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AUTO CHARGING OF ELECTRIC VEHICLE BY USING SOLAR TRACKER

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Abstract: This paper describes the design of solar powered charging station for charging of electric vehicle describes design of solar powered charging station for charging of electric vehicle that solves the key downside of fuel and pollution. Electric vehicles have now hit the road worldwide and are slowly growing in numbers. Apart from environmental benefits electric vehicles have also proven helpful in reducing cost of travel by replacing fuel by electricity which is way cheaper. Well here we develop an EV charging system that solves with a unique innovative solution. This EV charging of vehicles without any wires, No need of stop for charging, vehicle charges while moving, Solar power for keeping the charging system going, No external power supply needed. The system makes use of a solar panel, battery, transformer, regulator circuitry, copper coils, AC to DC converter, atmega controller and LCD display to develop the system. The system demonstrates how electric vehicles can be charged while moving on the road, eliminating the need to stop for charging. Thus, the system demonstrates a solar powered wireless charging system for electric vehicles that can be integrated in the road.

Keywords **- AT-mega controller, Servo Motor, LCD Display, Solar tracker, Vehicle Body.**

I. INTRODUCTION

Electric vehicles have now hit the road worldwide and are slowly growing in numbers. Apart from environmental benefits electric vehicles have also proven helpful in reducing cost of travel by replacing fuel by electricity which is way cheaper.

This EV charging system delivers following benefits:

[1] Wireless charging of vehicles without any wires.

[2] No need to stop for charging, vehicle charges while moving.

[3] Solar power for keeping the charging system going.

[4] No external power supply needed.

[5] Coils integrated in road to avoid wear and tear.

The system makes use of a solar panel, battery, transformer, regulator circuitry, copper coils, AC to DC converter, AT-mega controller and LCD display to develop the system. The system demonstrates how electric vehicles can be charged while moving on road, eliminating the need to stop for charging.The solar panel is used to power the battery through a charge controller. The battery is charged and stores dc power. The DC power now needs to be converted to AC for transmission. For this purpose we here use a transformer.The power is converted to AC using transformer and the regulated using regulator circuitry. This power is now used to power the copper coils that are used for wireless energy transmission. A copper coil is also mounted underneath the electric vehicle.

When the vehicle is driven over the coils energy is transmitted from the transmitter coil to ev coil. Please note the energy is still DC current that is induced into this coil. Now we convert this to DC again so that it can be used charge the EV battery.

We use AC to DC conversion circuitry to convert it back to DC current. Now we also measure the input voltage using an AT-mega microcontroller and display this on an LCD display. Thus the system demonstrates a solar powered wireless charging system for electric vehicle that can be integrated in the road.

LITERATURE SURVEY

1. Chamberlain, K.;Al-Majeed, S. Standardisation of UK Electric Vehicle Charging Protocol, Payment and Charge Point Connection. *World Electr. Veh. J.* 2021. https://doi.org/10.3390/ wevj12020063
2. The objective of the paper Design and Implementation of Solar Powered Electric Vehicle for On-Campus University Applications : Ahmad F. Tazay, 2021 is to improve efficiency, reduce greenhouse emissions, and increase driving range for the EV. The designing and implementing of a supportive renewable energy source to charge the EV are presented in this manuscript.
3. The paper by R. Singh, S. Kumar, A. Gehlot, and R. Pachauri, “An imperative role of sun trackers in photovoltaic technology: a review,” Renewable and Sustainable Energy Reviews. 2018.", review study various solar tracking system methods including single-axis, dual-axis, polar-axis, open-loop, closed-loop, hybrid model, and azimuth/tilt roll mechanism were discussed and compared with existing solar tracking methods.
4. Federal Communication Commission (FCC) certified the first mid-field radio frequency (RF) transmitter of wireless power in 2017.The paper presents O. Achkari, A. El Fadar, I. Amlal, A. Haddi, M. Hamidoun, and S. Hamdoune : “A new sun-tracking approach for energy saving,” Renewable Energy. 820–835, 2021., researchers have compared the thermal energy produced at a specific solar position with the energy demanded and implemented a solar tracking system that determines the solar position.

