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Wireless Charging System for EV's Using Solar

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ABSTRACT

Solar Parking Proposals describe a solar parking installation that addresses the negative effects of gasoline and air pollution. Electric cars are now on roads around the worldand their numbers are slowly increasing. In addition to their environmental benefits, electric vehicles also help reduce travel costs by using cheap energy instead of gasoline.We are expanding the Electrticl vehicle charging system to solve the problem with a distinctive and improved solution. This type of electric car does not need cables, has no charging protection, the car's charges can be changed simultaneously, can power solar charging equipment, and does not need external electricity. The machine uses solar panels, batteries, power distribution, transmitter and receiver coils, Arduino controllers, Bluetooth modules and LCD display to expand the machine. The deceshows how anelectric car can be charged while driving on the road, eliminating the need for precharging. The device thus demonstrates a solar powered Wi-Fi charger for electric vehiclesthat can be combined on the road.

Keywords: *E-Vehicle,Solar parking, Battery, LCD, Wi-FiCharging.*

I. INTRODUCTION

The world has come to a critical turning point in its transition, with alarming situation and fear of depletion of conventional fossil fuels. We still depend on these conventional fuels for our energy requirements. Climatic changes, rising sea levels, pollution, deforesting and pollution are ill side effects of burning the fossil fuels. The conservation of ourplanet from green house effects has to be mitigated on a urgent basis by one and all.As concerns grow regarding the ever-increasing use of fossil fuels, the governments, automakers, and energy companies have interest in the vehicles which are powered by alternative energy. Worldwide, photovoltaic power generation has increasingly high incursion level in smart grid, and the annual growth rate over the last 18 years was above 45%. The electrification of the conventional vehicle (CV) represents one of the mostviable solutions to decrease the pollution. The electric vehicle (EV) extends major advantages in terms of emission reduction, energy conservation, and grid security.

Electric vehicles use energy stored in a battery (or multiple batteries) to power the vehicle. Electric motors provide a clean and safe alternative to combustion engines. It is weknown that electric cars have higher speed but shorter range than hybrid engines. They do not produce out gassing but require a longer charging time. The most efficient way to use renewable energy to charge electric vehicles is through grid-based renewable energy sources.

With the increment in electric vehicles andthe expanding request for remote charging frameworks, remote control

exchange has ended up required for electric vehicle batteries. Remote charging frameworks for electric vehicles have been created as viable arrangements for stationary and mobile vehicles. This problem makes electric cars progressively competitive. There's no have to be charge the electric car for remote charging frameworks to be introduced within the vehicle. WPT innovation is based on the combination of two uncommonly outlined coils; Control transmitter and collector. There are two sorts of WPT advances: Capacitive Control Exchange (CPT) and Inductive Coupled Control Exchange (ICPT).

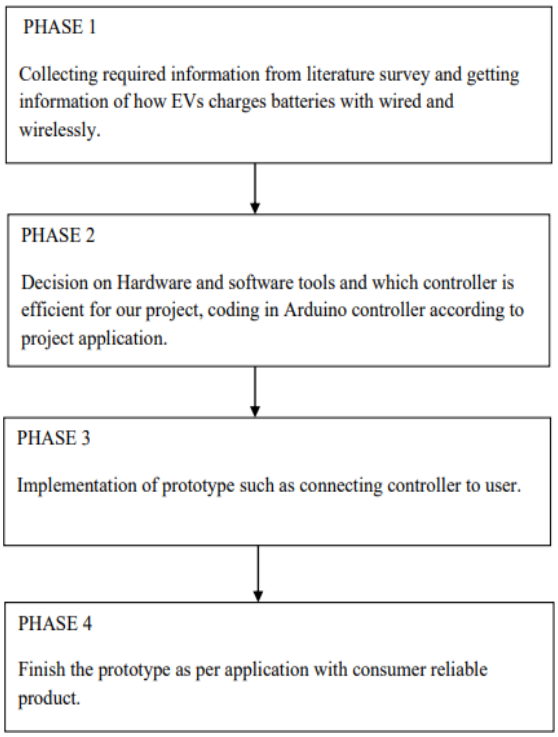
II. PROBLEM DEFINITION

The impediment related with Remote Charging Framework is that they can as it were be utilized when the car is stopped or in stationary modes, such as in car parks, carports,or at activity signals. In expansion, stationary WCS have aelectromagnetic compatibility (EMC) issues, restricted control exchange, bulky structures, shorter extend and higher productivity.

III. OBJECTIVES

Wireless Power Transfer (WPT) systems overcome the problems and dangers caused by traditional methods because there is no physical contact between the vehicle and charging equipment. Therefore the objectives are:

1. Restore conductive charging method with new WPT technology while maintaining comparable power level



and efficiency. Dynamic electric car moving on the road charges the vehicle wirelessly without charge.

