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Solar Based Wireless Electric Vehicle Charging System

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Abstract: ***The increasing demand for electric vehicles (EVs) has created a need for efficient, eco-friendly, and user-friendly charging systems. This paper presents a solar-based wireless electric vehicle charging system that integrates renewable energy with wireless power transfer technology. The system utilizes solar energy as the primary source, which is stored in a battery and transmitted wirelessly using inductive coupling to charge EV batteries. This eliminates the need for physical connectors, enhances safety, and reduces dependency on fossil fuels.***

Index Terms: Electric Vehicles, Wireless Charging, Solar Energy, Inductive Coupling, Renewable Energy

I. INTRODUCTION

The rapid growth of electric vehicles has led to increased demand for efficient charging systems. Traditional wired charging systems have limitations such as inconvenience, safety risks, and maintenance issues. Renewable energy sources like solar energy provide a sustainable solution.

Wireless power transfer enables contactless energy transmission using electromagnetic fields. This paper presents a system combining solar energy and wireless charging for EV applications.

II. LITERATURE SURVEY

Several studies have been conducted on wireless EV charging and solar-based systems:

- Wireless charging using inductive coupling provides safe and contactless power transfer.
- Solar-powered charging stations reduce dependency on grid electricity.
- Recent research highlights challenges such as low efficiency, coil misalignment, and energy losses.
- Advanced systems include smart control using microcontrollers and sensors.

These studies indicate that combining solar energy with wireless charging is a promising solution for future EV infrastructure.

III. SYSTEM OVERVIEW

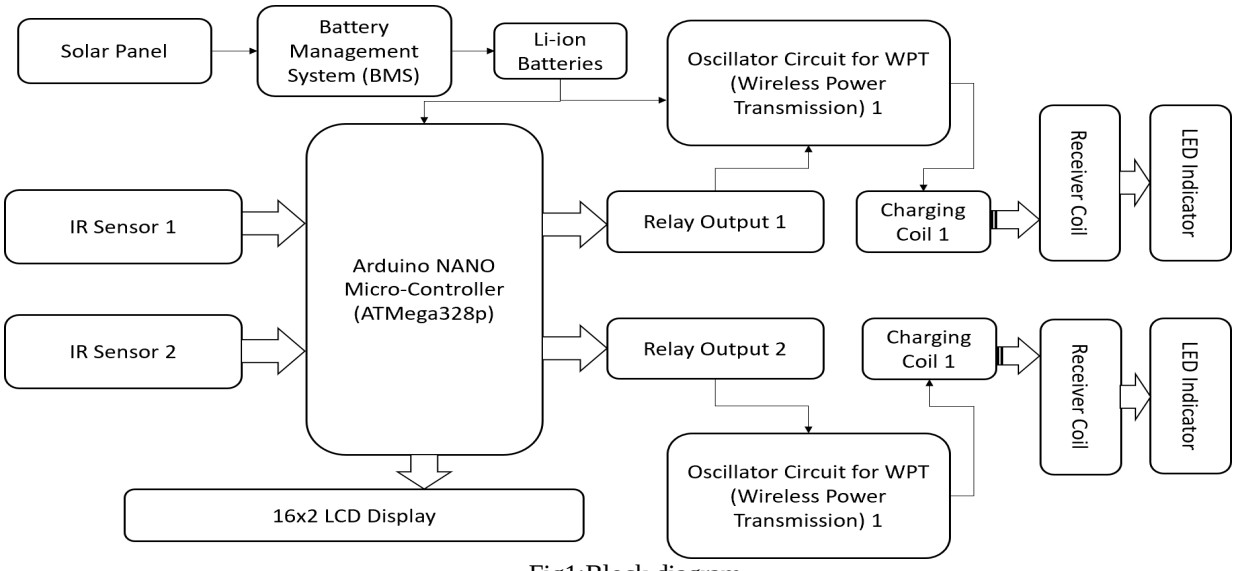

Fig1:Block diagram

The coil from the primary side gets energy anditcreatesthemagneticfieldaroundthecoil.Due totheusingofhigh-frequencyoutput,the creation of magnetic flux will be very strong. When the flux from the primary coil links with the secondarycoilorReceivercoil,thiswillinducethe current in inductor and capacitor connected in parallel. This induction is known as Electromagnetic Induction or in short EMI, today smartphone wireless charging works on same principle and able to induce 40 watts of power wirelessly. The voltage generator across the LC circuit isAlternatingcurrentandthis A.C.signalisapplied toBridgerectifiercircuit.Thiscircuit convertstheAlternatingcurrentintoDirectcurrentandthecapacitorisconnectedtotheoutput .to generate a smooth DC signal. TheVoltageregulatorisusedtolimitthevoltagetopreventthe damage to the load.

