iJRASET
International Journal For Research in
Applied Science and Engineering Technology

# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

**Volume:** 10 **Issue:** VI **Month of publication:** June 2022

**DOI:** https://doi.org/10.22214/ijraset.2022.43425

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue VI June 2022- Available at www.ijraset.com

# Advanced Power Transmission from Road to Electric Vehicle

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***Abstract: With recent advancements in magnetic field simulation speed and capacity, as well as in power electronics, the area of wireless power transmission has grown considerably. Electric cars are being investigated as a possible substitute for internal combustion engine-powered vehicles in the future transport sector, particularly for CO2 reduction and alternative energy purposes. However, because to the vehicle's high weight, large capacity, and restricted driving range, many critical problems must be addressed. The article introduces the novel on-road dynamic wireless charging system for electric vehicles. Repowering technique for rechargeable vehicles is categorized as conductive or wireless, fixed or dynamic, and slow or rapid. In this paper, a concept in which an electric car is charged while in motion, without the need for a halt. Furthermore, a green and creative method to generate energy for the purpose of charging these cars is being proposed.***

***Keywords: Accident; Monitoring;Arduino***

## I. INTRODUCTION

Wireless power transmission (WPT) is a growing and popular technology that is finding applications in a variety of areas. Without the use of connectors, power is transported from a source to an electrical load. WPT is beneficial for powering electrical equipment in sites where physical wiring is unfeasible or impossible. The technique is based on the mutual inductance concept. One of the potential uses is in the automobile industry, particularly in the field of electric vehicles. The motive of this article is to discuss the study and progress of wireless charging systems for power-driven cars that work through wireless transmission. The primary objective is to transfer energy through resonance coupling and to construct charging systems. The systems are composed of an alternating current source, a transmission coil, a reception coil, a convertor, and an electric load, which is a battery-operated.

In the annual term 2020-21, more than 2,36,802 electric cars were sold, compared to 27,11,457 conventional combustion vehicles. The average cost of an electric car is about 22 lacs, while the cost of a conventional combustion vehicle is just 7-10 lacs. When compared to their gasoline-powered equivalents, electric vehicles need 98 percent more time to be completely charged. Electric automobiles are the transportation method of the future. Instead of its conventional induction vehicle competitors, they are a more ecologically friendly alternative that is both environmentally beneficial and more sustainable in the long run. Over time, the demand for electric cars has increased dramatically, owing to a variety of apparent factors, including [2] government support and decreased greenhouse gas emissions, with reduced carbon dioxide (CO2) and carbon monoxide (CO2) emissions being one of the most important. [1] Various nations in Europe and the United States conducted many investigations and came to the conclusion that the car industry was responsible for more than 25% of total greenhouse gas emissions. Automobile owners continue to buy conventional induction cars for the primary reason that they are concerned that the autonomy of electric vehicles will not be adequate to provide a hassle-free trip on the highway. Electric vehicles may be charged using either a cable charger or a wireless charger, which consists of pads that must be put on both the car and the charging station in order for the vehicle to be charged. Later, the fundamental scientific idea of EMI is used in order to generate current, which in turn charges the vehicle's battery. Fig 1 shows the block diagram of the concept of this project.

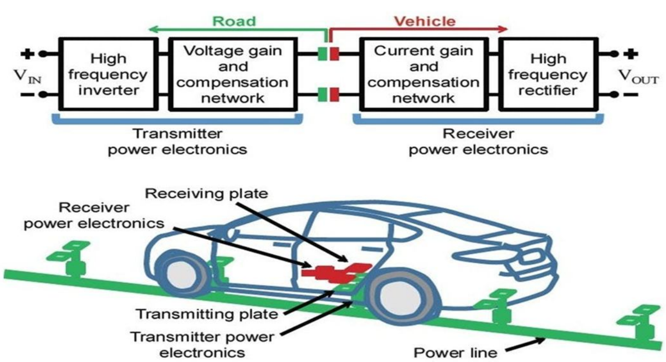


Fig 1. Block Diagram and Demonstration

Nowadays, the globe is moving toward electric mobility in order to decrease pollutant emissions from nonrenewable fossil-fueled cars and to offer an affordable alternative to high-priced gasoline. However, for electric cars, the driving range and charging procedure are the two primary factors limiting their acceptance relative to conventional vehicles. Electric vehicles (EVs) have advanced considerably in recent years, both in terms of performance and range. There are currently a variety of commercially existing models, and the number of EVs on the road is rapidly increasing. Although the majority of current electric vehicles are charged through electric wires, companies such as Tesla, BMW, and Nissan have begun developing wirelessly charged electric automobiles that do not need cumbersome connections. Rather of relying on a physical cable connection, the wireless (inductive) link efficiently eliminates sparking caused by plugging and unplugging. Additionally, wireless charging enables dynamic charging — charging while driving. Once understood, EVs will no longer be constrained by their electric driving range, significantly dropping the need for battery storage.