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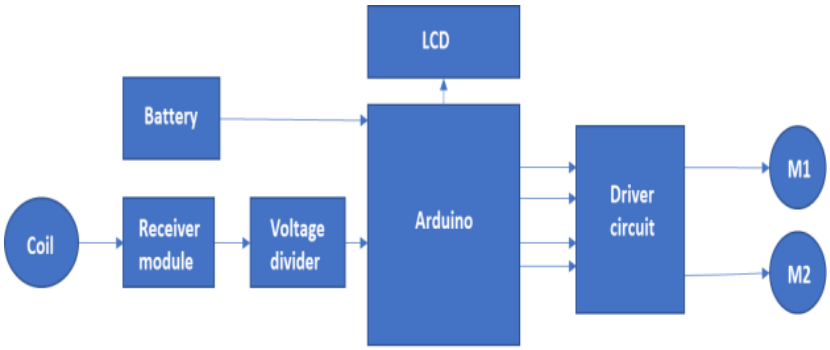
IV. METHODOLOGY

The framework illustrates how moving electric vehicles can be charged whereas on street, without any have to be halt for charging.



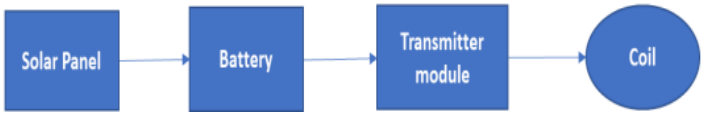


Figure 4.1: Flow Chart of Charging Phases of EV's **Figure 3.2: Block Diagram**

STEPS:

This methodology applies to the charging of electric vehicles through EV charging systems, including their associated infrastructure steps are as follows:

Step 1: The Framework make utilize of a sun arranged board, battery, voltage divider circuit, transmitter and beneficiary coils, Arduino controller, LCD and Bluetooth module appear to form the system.

Step 2: The Framework outline how electric vehicles can be charged when it is moving on the street, killing the thought of end for charging.

Step 3: The sun board is utilized to control the battery through a charge controller. The battery is charged and stores dc power and that is supplied to the transmitter coil which are mounted on the way or path.

Step 4: This supply is now used to give power to the receiver coils that are used for wireless energy transmission; these coils are mounted underneath the electric vehicle.Step 5: When the vehicle drives over the coils vitality is transmitted from the transmitter coil to collector coil.

Step 6:Presently we moreover degree the input voltage utilizing by an Arduino controller and it is shown on LCD display.

Step 7: Hence, the system illustrates a solar powered wireless charging systemfor electric vehicles that can be coordinates within the road.

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V. HARDWAREUSED

Electromagnetic induction is defined as transfer of power through air along small air gap. Word dynamic in dynamic wireless charging means vehicle need not to stop and wait for charging, it can be done while in motion. Most important advantage it can provide is reduced overall battery capacity also the charging time reduced

1. ARDUINO CONTROLLER

The Arduinouno is an open-source microcontroller board based on the microchip ATmega328P microcontroller and developed by Arduino.cc and initially released in 2010. The board is equipped with sets of digital and analog input/output pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by a USB cable or a barrel connector that accepts voltages between 7 and 20 volts, such as a rectangular 9-volt battery.

Figure 5.1: Arduino controller

2. DRIVER CIRCUIT:

They are usually used to regulate current flowing through a circuit or to control other factors such as other components and some other devices in the circuit. The term is frequently used in specialized integrated circuit that controls highpower switches in switched-mode power converters. An amplifier can also be used as a driver for loudspeakers, or a voltage regulator that keeps an attached component operating within a broad range of input voltages.

Figure 5.2: Driver Circuit.

3. VOLTAGE DIVIDER

A voltage divider is a divider circuit which turns a large voltage into a smaller one. Using two series resistors and an input voltage, we can drive an output voltage which issmaller of the input. Voltage dividers are themainly fundamental circuits in electronics.

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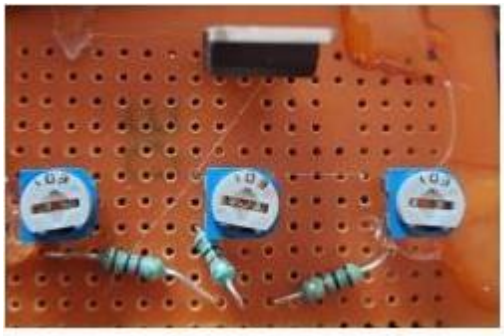

Figure 5.3: Voltage Divider

4. LCD DISPLAY

LCD iswidely used electronic display module in avariety of applications like various circuits & devices like calculators, computers, TV sets, mobile phones etc. LCD stands for Liquid Crystal Display. The main benefits of using this module are inexpensive, simple programmable, animations, and there are no limitations for displaying custom characters, special and even animations etc.

