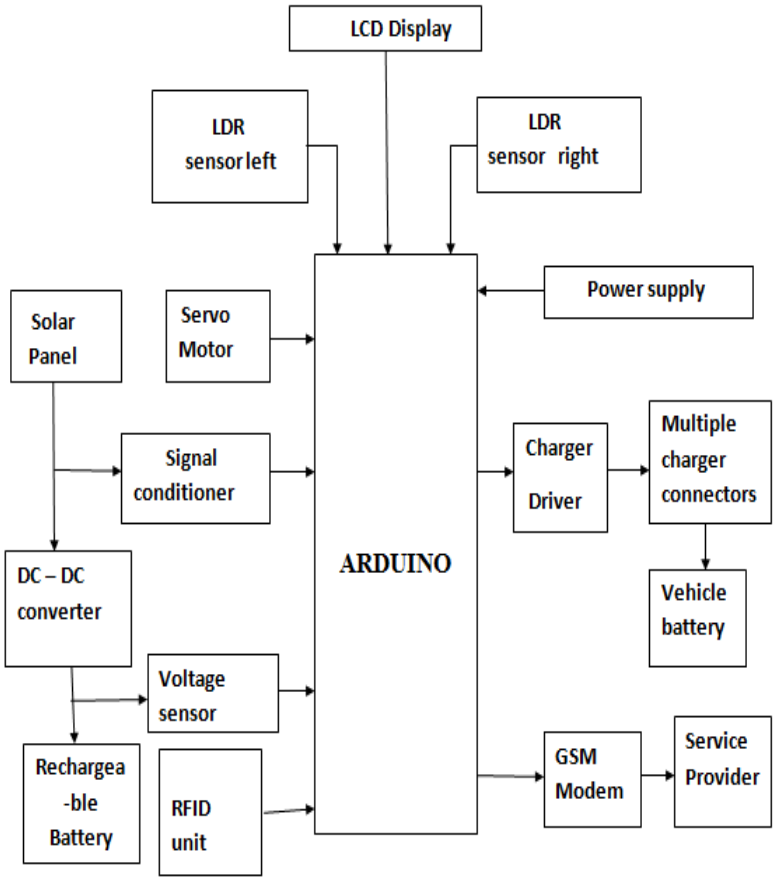

Figure.2: Schematic block diagram of proposed system

5. Result And Discussion

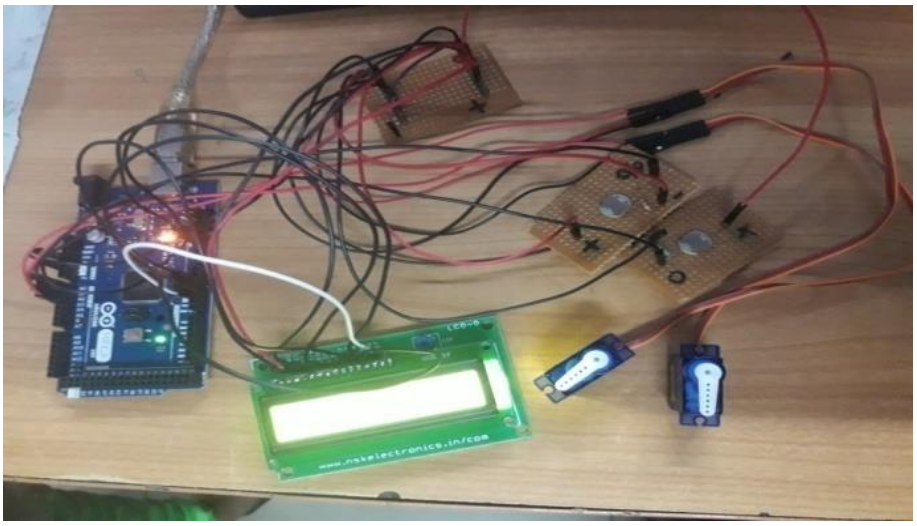

Figure.3: Experimental structure of LDR.

