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SOLAR WIRELESS ELECTRIC VEHICLE NON-STOPPABLE CHARGING SYSTEM

SANTHOSH E, RAJ KUMAR K, VINOD RAJ B, YOGESH GOWDA M, VASANTH KUMAR G

DIPLOMA STUDENT, HOD, DIPLOMA STUDENT,DIPLOMA STUDENT,DIPLOMA STUDENT,
DEPARTMENT OF MECHANICAL ENGINEERING,EAST WEST POLYTECHNIC,BANGALORE 560091

ABSTRACT:

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 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 coil's 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 t 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 Atmega 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.

INTRODUCTION

Solar Wireless Electric Vehicle Non-Stop Charging System: Paving the Way Towards Sustainable TransportationIn recent years, the world has witnessed a remarkable surge in the adoption of electric vehicles (EVs) as a cleaner and more efficient alternative to traditional gasoline-powered cars. The global shift towards sustainable transportation has been driven by the pressing need to reduce greenhouse gas emissions, mitigate climate change, and decrease our dependence on fossil fuels. However, the widespread adoption of EVs poses several challenges, particularly in terms of charging infrastructure and range anxiety.

To address these challenges, researchers and engineers have been tirelessly exploring innovative solutions to ensure convenient and uninterrupted charging for electric vehicles. One such solution that holds immense promise is the concept of a solar wireless electric vehicle non-stop charging system. This cutting-edge technology aims to revolutionize the way we charge EVs, making them even more convenient, efficient, and environmentally friendly.

The solar wireless electric vehicle non-stop charging system harnesses the power of the sun and wireless charging technology to enable continuous charging of electric vehicles while on the move. It eliminates the need for conventional charging stations, lengthy charging stops, and the hassle of physically plugging in the vehicle. By integrating solar panels into the infrastructure and utilizing wireless power transfer, this system offers a sustainable and seamless charging experience.

The core principle behind this innovative charging system lies in the combination of solar energy and wireless power transfer technology. Solar panels are strategically installed along the roadways, highways, and parking lots, converting sunlight into electricity. The generated solar power is then wirelessly transferred to the electric vehicles using inductive power transfer (IPT) or resonant inductive coupling (RIC). This eliminates the need for physical connectors and enables the continuous charging of EVs while they are in motion.

LITERATURE REVIEW

Nikola Tesla [1] The concept of wireless power transfer dates to the late 19th century experimented with transmitting electrical energy wirelessly. Tesla's pioneering work laid the foundation for the development of wireless power transfer technologies, including inductive and resonant coupling.

S. S. Rajput, M. R. Khan, and M. S. Al-Haddad [2] "Solar-Powered Wireless Charging of Electric Vehicles: This review article provides a comprehensive overview of solar-powered wireless charging for electric vehicles. It covers various aspects of the technology, including the underlying

principles, system components, and control strategies. The article also discusses the current state of research and development in this field and identifies the challenges and opportunities associated with solar-powered wireless EV charging.

S. H. Han and H. J. Lee [4] "Wireless Solar-Powered Charging Station for Electric Vehicles" This research paper proposes a wireless solar-powered charging station for electric vehicles. The system consists of a solar panel array, a wireless power transfer unit, and a battery storage system. The paper describes the design and implementation of the system and evaluates its performance under different operating conditions.

M. N. Islam, S. S. Rajput, and M. R. Khan [5] "Optimal Design of Solar-Powered Wireless Charging System for Electric Vehicles" by This research paper presents an optimal design methodology for a solar-powered wireless charging system for electric vehicles. The methodology considers various factors such as system efficiency, cost, and environmental impact to arrive at anoptimal design. The paper also includes a case study to demonstrate the effectiveness of the proposed methodology.

Methodology:

The methodology of a Solar wireless electric vehicle non-stoppable charging system project typically involves the following steps:

