Wireless solar EV charging station

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Abstract: The industry is rapidly transforming from an IC engine vehicle to an electric vehicle. The demand for an electric vehicle is increasing, these lead to an increase in charging station as well. In this project, a wireless charging system is used to charge the vehicle wirelessly via inductive coupling.

We just simply need to park the car on the charging spot. The transmission of electrical energy from source to load from a distance without any conducting wire or cables is called Wireless Power Transmission. The system checks if the person has sufficient balance and then deduct the charging charges and update the balance. The Internet of Things describes the network of physical objects that uses sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems.

Keywords: : Electrical energy, IOT, Android app, Electric Vehicle (EV), Electric Vehicle Supply Equipment (EVSE)

I.INTRODUCTION

Energy in the form of electricity plays a very important role in the life of a normal man. Electricity is one of the greatest wonders of science. Next to man, it is the most important and revolutionary creation in this world of ours. It has practically revolutionized the world .

The gradual but excessive use of electricity has come to bring about stupendous changes in industry. With it our modern gigantic tools are worked. Computers as also calculators sum up totals and make other calculations with the utmost accuracy. Newspapers and books are printed in millions overnight. There is not a single phase of human life that is not indebted to electricity for its progress .The modern age has, therefore, been truly called the "age of electricity."

We do many things with electricity now days. We warm our homes, we drive the machines in factories, and we run our trains and buses. Electricity has completely revolutionized the methods of travel and transport .It has enabled us to travel in aero planes and fly into cold atmosphere of the sky. We also have electric trains in our country.

The infrastructure element that provides the crucial link between an Electric Vehicle (EV) with a depleted battery and the electrical source that will recharge those batteries is the Electric Vehicle Supply Equipment or EVSE. This report provides a review of the current and emerging EVSE technologies and an assessment of the common codes and standards associated with EVSE. The report also evaluates the barriers and challenges of deploying an expanded

An electrical vehicle battery recharging system composed of a set of photovoltaic solar panels connected to the electrical power grid. Thus, the energy generated by the solar panels is preferably used to recharge the electrical vehicle where the generated energy is injected into the power grid. In things where the generation of energy by the panels is but the demand of the electrical vehicle, the grid complements the specified energy.

An electrical vehicle battery recharging system composed of photovoltaic solar panel connected to the electrical power grid. With the help of Solar panel, energy will be stored into the battery. When vehicle is parked at the charging station, vehicle battery will be charged by charging station battery.

After full charging the supply will be cutoff by the relay. Also using NODE MCU, Battery voltage will be continuously monitored on android application through Wi-Fi. LDC is used to display battery voltage and percentage of battery charge.

II.. LITERATURE SURVEY

SR No.	Author Name	Paper Name	Publication Name	Description
1	Shaikh Arbaz, Nayna Dahatonde, Nagori Meeran, Shirgaonkar Zimad, Shaikh Maseera	Electric Vehicle Charging System using Wireless Power Transmission, IoT and Sensors	International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 07 Issue: 05 May 2020	In this paper, a wireless charging system is used to charge the vehicle wirelessly via inductive coupling. The transmission of electrical energy from source to load from a distance without any conducting wire or cables is called Wireless Power Transmission.
2	Zaw Min Min Htun, Htay Win Mar	Wireless Mobile Charger Design Based on Inductive Coupling	International Journal of Trend in Scientific Research and Development (IJTSRD), e-ISSN: 2456 – 6470 Volume 3 Issue 5, August 2019	In this paper, authors have been proposed wireless charging system by using inductive coupling. There was a growing market to construct the wireless charging system in the various kinds of electronic devices.
3	Ashwini Jayawant, Swati Zope	A Review Paper on Wireless charging of mobile phones	International Journal of Engineering Research & Technology (IJERT) IJERT www.ijert.org ICONECT' 14 Conference Proceedings	In this paper two methods for wireless charging of mobile phones are studied. Nowadays Mobile communication not only restricted for voice transmission but also used for various multimedia applications like transfer of text, images, videos, playing games etc
4	Stephen Lee, Srinivasan Iyengar	Shared Solar-powered EV Charging Stations	Feasibility and Benefits" 2016 IEEE	In this paper, we explored the benefits of integrating renewable solar energy with EV charginginfrastructure placed at car-sharing service's parking lot. We formulated a Linear Programming approach that maximized both solar energy utilization and customer satisfaction.