IV. METHODOLOGY

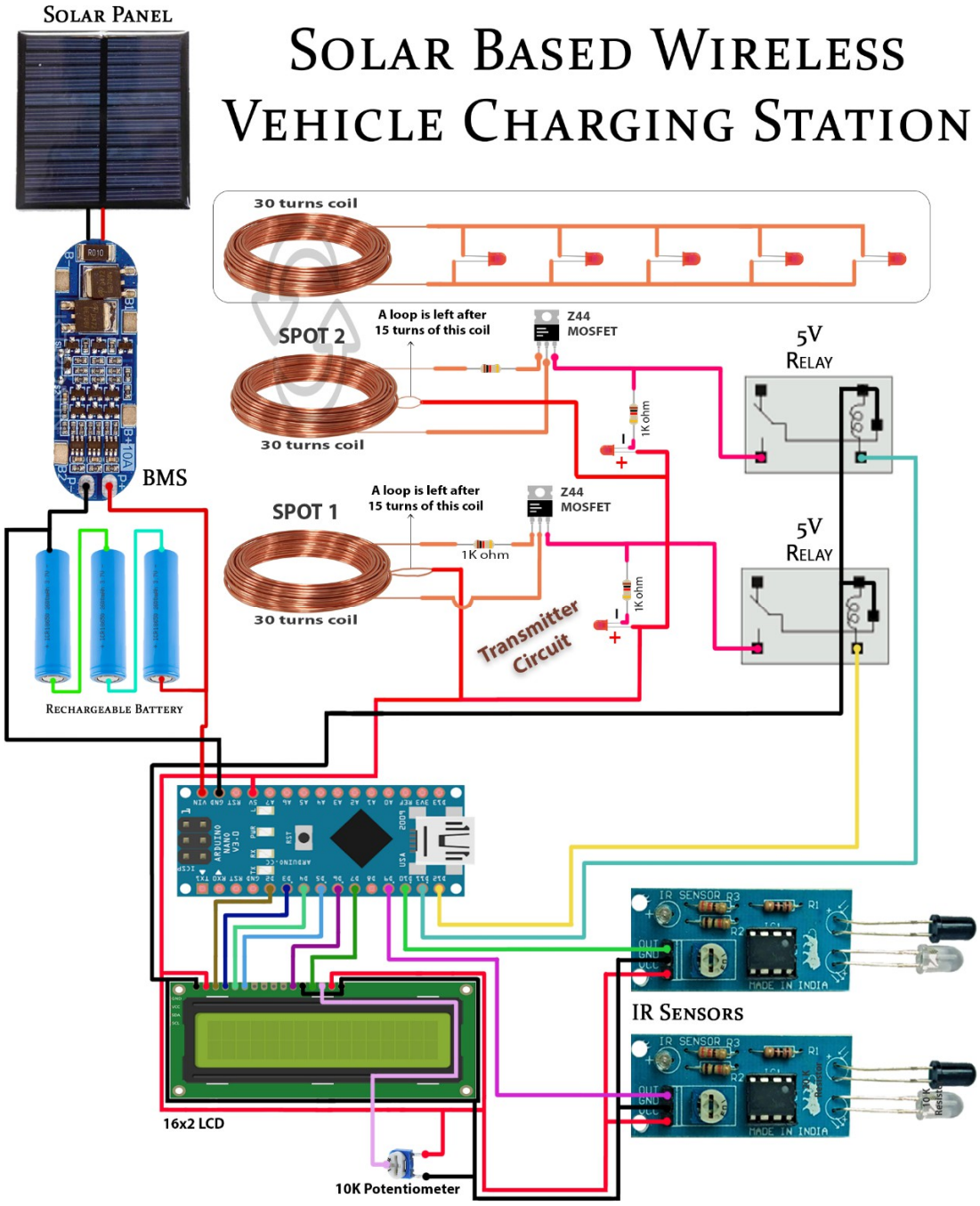

Fig.2.Systemphoto

The framework going for delicate products is the looking at achieved on an outright, included machine to assess the machine's congruity with its exact necessities. gadget testing would also fall inside the range of the dark compartment looking at, and in this way, it must need no data around theinteriorstructuringofthepresenceofmindorthecode.It'smilesatotallycomparable deliberate check case lettering. inside the check case lettering we ought to be equipped for compose the check case circumstances and moreover the utilization cases.

