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Solar-Based Electric Vehicle Dynamically Charging System

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Abstract : This paper describes the planning and design of an electric vehicle charging system that uses solar electricity to offset the costs associated with fuel and reduce pollution. The number of nations where electric cars are used for transportation is continuously increasing. Electric vehicles have shown to help reduce transportation expenses by replacing costly fuel with far more economical power, in addition to benefiting the environment. Here, by developing an infrastructure for charging electric vehicles, we provide a creative and practical solution to this issue. Since the EV can charge while traveling and the system is fueled by solar energy, there is no need for a second power source, there is no need to stop charging. The solar panel, battery, regulator circuits, copper coils, AC to DC converter, ATmega controller, and LCD are all used in the system's construction. The idea behind this technology is that electric cars can be charged without stopping to use a charging station. Thus, technology validates the feasibility of an EV wireless charging system that is embedded into the road and powered by solar energy.

IndexTerms - **Arduino UNO, wireless power transmission, BMS, LCD.**

I. INTRODUCTION

Electric vehicles (EVs) are a new idea within the transportation domain. It's expected that electric cars, or EVs, will soon dominate the auto industry. In this case, regulation of the electric vehicle (EV) charging process is necessary to maintain the integrity of the power networks. Despite this, as electric cars (EVs) become more common, a sizable amount of energy will be stored in their batteries, enabling the opposite effect. In the future, EV interactivity will play a significant role in smart grid technologies, enhancing the power grid's independence. As fossil fuel prices rise and carbon dioxide emissions decline, electric vehicles are now more competitively priced than vehicles with traditional internal combustion engines. Despite these drawbacks, the expensive cost of EVs prevented them from being widely embraced by consumers. Both fast-charging facilities and all-electric cars are hard to come across. Electric vehicles can be classified into two categories: fully electric vehicles and partially electric vehicles. Electric vehicles use little to no fossil fuels, which adds to their low running costs and minimal environmental impact. To improve the efficiency of charging stations, electric vehicles will become the main mode of transportation in the future. Electric automobiles are becoming more affordable than conventional ones due to growing fossil fuel prices and decreasing CO2 emissions. Due to limitations like high car expenses, electric vehicles have not been widely embraced. Both fast-charging facilities and all-electric cars are hard to come across. Electricity can be used to power EVs either fully or partially. Electric automobiles have cheaper running costs than their gasoline-powered counterparts because they have fewer moving components and have a smaller environmental effect .

To construct the system, our project system makes use of an LCD display, an ATmega controller, copper coils, regulator circuits, batteries, solar panels, and transformers. This method eliminates the need for stops for recharging because electric vehicles may be charged while in motion. The battery and solar panel are connected by a charge controller. The battery is storing direct current electricity. The DC power now needs to be converted to AC power to be sent.

II. LITERATURE REVIEW

Following are some of the research papers that we used as a reference for our paper. we have tried to reduce the limitations in the following research papers. Wireless Charging of Electric Vehicles by Solar Powered Charging Station by Narendra Landge, Rahul Lande, Rohit Ni- malkar, Harshwardhan LatE, the proposed system defined in this paper has a limitation i.e. While charging, the battery generates more heat than static charging system, this can be reduced in our proposed system.

Solar Wireless Electric Vehicles Charging System Using ESP32 by Nivedita Muganur, Naveen Manawadi, Manohar Malagi, Manjunath Malagi, and Sidramayya Matad, in this paper, the limitation is a severe lack of convenient charging infrastructure for drivers of electric vehicles also limited range, high costs, and inconvenient charging for EVs, these problems can be overcome in our system by using copper coil as a transmitter and receiver and creating road as a charging station that can charge vehicle while charging.