III.PROPOSED SYSTEM

We live in a world of technological advancement. New technologies emerge each and every day to make our life simpler. Despite all these, we still rely on the classical and conventional wire system to charge our everyday electronic gadgets. The conventional wire system creates a mess when it comes to charging several electric vehicles simultaneously. It also takes up a lot of electric sockets at the charging port.
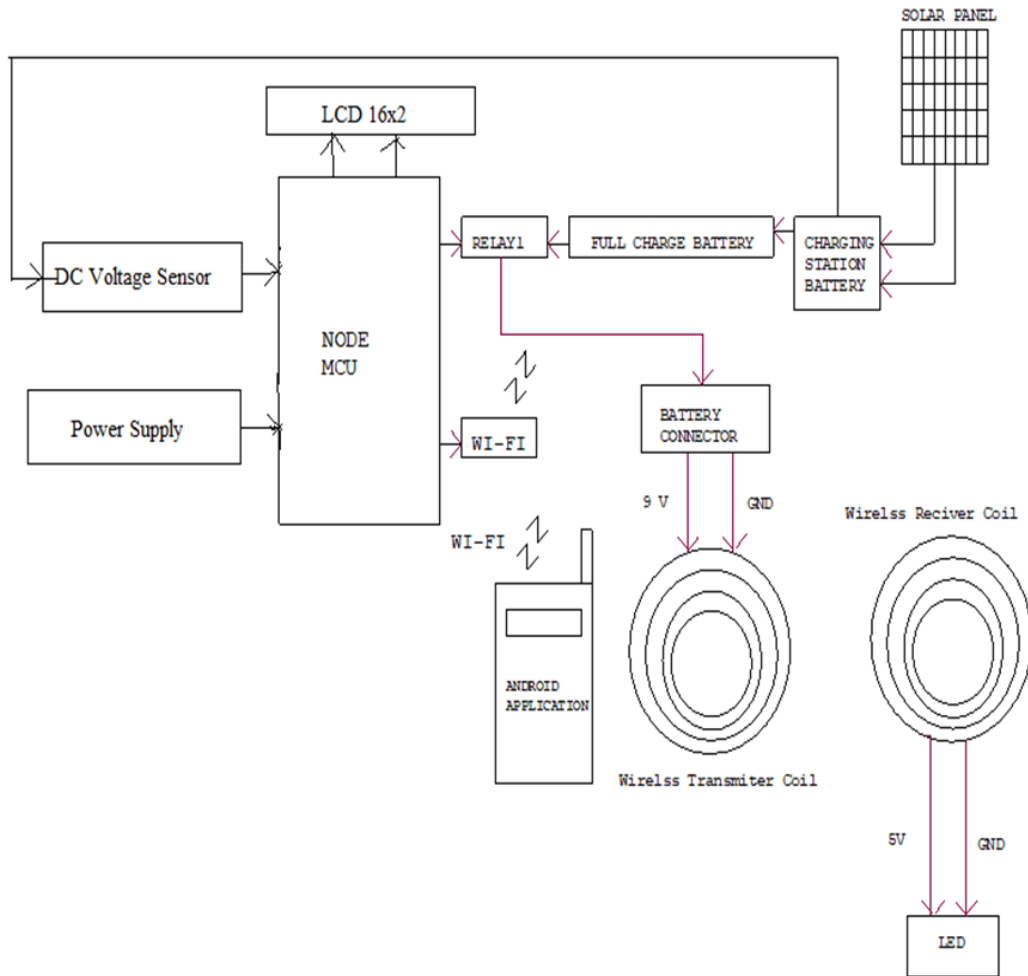
IV.SYSTEM ARCHITECTURE