Figure.4: Output of LCD display

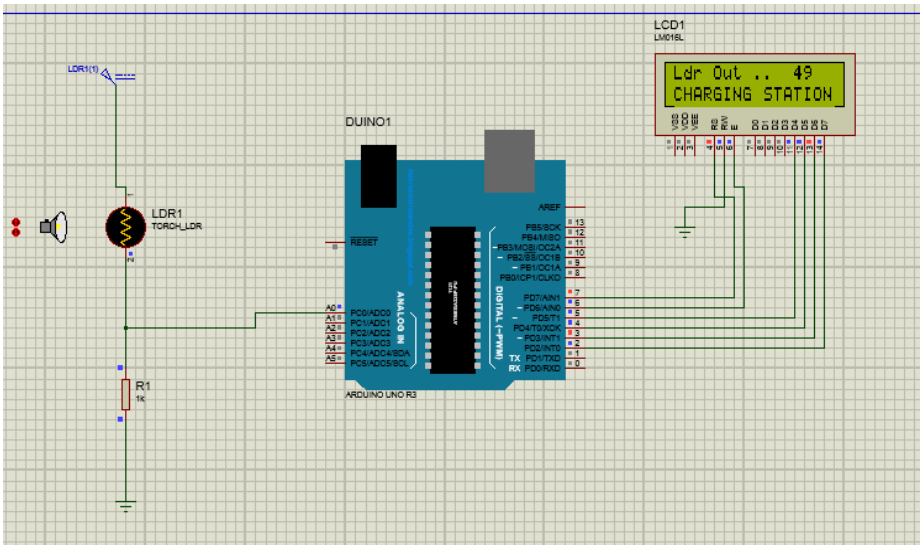

Figure.5: Proteus simulation for LDR and LCD

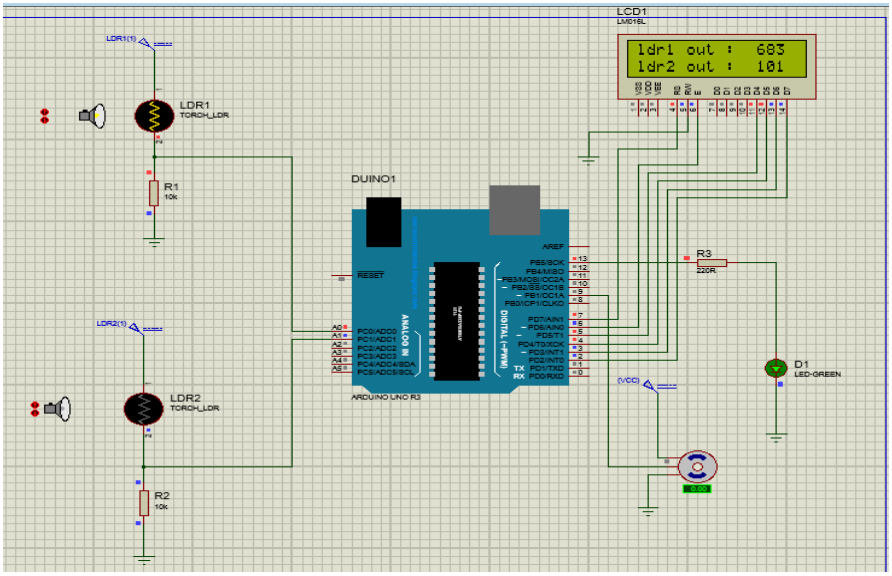

Figure.6: proteus simulation for LDR with servo motor for solar panel tracking

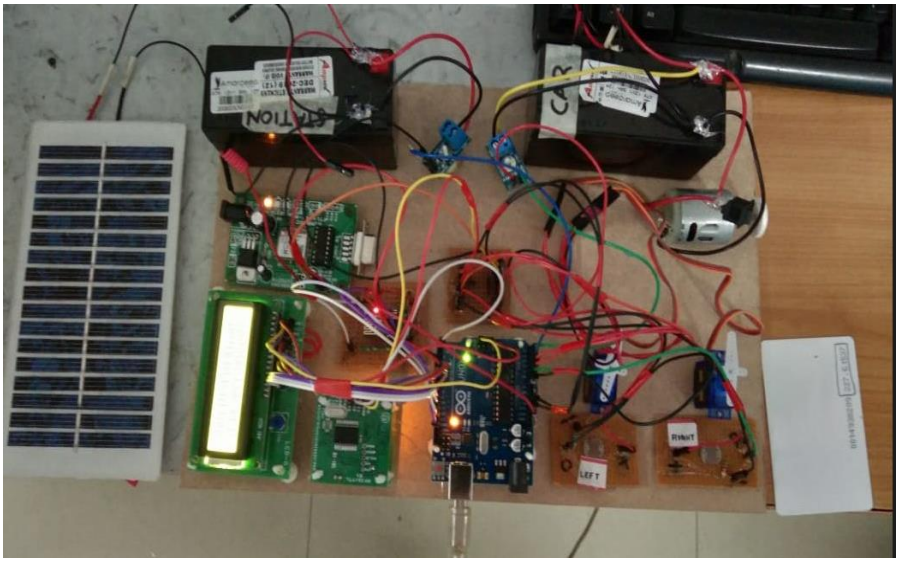

Figure.7: experimental structure of the e-vehicle charging station.

As a sun oriented board PV cells assumes significant job in this task, to follow the situation for creating power from the source this model simply uses the torches with LDR sensor. Since the inclining edge of sun is between 0 to 180o, two sensors are used for both right and left side. From the solar PV cell the electric source is collected and transferred to the converter which stabilizes the power. The LCD shows the output of every operation. The LCD also displays the tilting position of the solar panel. The RFID is used to authenticate the user [9,10].

6. Conclusion

In this paper we have shown the module for the e-vehicle charging station with IOT using PV cells of solar panel. This paper centers around the IOT to screen the accessibility status of intensity in the e-vehicle charging station. The IOT created here utilizations a cloud stage for the executives of data like power generated, power stored and location tracking of charging station. The e-vehicle client can have the option to check the location of charging station. The information dumped in the Arduino can stay until the charging station neglects to recharge.

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