- **Feasibility Study**: Conduct a comprehensive feasibility study to evaluate the viability of implementing a solar wireless charging system for electric vehicles. Assess factors such as solar resource availability, parking patterns, traffic volume, and potential user demand.
- **System Design and Engineering:** Develop a detailed system design based on the specific requirements and constraints of the charging site. This includes determining the number and layout of charging stations, solar panel capacity, energy storage capacity, wireless charging technology, and communication protocols.
- **Solar Power Generation:** Install solar panels strategically to maximize energy generation. Conduct an analysis of solar irradiance patterns, shading, and orientation to optimize the performance of the solar power system. Determine the appropriate panel type, capacity, and configuration for the charging station.
- **Energy Storage System:** Integrate an energy storage system to store excess solar energy for use during periods of low or no sunlight. Select the appropriate battery or supercapacitor technology considering factors such as energy capacity, charging/discharging rates, efficiency, and lifespan.
- **Wireless Charging Infrastructure:** Implement wireless charging technology that enables efficient power transfer between the charging infrastructure and EVs. Choose a suitable wireless charging method such as inductive or resonant charging, and design the charging pads to align with the vehicle's receiver for optimal power transfer.
- **Vehicle Detection and Alignment:** Develop a reliable vehicle detection system that can identify the presence of an EV in a parking spot. Use sensors, cameras, or other technologies to detect and align the charging pads with the
  vehicle's receiver automatically.
- **Power Transfer and Conversion:** Employ power electronics and converters to facilitate wireless power transfer from the charging pads to the EV's battery system. Ensure efficient power conversion and delivery by optimizing voltage and current levels, and consider the use of bidirectional charging capabilities.

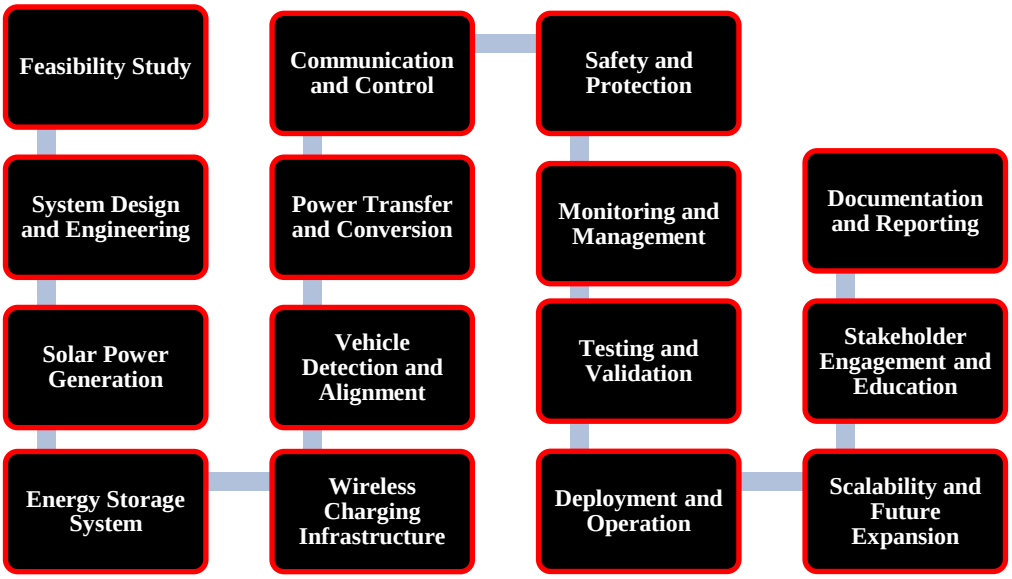

Figure 1.1 Flow chart of Methodology

ASSEMBLY:

