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# ON ROAD WIRELESS CHARGING FOR ELECTRIC VEHICLES

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## ABSTRACT

The current global trend in the automobile industry focuses on environmentally friendly vehicles, particularly electric vehicles (EVs), which offer significant environmental advantages over conventional fuel-powered vehicles. However, widespread adoption of EVs is hindered by challenges such as high weight, cost, limited battery life, and extended charging times. These concerns can potentially be addressed through innovations like wireless charging technology. Our project aims to develop solar-powered wireless auto charging systems for EVs, which are proposed as a viable solution to reduce oil consumption, air pollution emissions, and electricity costs.

**Keywords:** Electric Vehicles (EVS), Environmental Advantages, Extended Charging Times, Wireless Charging Technology, Solar-Powered.

## I. INTRODUCTION

Electric vehicles (EVs require efficient charging systems that are quick, affordable, and reliable for optimal performance. Wireless charging solutions offer a seamless alternative to traditional wired methods, eliminating the need for plugs, cables, and extensive infrastructure. This paper explores the foundational design, functional concepts, and distinctive characteristics of EV wireless charging. It begins by detailing fundamental wireless power transfer methods, followed by a comprehensive classification and analysis of both dynamic and stationary wireless charging technologies. A novel approach, the Dynamic Wireless Charging System, is also examined, which enables EVs to charge while in motion through magnetic resonance power transmission. This method minimizes energy loss by activating the transmitting coil only when in contact with the receiving coil, inducing voltage known as magnetic flux. The paper discusses current research findings, including the integration challenges and potential advantages of wireless charging, such as extending travel range, reducing battery size, and decreasing charging times. By enhancing user convenience and supporting environmental sustainability, wireless charging technology aims to accelerate the adoption of EVs in transportation networks, thereby reducing carbon emissions and improving economic efficiency.

## II. METHODOLOGY

If wired charging system is built at various charging stations. Wired charging station having more disadvantages such as space required is more, socket of different types, a small substation required, converter circuit is installed at every charging station, range of wire is limited and also time required for charging is more. This all problems are solved by wireless electrical vehicle charging system. In this system Electric Vehicle contains RFID Tag and Magnetic field receiving coil. The charging station contains RFID reader, solar panels, battery charger, battery, microcontroller to turn ON/OFF the relay and magnetic field transition coil. So, while Electric Vehicle is in motion charging can be possible.

**Development Tools Hardware:**

1) Arduino UNO
2) Step-down transformer
3) Solar Plate
4) Primary coil
5) Secondary coil
6) Charging Unit
7) Battery
8) RFID reader & tag

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9) Relay

**Software:**

1) Arduino IDE

2) Proteus

## III. MODELING AND ANALYSIS

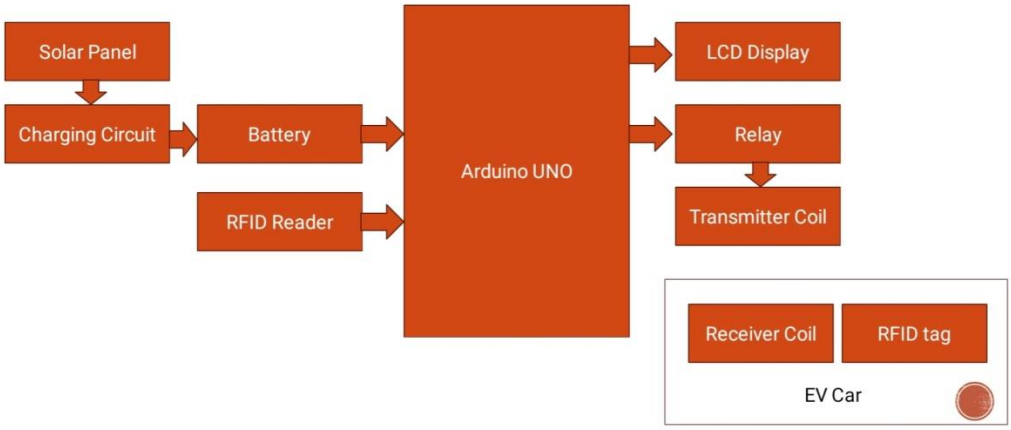


**Fig 1:** Block Diagram

**Description:**

- When solar panel exposed to sunlight, the electricity generated up to 12volts. The generated voltage is sent to the bridge rectifier, filter & regulator to stabilize the voltage. The filtered voltage is applied to the battery to charge it.
- A 12-volt, 4-amp battery is being used. The battery will be charged and the energy will be stored.
- A wireless transmitter attached to a battery generates magnetic field around the coil.
- We can display the all actions using an Arduino UNO and a 16x2 LCD. The coil on the receiver side receives magnetic fields, and the voltage is in DC format. This voltage is applied to the battery in the car, which stores energy and charges it. An LED indicator shows how much charge is left in the battery.
- RFID reader reads tag present on car and it calculates total bill.

