

Wireless Electric Vehicle Charging Robot (Movable Charging Station)

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Abstract - With the rising number of electric and hybrid vehicles the demand for customer-friendly and innovative solutions for the charging infrastructure is growing steadily. Furthermore, future autonomous driving and parking vehicles are calling for new approaches regarding to battery charging. Nowadays electric vehicles have to be charged by hand. Usually, electric vehicle systems are based on various modules that should ensure the high power and stability of the vehicle on the track. The majority of these components are linked to the charging mechanism. In this regard, dynamic wireless power transfer is a practical method to solve electric vehicle range anxiety and reduce the cost of onboard batteries. Wireless recharging has long been common with pure electric vehicles and is designed to allow charging even when the vehicle is in motion. In other words, someone has to connect the charging cable with the charging socket of the vehicle. This paper deals with automated charging systems for electric vehicles. As worlds resources are diminishing, govt. agencies and nongovernment organization are pushing greener solution through the use of renewable energy sources, as electric power must become less dependent on fossils fuel and transportation must become more electric to decrease carbon emission and mitigate climate change. Hence in order to reduce the pollution through the motor vehicles, electric vehicles are being invented and in order to run the electric vehicle the fuel required is the electricity which can be storable through the use of solar energy and run these electric vehicles through the electric vehicle smart charging station which is the promising alternative and environmentally sustainable solution to meet up to the energy crisis.

Keywords: Wireless Electric Vehicle, Charging Robot, Movable Charging Station.

I. INTRODUCTION

The demand for energy is increasing due to the increase in population and the economic conditions of many countries. Recent research works reported that fossil fuels have limitations such as global warming, limited resources and economical issues. The energy crisis is expected in the near future and the utilization of renewable energy is to be explored

to the maximum possible extent to overcome the problems that arise out from fossil fuels. Many researchers suggested the use of renewable energies considering many environmental aspects. Renewable energy such as solar energy can be an effective alternative in terms of its availability, cost-effectiveness and environmental friendliness. Electric vehicle smart charging station which is the promising alternative and environmentally sustainable solution to meet up the energy crisis. As worlds resources are diminishing, govt. agencies and nongovernment organization are pushing greener solution through the use of renewable energy sources, as electric power must become less dependent on fossils fuel and transportation must become more electric to decrease carbon emission and mitigate climate change. Hence in order to reduce the pollution through the motor vehicles, electric vehicles are being invented and in order to run the electric vehicle the fuel required is the electricity which can be storable through the use of solar energy and run these electric vehicles through the electric vehicle smart charging station which is the promising alternative and environmentally sustainable solution to meet up to the energy crisis.

Problem definition: The demand for energy is increasing due to the increase in population and the economic conditions of many countries. Recent research works reported that fossil fuels have limitations such as global warming, limited resources and economical issues. The energy crisis is expected in the near future and the utilization of renewable energy is to be explored to the maximum possible extent to overcome the problems that arise out from fossil fuels. Many researchers suggested the use of renewable energies considering many environmental aspects. Renewable energy such as solar energy can be an effective alternative in terms of its availability, cost-effectiveness and environmental friendliness. Electric vehicles are going to be the future transport. In order to increase the efficiency of the charging station and to reduce the charging time we made the charging station by utilizing the renewable and non-renewable energy to increase it's efficiency and with fast charging technology through wired or wireless modes to reduce the charging time. The charging station should mobile and should have a separate battery pack from which the electric vehicles are to be charged by using DC to DC rapid charging technology through wired connection or wirelessly.

II. METHODOLOGY

Solar charging for electrical vehicles is a basic and viable application of using solar energy to achieve sustainable energy development. The solar charging is based on the utilization of solar PV panels for converting solar energy to DC voltage. The DC voltage can be stored in the battery bank by a charge controller. An inverter is employed to convert the DC voltage from the battery bank to 110 volt AC at 60 Hz frequency that is identical to the power from the electric outlet. This paper will address the fundamental concepts of designing and developing solar PV systems for charging electrical vehicles.

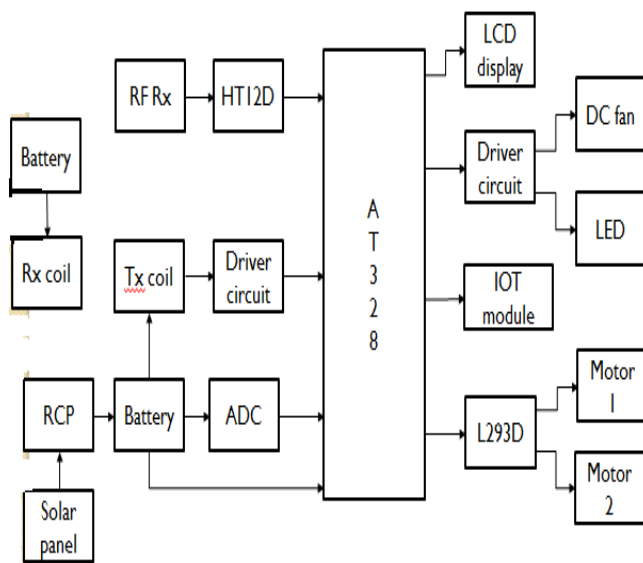


Figure 1: Block diagram of proposed

In this project Solar charging for electrical vehicles is a basic and viable application of using solar energy to achieve sustainable energy development. The solar charging is based on the utilization of solar PV panels for converting solar energy to DC voltage. We used IOT module to store Battery voltage and current on thing speak. When battery is charging we activate buzzer and led as indication for showing charging is on battery charging using WPT (Wireless Power Transfer) system. We display Battery voltage on LCD display. User can easily recognize battery is low or not. We move car using RF wireless network for moving station system. Four switches use for four different rotation like forward, backward, Left, Right etc. Car move using DC motor we pass signal To motor using L293D Motor Driver circuit through At-mega 328. This project uses power supplies, one is regulated 5V for modules and other one is 3.3V for At-mega 328 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.

III. RESULTS AND CONCLUSION

The development of the Solar Charging system for electrical vehicles project comprised of various disciplines like electrical, electronics, and mechanical engineering technologies. This project attempted to provide a framework for the design and development of a solar charging. The proposed solar charging system will be one of the initiatives taken to achieve a Green campus. The design considerations and calculation for various components are presented in detail. The economic analysis of the proposed system reveals that the payback period of the project is 3.5 years. It is clearly evident that the proposed solar-based vehicle charging system is better than the existing electrical charging system both in terms of operation and economical aspects. Researchers work on this project get a basic idea of the design and building of Solar PV systems for several useful applications such as electrical vehicle system.

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