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SOLAR WIRELESS ELECTRIC VEHICLE CHARGING SYSTEM

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Abstract: This project details the planning and design of a solar-powered electric vehicle charging station that solves the dual problem of expensive gasoline and harmful emissions. The number of countries where electric vehicles are on the roads continues to grow. Electric vehicles are not only environmentally friendly, but have proven to help reduce transportation costs by replacing expensive fuels with much cheaper electricity. Here, designing an electric vehicle charging infrastructure creates a novel and effective answer to this problem. Electric vehicles can be charged while driving, so there is no need to stop for charging. The system is powered by solar energy. No additional power supply required. Solar panels, batteries, transformers, regulator circuits, copper coils, AC/DC converters, atmega328P controllers and LCD displays are used to build this system. The technology is based on the idea that electric vehicles can be charged without stopping at a charging station. This technology therefore proves the feasibility of an on-road solar-powered wireless charging system for electric vehicles

Keywords: Wireless charging system, Electric vehicle, Solar power, Transmitting and receiving coil.

I. INTRODUCTION

Electric vehicles have become a new concept in the transportation sector and are expected to dominate the automobile market in the near future. In order to maintain the quality of the power grid, it is necessary to regulate the charging process of electric vehicles in this regard. Still, the widespread use of electric vehicles can backfire as significant amounts of energy are stored in batteries. Electric vehicle interactivity will be a key technology in future smart grids, contributing to grid autonomy. Declining carbon emissions and increased use of fossil fuels are making electric vehicles more competitive than conventional internal combustion engine vehicles.

Despite these drawbacks, electric vehicles have not been widely adopted in the market due to the high vehicle cost. There is a shortage of fast-charging stations and a shortage of fully electric vehicles. There are two types of electric vehicles: fully electric vehicles and partially electric vehicles. In addition to low running costs and environmental impact, electric vehicles use little or no fossil fuels. Electric vehicles will become the most important means of transportation in the future due to the increased efficiency of charging stations. A portable electric car charger was tested by utilizing renewable energy to reduce charging time. Wireless electric car chargers are a good choice for those who want to charge their electric vehicles with electricity.

Rising fossil fuel prices and decreasing CO2 emissions have made electric vehicles more cost-competitive than conventional vehicles. Electric vehicles have not been widely adopted due to limitations such as high vehicle cost. There is a shortage of fast-charging stations and a shortage of fully electric vehicles. Electric vehicles can be fully or partially powered by electricity.

Electric vehicles have fewer moving parts and less environmental impact, making them cheaper to run than gasoline vehicles. Our project system uses solar panels, batteries, transformers, control circuits, copper coils, AC-DC converters, ATM controllers and LCD displays to build systems. With this system, electric vehicles can be charged while driving, eliminating the need to stop by for charging. A charge controller connects the battery to the solar panel. Direct current is stored in a battery.

II. OBJECTIVES

The main goal of this project is to realize wireless energy transfer through inductive coupling between transmitting and receiving coils to charge the vehicle's battery. This energy allows the vehicle to travel long distances at efficient speeds and consumes less power at charging stations.

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III. APPROACH

Schematic for our project: When the sun shines, the first solar panel produces up to 12 volts. The generated voltage is passed to a bridge rectifier to stabilize the voltage. When there is enough sunlight in the environment, LDRs have high resistance and act as insulators. Direct current to the coil. On the other hand, in darkness, this LDR acts like a low resistance path, allowing current to flow through the grid or battery to the transmit coil. The battery charges and stores energy. A wireless transmitter connected to the battery sends the generated magnetic field around the coil. For transmission, the Transmitter circuit converts direct current to alternating current. This creates a magnetic field. A voltage sensor is connected to the battery to display the battery and solar power voltage. You can use Arduino UNO and 16x2 LCD to display the voltage. The receiving coil produces a magnetic field and the voltage is in AC form. It converts alternating current to direct current and stabilizes the voltage. This voltage is applied to the car battery to store and charge the energy. The LED display shows the remaining battery power. The system uses solar panels, batteries, transformers, regulator circuits, copper coils, AC-DC converters, Atmega controllers and LCD displays to develop the system. This system demonstrates how an electric vehicle can be charged while driving without having to stop for charging. A solar panel is used to power the battery via a charge controller. The battery is charged and storing DC power.

To transmit electricity, direct current must be converted to alternating current. For this purpose, we use a transformer here. Current is converted to AC using a transformer and regulated using a regulator circuit. Copper coils used for wireless energy transmission now work with this current. A copper coil is also installed under the electric car. As the vehicle drives over the coil, energy is transferred from the transmitter coil to the EV coil. Note that the energy is still direct current induced in this coil. Convert this back to direct current so you can charge your electric car battery. Convert back to DC using an AC-DC conversion circuit. It also uses an Atmega microcontroller to measure the input voltage and display it on the LCD display. This system therefore demonstrates a solar-powered wireless charging system for electric vehicles that can be integrated on the road.