V. RESULT

The proposed system demonstrates the feasibility of combining solar energy with wireless charging. Although efficiency is lower compared to wired systems, improvements in coil design and power electronics can enhance performance.
The system reduces dependency on conventional electricity and supports sustainable development.

VI. CONCLUSION

This paper presents a Solar-Based Wireless Electric Vehicle Charging System that integrates renewable energy with modern wireless technology. The system offers a clean, safe, and convenient method of charging EVs. Despite certain challenges, it has strong potential for future applications in smart cities and green transportation.

VII. ACKNOWLEDGMENT

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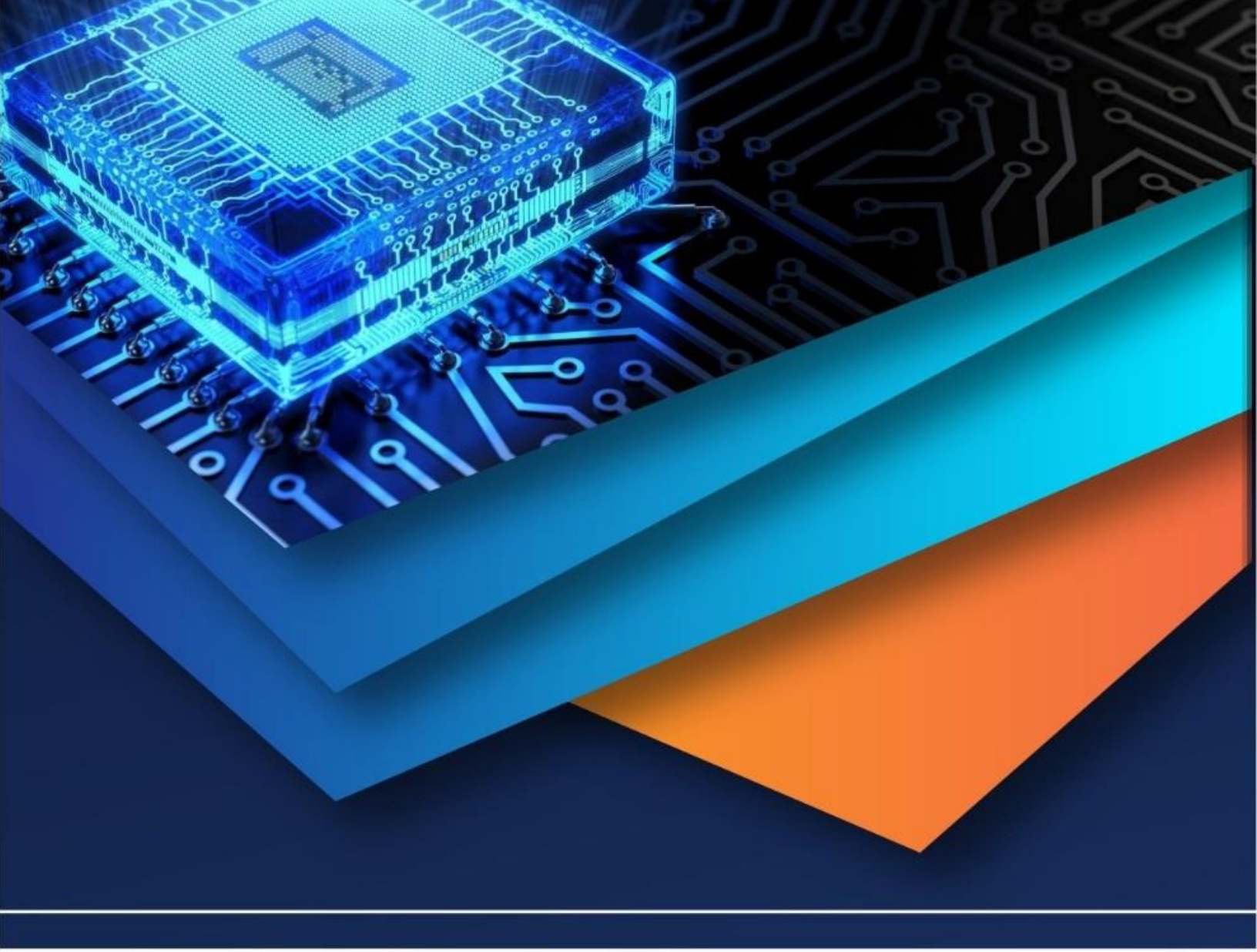

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