Figure 5.4: LCD Display.

5. TRANSMITTER AND RECEIVER COILS

The transmitter and receiver coils are basic elements in the wireless power transfer system and the pairingof these coils plays asignificant role in increasing the power transfer efficiency.

Figure 5.5: Transmitter and Receiver Coils.

6. SOLAR PANEL

Solar panel isthat device which is used to absorb the sun's rays andthen convertinto electricity by using photovoltaic (PV) cells. PV cells are made of materials that generate electrons when exposed to light. The electrons flow through a circuit and produce direct current (DC) electricity, powering various devices and storing

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in batteries.

Figure 5.6: Solar Panel

7. BLUETOOTH MODULE

To communicate with the HC05 Bluetooth module, the smartphone must have a Bluetooth application to send and receive data. You can find the Bluetooth Terminal application for Android and Windows among its applications. Therefore, when we want to communicate with the HC05 Bluetooth module from the Smartphone, connect the HC05 module to the PC via the serial to USB converter. For arranging two Bluetooth devices to communicate, we first need to pair the HC05 module with thesmartphone communication.

Figure 5.7: Bluetooth Module

8. BATTERIES

A battery is an electrical power unit with one or more electrical cells with external connections used to power electrical devices. When the battery is powered, its positive terminal is the cathode and its negative terminal is the anode. The negative terminal is the source of electrons that will flow from the external circuit to thepositive terminal. When the battery is connected to an external electrical source, the redox reaction converts high energy products into low energy products and thedifference in free energy is transferred outside as electrical power. Originally, the word "battery" referred to a device consisting of many cells; but usage has evolved to include devices on a single phone.

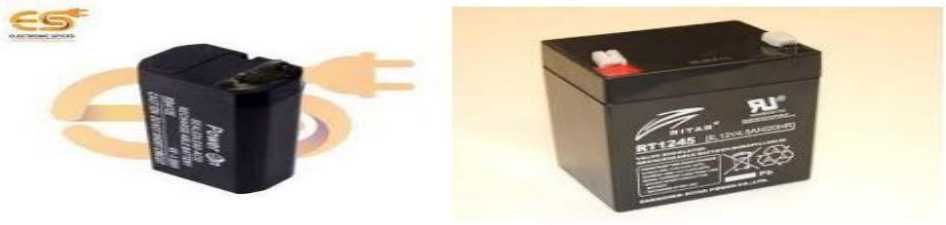

Figure 5.8: Batteries.

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VI. SOFTWARE IMPLEMENTATION

Arduino could be a well known open-source program stage utilized for development of computerized gadgets and intuitively ventures. It is designed to be user-friendly and simple to memorize, the foremost well known applications of Arduino is within the field of implanted frameworks, which includes the utilize of microcontrollers to control and computerize different gadgets. LCD 16x2 could be a 16-pin device that has 2 columns that can suit 16 characters each. LCD 16x2 is utilized in 4-bit mode or 8-bitmode. It is additionally conceivable to make custom characters. It has 8 information lines and 3 control lines which are utilized for control purposes.

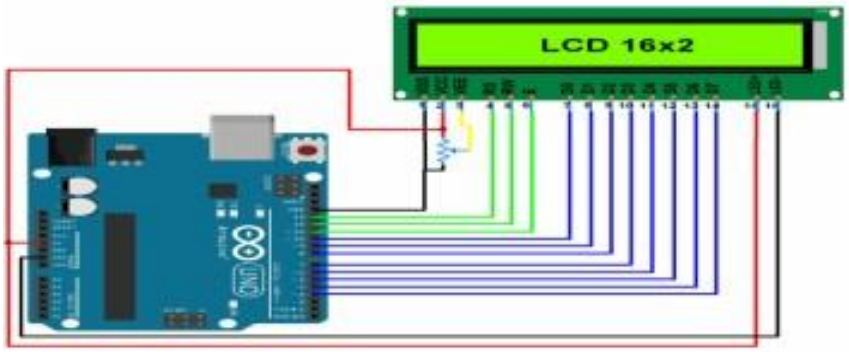
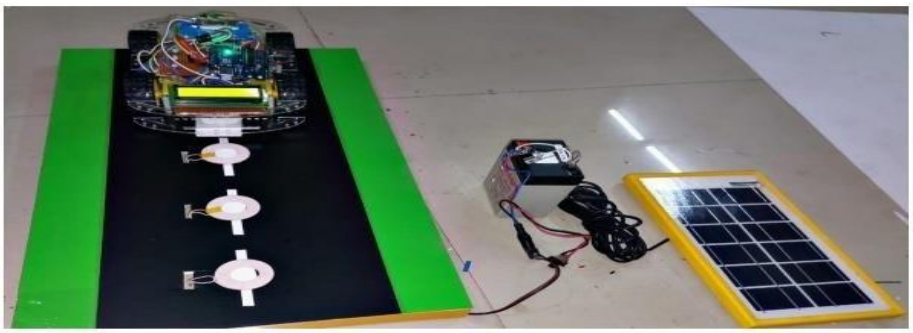