PROBLEM STATEMENT

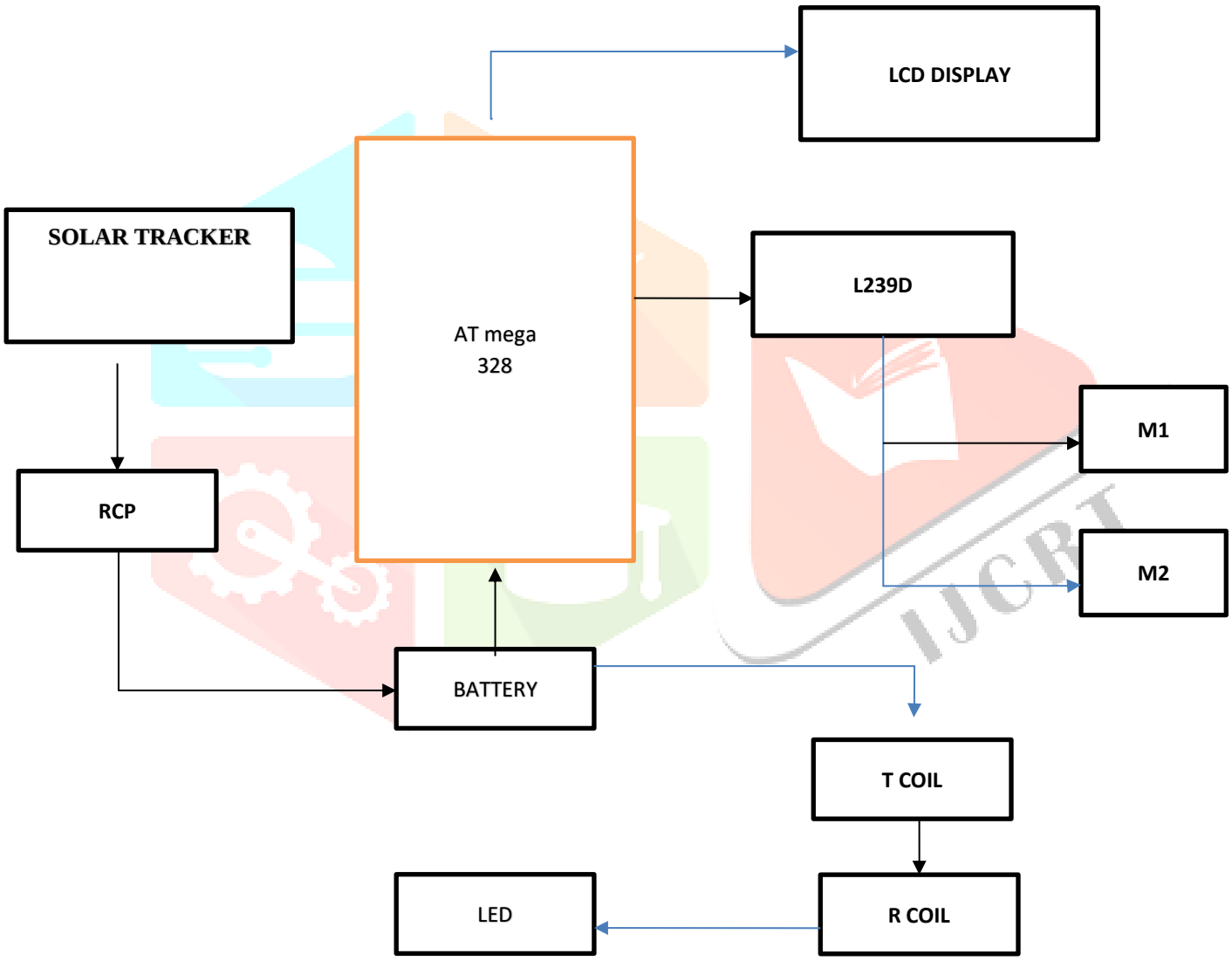
- Long charging time
- Less number of charging station

- Battery technology is expensive
- Solar panels are stationary and do not follow the movement of the sun

OBJECTIVES

- To reduce the growing costs of electricity and environmental impact of fossil fuels.
- To reduce the long charging time
- To increase the efficiency of the solar panel by using tracking system.
- To improvise the absorption of light energy for better performance of solar panel

METHODOLOGY



DESCRIPTION

Solar power has increasingly become popular over the past year. With its uncountable improvement and cost-effective ways, more and more people are opting to switch over to solar energy rather than their regular form of energy. Solar charging is based on the use of solar panels for converting light energy into electrical energy (DC). The DC voltage can be stored battery bank. There is Reverse charging protection circuit is provided for the backflow of energy from the battery to a solar panel. The transfer coil is located at charger side and receiver coil is placed on vehicle side. A wireless power transfer module (WPT) is used for

transferring electric power which is generated from the solar panel to the Electric vehicle by using the principle of Electromagnetic Induction. To measure battery voltage, a volt meter is used. The battery voltage will be measured by microcontroller & showed on a 16x2 LCD. It will also display battery low status, whenever battery voltage falls below a certain level. L239D is the motor driver which is used for movement of wheels of that vehicle.

ADVANTAGES

- Low maintenance cost due to an efficient electric motor
- Eco friendly
- Better performance
- No noise pollution
- No charging time

APPLICATIONS

- Public transportation
- Usable in areas where fuel-based vehicles are not permitted

CONCLUSION

The proposed project i.e. PV2EV is a low-cost project to cater the need for charging station on pilot basis

- Increase option for recharging
- Solar Trackers can increase the output of solar panels by **20-30%**, which improves the economics of the solar panel project.

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