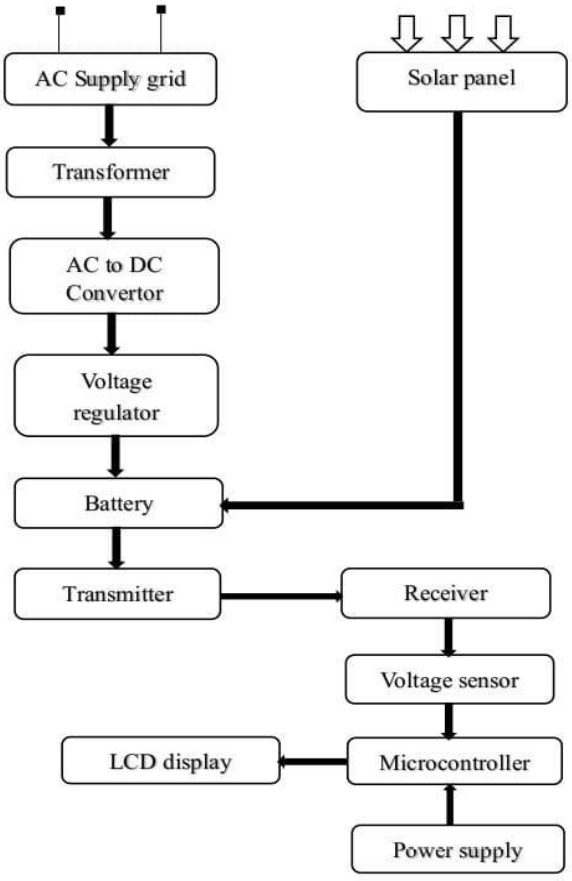

Fig 1: Block diagram of Solar Wireless Electric vehicle charging system

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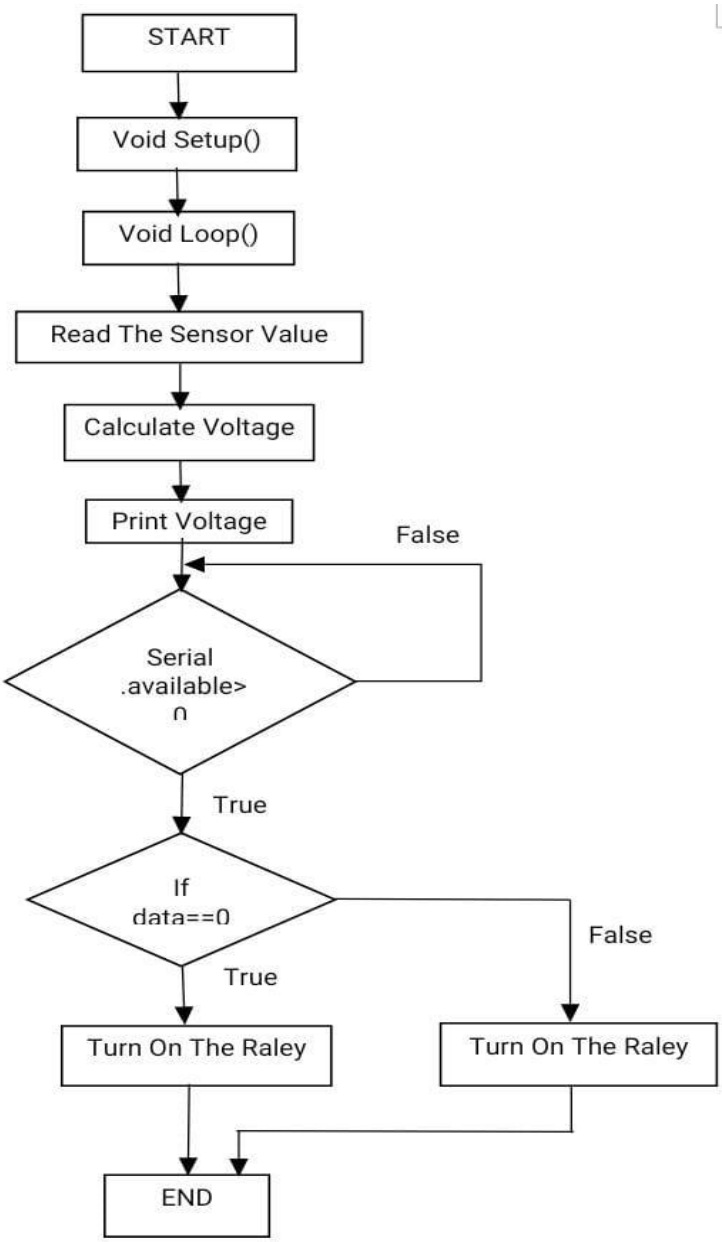
IV. METHODOLOGY



The flow chart for code of solar wireless electric vehicle charging system is as shown in the figure. The code starts and will take input, void setup() will set 16 columns and 2 rows of 16x2 LCD display. Void loop() will read the sensor value and convert the sensor value to voltage and displayed on LCD. This loop will read the value continuously and print the value. Next conditional statement will be checked and if false this loop will be executed till it get true. if true, another conditional statement [data ==1] is checked and if true, relay will be turned on and shift. If false, relay will shift. This loop will be executed continuously.