Figure 6.1: Interfacing of Arduino and LCD Display

VII. RESULT AND DISCUSSION:

The main purpose of deployment optimization is to achieve maximum energy from EV, minimize the infrastructure deployment cost and to optimize battery power. Various deployment optimization techniques are there in the current market. These are On-Line Electric Vehicle (OLEV) project deployments. Resonant (IPT) is used mostly in higher power applications suitable for electric cars battery charging. Resonant IPT is efficient for both static and dynamic wireless charging. Static or stationary charging is when the car is parked in a specific position. In dynamic charging the electric vehicle acquire the electric power continuously while driving/moving. Coil design for coupling mechanism, the resonant compensation and control mechanism of power transmission are the key technical challenges for wireless charging of electric cars. Primary coil is inthe form of inductive coil laid along the road is powered by solar power through transmitter module. Working together they create magnetic field that is linked with secondary coil thus the powr is transferred directly from solar battery to vehicle.



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Electrical Vehicles without cable charging is a very efficient, practical and simple technique for wirelessly recharging electric automobiles. The result of our project is:

- Cordless charging of Electric Vehicles.
- Generation of electricity from solar to electrical charging station.

The transmitter and receiving coil rating of each coil is 5V, we mounted 3 coils on primary side parallelly and same as the receiving coils but they are serially connected to collect more amount of charge. The primary equations are$E_T = E_1 = E_2 = E_3$.. That means voltage distribution on each coil is same which 5V each is. The secondary coil receives voltage which is serially connected to each other when vehicle moves on the transmitter coil it displays the sum of all voltages.

Equation: $E_T = E_1 = E_2 = E_3$.

Table 1: The voltage and distance between the primary and receiver coil.

Distance	Voltage
3mm	5v
5mm	7v
8mm	10v
10mm	12v

The above table1 shows the voltage and distance in wireless modulator gives the voltage measured in receiver coil. The primary coil is placed at the ground as shown in fig.7.1. When the distance between the primary and secondary coil is 3mm, then 5V/2A is received in the receiver coil which is placed on the bottom of the vehicle. The minimum distance is 3mm which reads high efficiency. When the distance is minimum between the two coils gives the higher efficiency.

VII. ADVANTAGES

1. Wireless Charging lowers the cost of operation, results in more affordable buses with smaller batteries and extends the life time of batteries.
2. Wireless EV charging has the potential to increase EV uptake.
3. Wireless charging of vehicles without any wires.

VIII. DISADVATAGES

1. Long charging time, 1-3 hrs required for charging.
2. Non availability of power for charging stations in off cities and remote areas

IX. APPLICATIONS

1. Medical devices.
2. Wired charging also reduces the number of cables and power adapters needed to fix the device or app.

X. CONCLUSION

The charging system can adapt the corresponding values for the current and the voltage corresponding to the load. The WPT's are more appropriate for small distance transmission, the optimal distance is up to twice the coils dimensions. The efficiency of such systems depends upon several parameters such as electronic components of power electronic converters and regulators, frequency operating range, controlling technique used, coil dimensions, ferrite shape, linking as well as leakage flux, charging pads, sensors and optimization, deployment and communication technologies. Wireless dynamic charging will revolutionize the automation of vehicle. With automation there should be no delay in charging. After this dynamic technology vehicle need not to wait for charging or refueling. Deployment technique also improve the range of vehicles. With range is they can travel more with a fully charged vehicle. With suitable coil shapes and ferrite design efficiency of power transfer increases.

REFERENCES

[1] Sasikumar, G., Sivsangari, A., "Design and Development of Solar Charging System for electric Vehicles: An Initiative to achieve Green campus", Vol.20, 2021.

[2] Hiwale, S. A., Patil, V. M., Vinchurkar, H., "An efficient MPPT solar charge controller", Vol.3, Issue, July 2014.

[3] Singh, B., Verma, A., Chandra, A., Al-Haddad, K., "Implementation of Solar PVBattery and Diesel Generator Based Electric Vehicle Charging Station", June 2019.

[4] Lohar, O.N., Saini, S., Tomar, K., "Design of a Solar Charger for Electric Vehicles", Vol.8, Issue.6, November 2021.