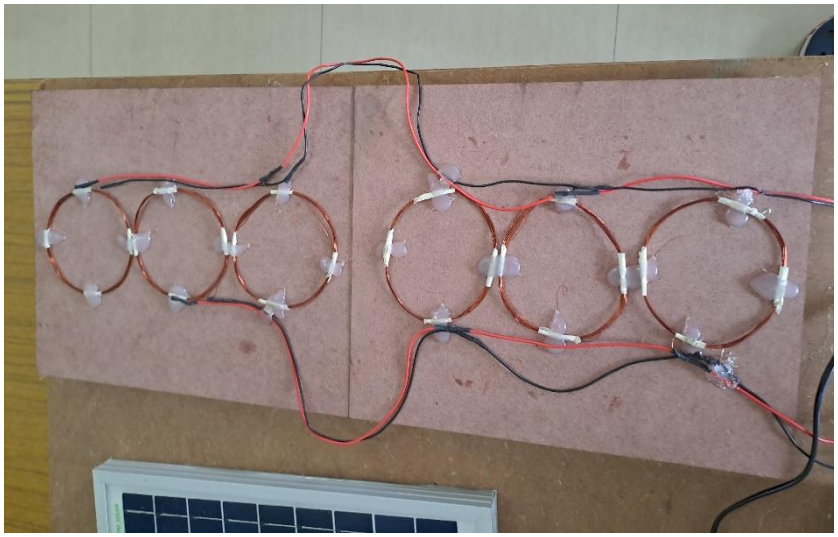

Figure 1.2 Coil Board

Figure 1.3 Connecting transformer

Figure 1.4 Soldering IL programmer board

Figure 1.6 Installing Wheels body

Figure 1.7 Fixing a Switch to Board

Figure 1.8 Installing PCB board

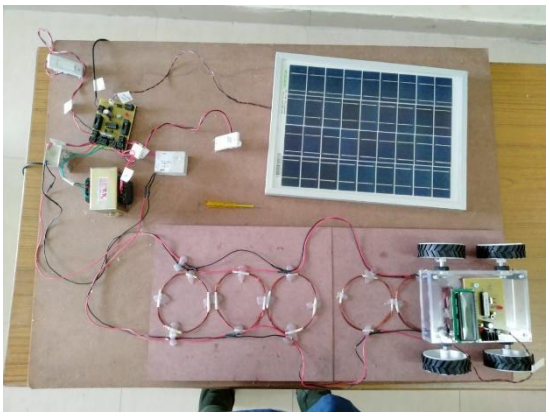

Figure 1.9 Complete view of demonstrated project solar wireless electric vehicle non stoppable charging system.

TESTING AND VALIDATION

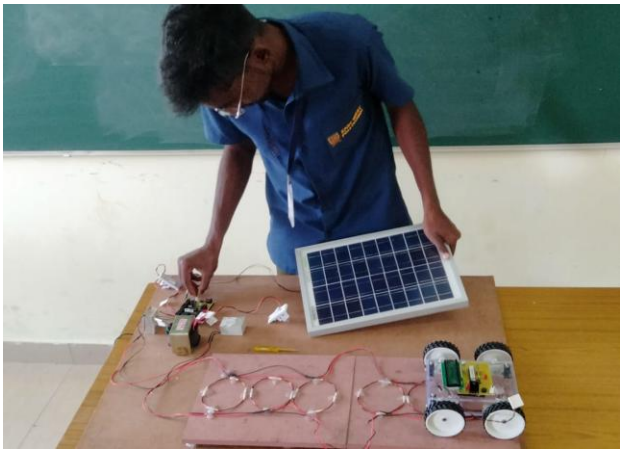

Figure1.10 Assembly of Solar panel

Figure1.11 Assembly of Switch

Figure 1.12Moving the vehicle body and checking

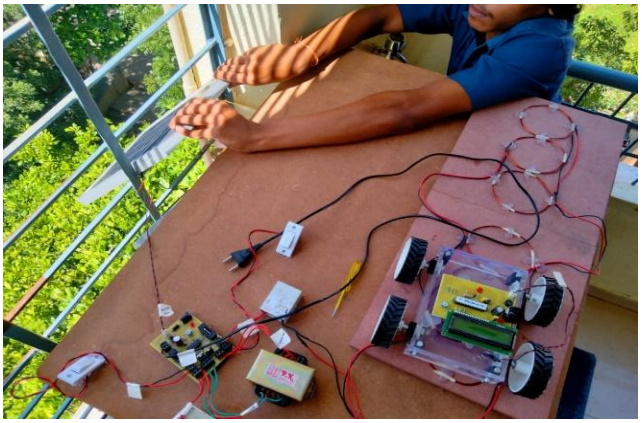

Figure 1.13 Emerging the Solar panel the voltage

A solar wireless electric vehicle non-stoppable charging system, also known as a solar wireless EV charging system, aims to provide continuous and convenient charging for electric vehicles (EVs) using solar energy and wireless power transfer technology. The system typically consists of solar panels, a wireless power transmitter, and a wireless power receiver installed in the EV.

- Renewable Energy: By utilizing solar power, the system reduces reliance on non-renewable energy sources, contributing to a cleaner and greener transportation system.
- Convenience: Wireless charging eliminates the need for physical connections or plugs, allowing for effortless charging without the hassle of cables.
- Continuous Charging: A non-stoppable charging system implies that the vehicle can charge while in motion, potentially extending the range and usability of electric vehicles.
- Grid Independence: By generating and storing solar energy, the system reduces dependency on the power grid, offering greater energy independence.

References:

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- "Electric Vehicle Technology Explained" by James Larminie and John Lowry

- Wireless Power Transfer for Electric Vehicles: Foundations and Design Approach" by Pedro Alou, Miguel Castilla, and Luis G. de Vicuña
- "Wireless Charging of Electric Vehicles: A Techno-economic Assessment" by Marc Múltin, Florian Schlögl, and Clemens M.
- (https://www.energy.gov/eere/vehicles/solar-electric-vehicle-charging)