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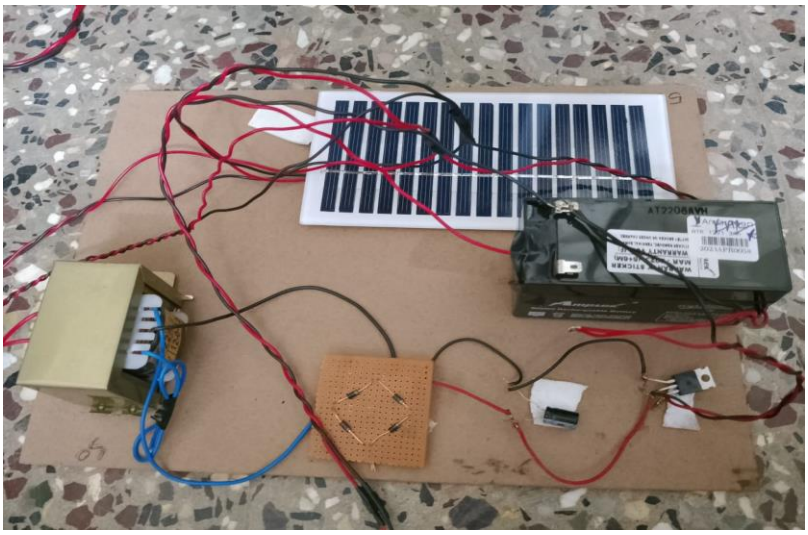
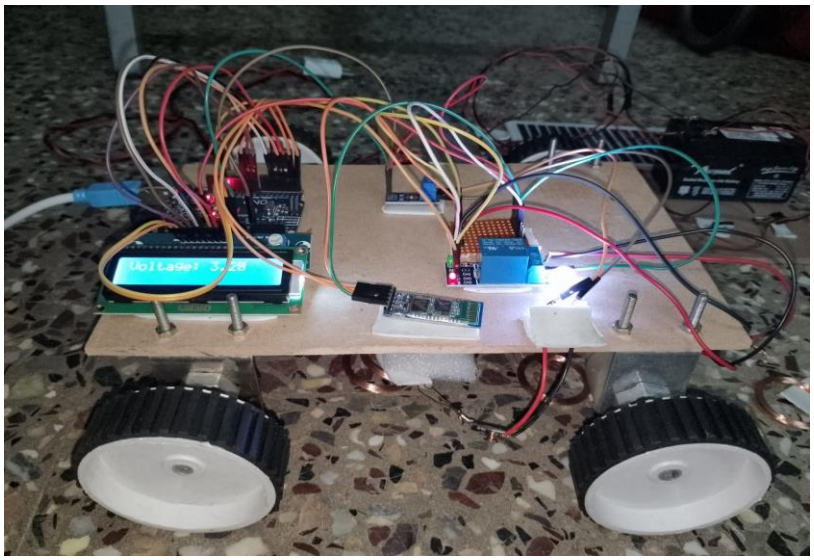
V. RESULTS ANALYSIS





This project contributes to the expansion of research on electric vehicle charging stations based on renewable energy and reveals the potential for sustainable and environmentally friendly transport solutions. Grid-connected EV charging stations are an attractive option for EV charging infrastructure in regions where solar power is affordable, reducing carbon emissions, saving energy costs, and improving energy resilience. and other benefits.

Further research and development in this area could lead to widespread deployment of charging stations based on renewable energy and contribute to the transition to sustainable transport systems.

VI. CONCLUSION

Electric vehicles are the future of transportation because they can maximize the efficiency of charging stations. Electric vehicle charging stations will play an important role. Growing demand for EVs in the market requires removing a fundamental barrier to EV adoption: lack of public charging stations.

We focused on portable electric car chargers that use renewable energy to speed up charging. The study presented here introduces a new service for long-distance travelers with electric vehicles by using hybrid drive systems in vehicle battery charging stations. Unfortunately, there is a significant lack of convenient charging infrastructure for EV drivers on highways. A wireless electric car charger is the best option for charging your electric car.

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