The following table includes some of the papers and the methods that are used in those papers are mentioned as follows:

Sr. No.	Title	Author	Methods Used
1	Solar Based Wireless Electric Vehicle Charging System	Karim,Merazul, Shafiq Nahian Bin, Zame Tousif-ul Islam, Hossain MD.Sakib	The wireless power trans- the form uses the same fundamental principle as inductive power transfer and charges the vehicle dynamically through copper coils
2	Wireless Charging Of Electric Vehicles by Solar Powered Charging Station	Narendra Landge, Rahul Lande, Rohit Nimalkar, Harshwardhan LatE	In this system the coupler is designed as for static and dynamic charging of electric vehicles. A charging pad is also used to reduce the wastage of flux losses
3	SOLAR WIRELESS ELECTRIC VEHICLE CHARGING SYSTEM USING ESP32	Nivedita Muganur, Naveen Manawadi, Manohar Malagi, Manjunath Malagi, Sidramayya Matad	By running an alternating current through a coil, a magnetic field is created. Another coil that is close to the first coil experiences a current due to this magnetic field. The device linked to the second coil can then be powered by the induced current.
4	A Comprehensive Review of Wireless Charging Technologies for Electric Vehicles	Aqueel Ahmad, Mo- hammad Saad Alam, Rakan Chabaan	In this paper, A comparison is made between conductive charging and inductive wireless charging. A brief discussion on the static and dynamic wireless charging technologies, their efficiency, and dependency on various factors are discussed.

TABLE I Literature Review

III. METHODOLOGY

If multiple charging stations are equipped with cable charging systems. The downsides of wired charging stations are numerous and include the need for greater space, a variety of socket types, a small substation, an installed converter circuit at each charging station, a limited wire range, and longer charging times. The wireless electrical car charging technology solves all of these issues. Conventional plug-in or wired charging systems are not conducive to environmental sustainability or ease of use. Many batteries can be utilized, or as needed, the charged batteries can be switched for the exhausted ones to shorten the charging time. When the coil is conducted for an extended period, line loss results in energy waste. Its lifespan will be shortened as a result of continuous working.

IV. BLOCK DIAGRAM

As illustrated in the image, the block diagram includes the Arduino Uno, TP4056, transmitter coil, receiver coil, AC to DC converter, lithium-ion battery, LCD, DC motor, and LED. A solar panel charges the transmitter coils, which in turn charges the battery that is kept in the regulator. The magnetic field connecting a transformer's primary and secondary coils must be directed by the transformer's core to prevent energy waste. The receiver coil records an induced electric current as the net magnetic flux of the stimulated spin system oscillates. The receiver coil is wirelessly charged as a result. After the AC power has been converted, the DC power produced by the AC to DC converter powers the ATmega controller. An LCD panel that is built into the system can show the vehicle's original charging setup. That is the nature of the system.