**Circuit Diagram:**

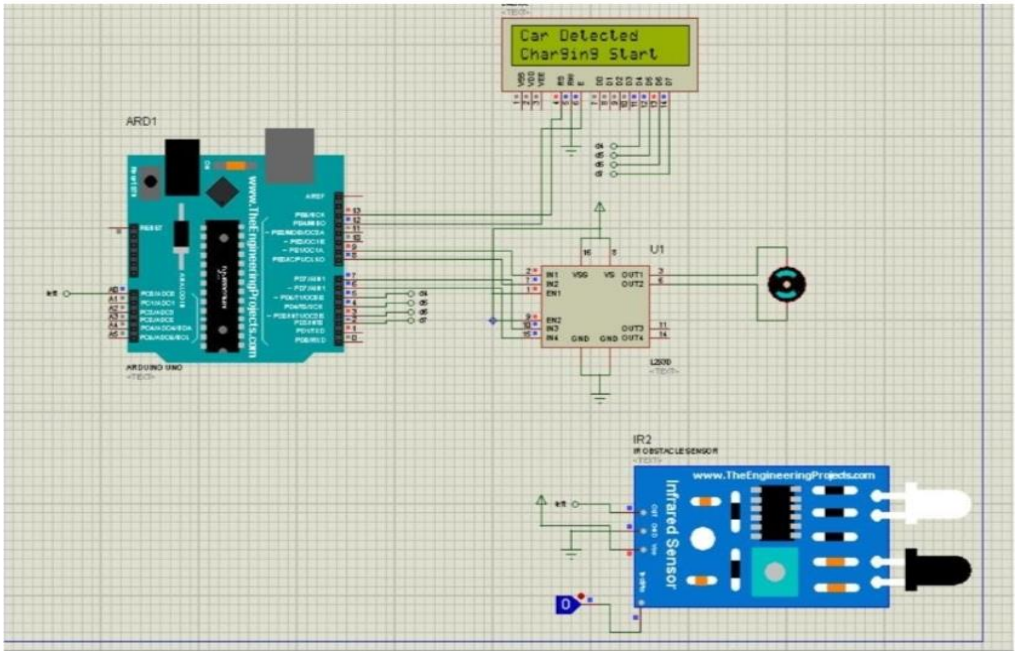


**Fig 2:** Circuit Diagram

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**Flow Chart:**

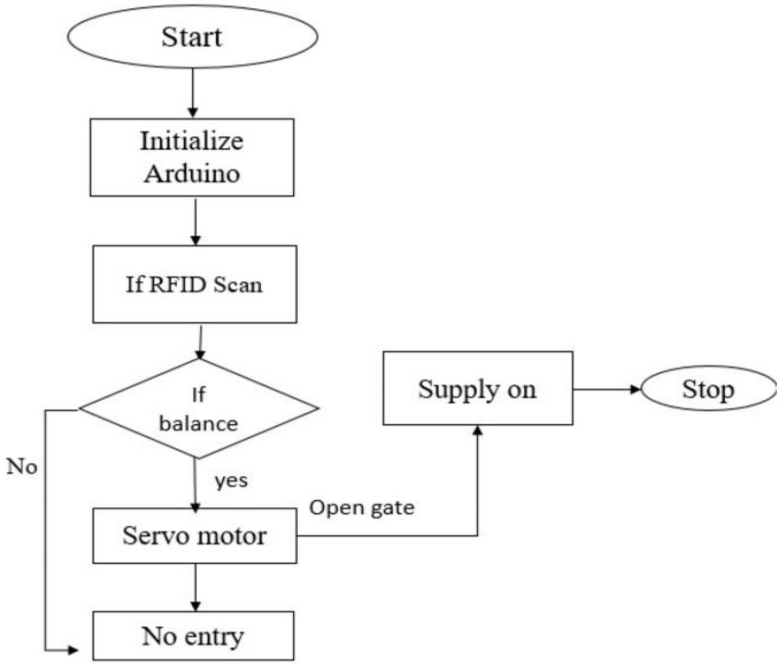


**Fig. 3:** Flowchart

## IV. RESULTS AND DISCUSSION

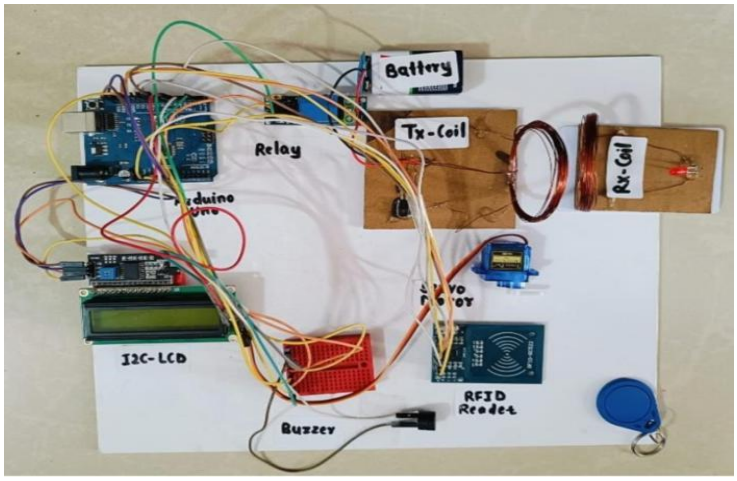


**Fig 4:** Result

## V. CONCLUSION

Wireless charging provide many benefits compared to wired charging in particular, when the roads are electrified with wireless charging capability. In order to achieve higher power transfer efficiency, low harmonics, unity power factor and several stage of power conversion is required.

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