Fig 1 Block diagram

In this project, we are going to develop a system using IoT based technology and renewable energy source i.e. solar energy. Whole system will be operated on 12 V supply using battery. Battery will be charged by solar panel. We will be using Node MCU microcontroller for interfacing Voltage sensor and to monitor voltage level.

Voltage sensor gives analog output to Arduino UNO. This controller converts Analog signal into digital form and provides it to LCD and Node MCU. Percentage of battery will be displayed on LCD 16X2. For wireless power transfer, we are using transmitter and receiver coil. The distance between these two coils is less than 5 mm so we get the voltage 5 volt. The transmitter coil requires 9 volt DC supply and at the end of receiver coil, we get the 5 volt supply.

We can have customized control from Android App to ON and OFF the relay for charging the battery with time. If the Relay is OFF then it will turn OFF the transmitter coil supply 9 Volt. If the relay is ON then it will turn ON the wireless transmitter coil supply 9 Volt. So it will save the battery power with the help of Android application and also will increase the battery life because timer function is available in Android application. It provides fully customized and dynamic setting to ON and OFF the relay for EV and mobile charger on time as per battery charging requirement.

V.SYSTEM REQUIREMENTS

1. User Interfaces

   For user interface, either use can used android application or web application.

2. Hardware Interfaces

  We will interface Node MCU controller with LCD 16x2, DHT11 sensor, moisture sensor, relay, DC pump motor, voice module and MIC. We will interface all components with arduino microcontroller. To provide 5V DC supply. We used transformer and rectifier circuit at the input side of project.

3. Software Interfaces

  We have chosen windows 7 operating system for its best support and user friendliness. To implement the project we used Arduino IDE, Altium and OrCAD software.

4. Communication Interfaces

  We are using simple software and hardware in this project communication between microcontroller and devices can be easily controlled by Android application connecting with Wi-Fi.

VI.ACKNOWLEDGMENT

VII. CONCLUSION

We have successfully studied interfacing of LCD and Voltage sensor with Node MCU microcontroller. We have designed a prototype model for the implementation of EV charging station. The use of hardware and software along with the android app also will be studied. For mobile charging, the interfacing of relay through converter module is done which is very effective wireless mode of charging. Using Node MCU microcontroller having in-built Wi-Fi technology, a project has developed in Blynk app for monitoring and controlling charging of EV and mobile battery as well.

REFERENCES

[1] Shaikh Arbaz, Nayna Dahatonde, Nagori Meeran, Shirgaonkar Zimad, Shaikh Maseera, "Electric Vehicle Charging System using Wireless Power Transmission, IoT and Sensors", International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 07 Issue: 05 May 2020

[2] Zaw Min Min Htun, Htay Win Mar, "Wireless Mobile Charger Design Based on Inductive Coupling", International Journal of Trend in Scientific Research and Development (IJTSRD), e-ISSN: 2456 – 6470 Volume 3 Issue 5, August 2019

[3] Ashwini Jayawant, Swati Zope, "A Review Paper on Wireless charging of mobile phones", International Journal of Engineering Research & Technology (IJERT) IJERT www.ijert.org ICONECT' 14 Conference Proceedings

[4] Stephen Lee, Srinivasan Iyengar, David Irwin, Prashant Shenoy, "Shared Solar-powered EV Charging Stations: Feasibility and Benefits" 2016 IEEE

[5] G.R. Chandra Mouli, P. Bauer , M. Zeman, "System design for a solar powered electric vehicle charging station for workplaces" ELSEVIER http://dx.doi.org/10.1016/j.apenergy.2016.01.110