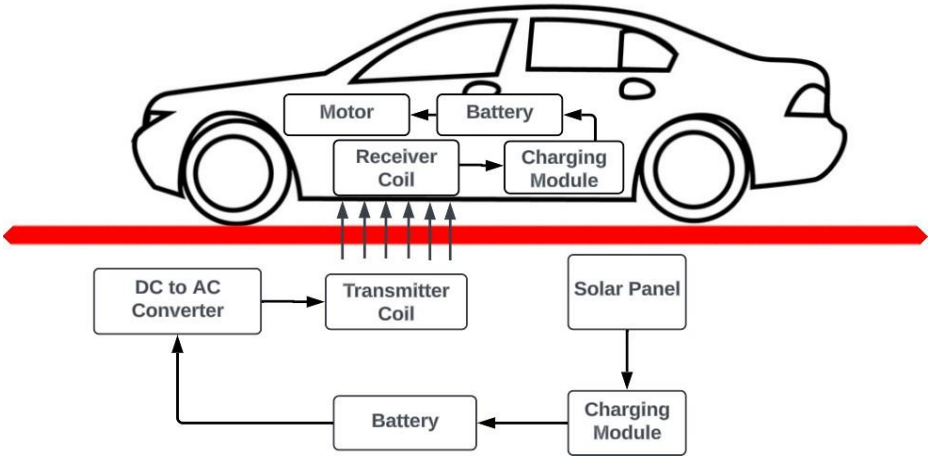


Fig. 1. BLOCK DIAGRAM

V. CIRCUIT DIAGRAM

A. *Transmitter*

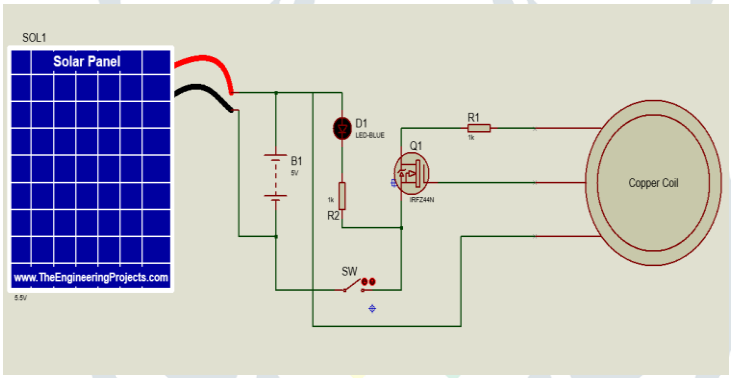


Fig. 2. Transmitter Circuit

B. *Receiver*

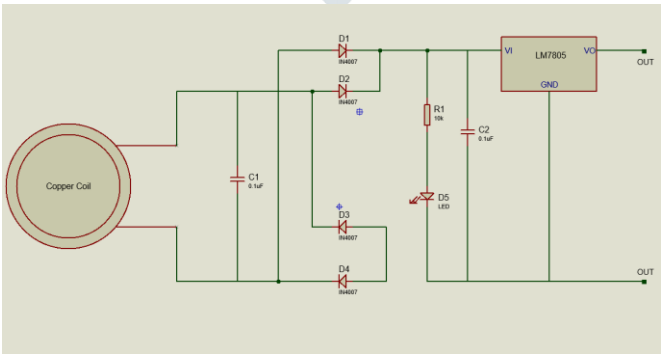
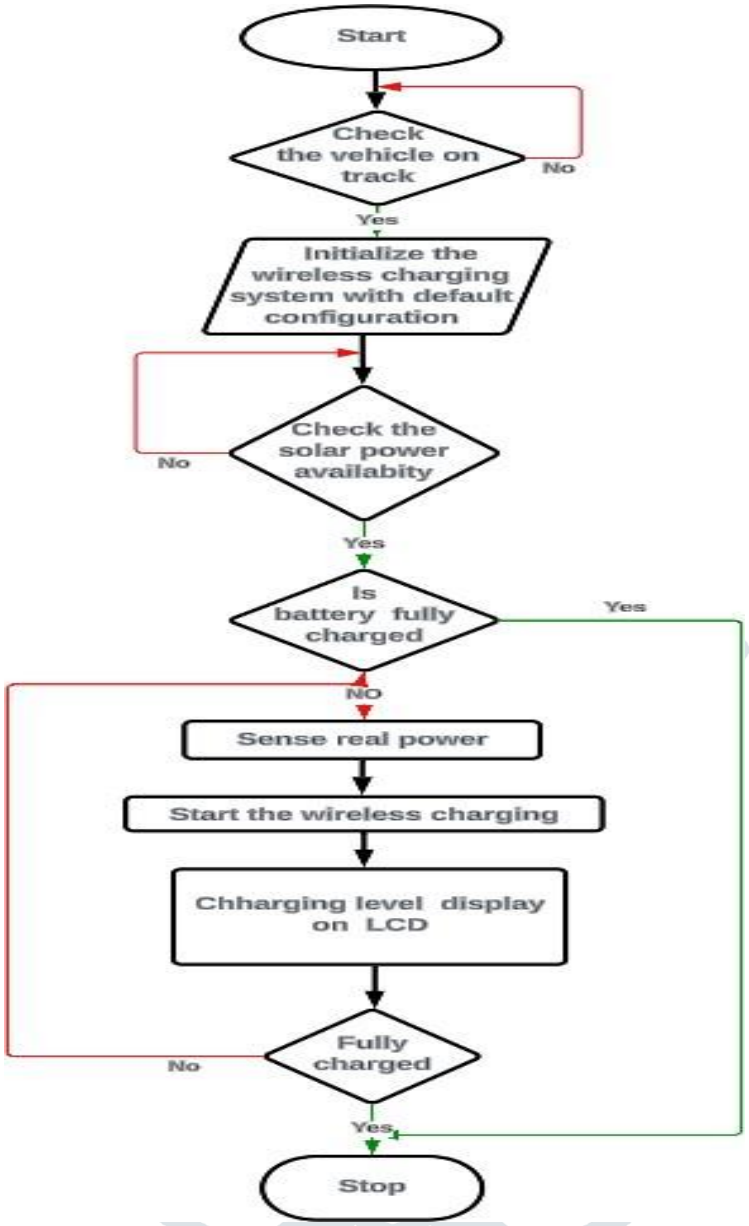


Fig. 3. Receiver Circuit

VI. FLOW CHART



VII. DESIGNED SYSTEM

Fig. 5. Designed System

VIII. CONCLUSION

The ability of electrical vehicles to optimize the effectiveness of charging stations makes them the transportation of the future. Charge stations for electric vehicles will play a significant role. To boost EV demand in the market, the lack of public charging stations must be addressed as the primary obstacle to EV adoption. We examined a portable EV charger that accelerates charging by utilizing renewable energy. The technology discussed here uses a hybrid power system for a vehicle battery charging station to provide a novel service to long-distance electric vehicle travelers. Sadly, there is a dearth of easily accessible charging stations for owners of electric vehicles on roads and interstates. The most efficient way to charge their electric cars is with a wireless charger.

IX. FUTURE SCOPE

Even though wireless dynamic charging is still in its infancy, it will probably emerge as one of the most important ways to satisfy the expanding demand for infrastructure for charging in the next years. Even while additional investments in dynamic charging infrastructure would need to be made during the installation phase, we found that longer battery life can result in much greater cost savings.

REFERENCES

[1] Ram Vara Prasad, bugatha , geethanjali, m , sonia , m ganeesh, and s Krishna, p. (2022). Solar wireless electric vehicle charging system. International journal of Scientific Research in engineering and Management 06. 10.55041/ijsrem14449.
[2] Ram vara prasad, bugatha and deepthi, t. (2021). Solar charging station for electric vehicles. 7. 10.48175/ijarsct-1752
[3] Sudharshan, Ashok,Vikas, Sindhu,Abinezer, and Vinay (2023) Wireless Electric Vehicle Charging System Department of Electrical and Electronics Engineering, Guru Nanak Dev Engineering College, Bidar, Karnataka
[4] Singh, Sagolsem, Hasarmani, Totappa and Holmukhe, Rajesh. (2012). Wireless transmission of electrical power overview of recent research and development. International journal of computer and electrical engineering. 207-211. 10.7763/ijcee.2012.v4.480.
[5] Javor, dario , raicevic, nebojsa , klimenta, dardan and janjic, aleksandar. (2022). Multi-criteria optimization of vehicle-to-grid service to minimize battery degradation and electricity costs. Electronic ir elektrotechnika.
28. 24-29. 10.5755/j02.eie.31238.
[6] C.e.kennedy and h.price “Progress in development of high temperature solar selective coating”, proceedings of isec2005, August 6-12 2005, or Lando, Florida, USA.
[7] Society of motor manufacturers and traders:‘ev and afv registrations’. January 2018. Available at https://www.smmt.co.uk/2018/02/january-evregistrations/, accessed 10 March 2018