With the initiation of wire charging technology, there is no need to wait hours at charging stations; you can now charge your vehicle simply by parking it on a parking space, in your garage, or even while driving. We are already extremely acquainted with wireless data, audio, and video transmission, so why can't we transmit electricity over the air?

## II. PREVIOUS WORK

The most well-known technology for WPT in Electric automobiles is an induction motor with a pair of air-core coils. According to Ampère's Law, when the transmitter coil (also called the main coil) is energized with a time-varying current, it produces a dynamic magnetic field surrounding the structure. Induced voltage is seen when a receiver or secondary coil is able to concatenate part of the flux. Following a comparison of conductive and wireless charging, a comprehensive explanation of Static Wireless Charging, Dynamic Wireless Charging, and Quasi Dynamic Wireless Charging is provided. The article discusses roadblocks such as coil design for power pads, frequency, power level restrictions, and misalignment, as well as possible remedies. The standards are then tallied to provide a unified picture of the present state, followed by an explanation of the standards' underlying principles.

Electrical vehicles are simple to operate and therefore popular with consumers. One critical need is that it requires suitable charging and car park space. By integrating these two systems, a planned model is intended to provide an well-organized result to problem. The purpose of this article is to describe the design of a system capable of managing available parking spaces and pricing schedules. The current car park system is incapable of accommodating all vehicle kinds. There is a need for charging places and parking for rechargeable vehicles. The suggested approach enables charging space reservations through smartphone.

The system then handles all related operations based on information such as the vehicle's arrival time and battery state. Customer manager, vehicle manager, map manager, and lot manager are the key components.

## III. PROPOSED WORK

An idea in which an electric car is charged while driving without stopping. Additionally, providing a sustainable and creative method of generating energy for charging these cars. The idea project consists of IR sensors and coils, when the ir sensor is triggered when car comes, the coil below the vehicle is activated through relay and charging of the vehicle starts.

Dynamic WPTS is responsible for charging electric cars. The method uses Electromagnetic Induction, a fundamental concept in magnetism, to induce current through two copper coils. One is located on the vehicle's lower chassis and is referred to as the main coil, while the other is located on the road just under its surface and is referred to as the subordinate coil. The main coil is linked to the power supply through conducting wires. The main coil generates a magnetic field around it when electricity flows through it. Due to the near proximity of the two coils, a magnetic field is produced around the subordinate coil. At any moment in time, the main coil's electricity is transformed to a magnetic field, which generates electricity in the secondary coil. This electrical energy is then transferred to the car's battery through conductive cables, completing the charging process without the vehicle having to stop or slow down at any point. It must be guaranteed that the system consumes no energy while no vehicle is on the road. With the aforementioned in mind, infrared sensors are installed on both sides of the road. These sensors' primary function is to detect any kind of motion. If the sensor detects movement of the vehicle, the system's circuit closes and power is given to the vehicle; if no motion is detected, the circuit remains open, and therefore no energy is used or lost. The energy needed to charge the car may be obtained directly from the vehicle. To generate energy, a flywheel, ratchet, axle, and dynamo may be utilized. The flywheel is placed into the road or speed braker surface in such a way that only about two-fifths of it is visible from the outside, while the other three-fifths is hidden under the ground. The flywheel makes direct touch with the ratchet, which moves in response to the passage of a vehicle over the flywheel. Axle connects the ratchet to the dynamo. The ratchet rotates the axle, which is utilized by the dynamo to convert mechanical energy to electrical energy through the Electromagnetic Induction method.

The energy generated in this manner may be stored in a battery through conductive wires. Additionally, energy may be generated via the installation of solar panels and hydropower facilities. The microcontroller used is Arduino uno, the ir are connected to it, with relays and coding operates the relay corresponding to the IR sensor which is triggered by the vehicle on the road. The project image is shown in fig 3.

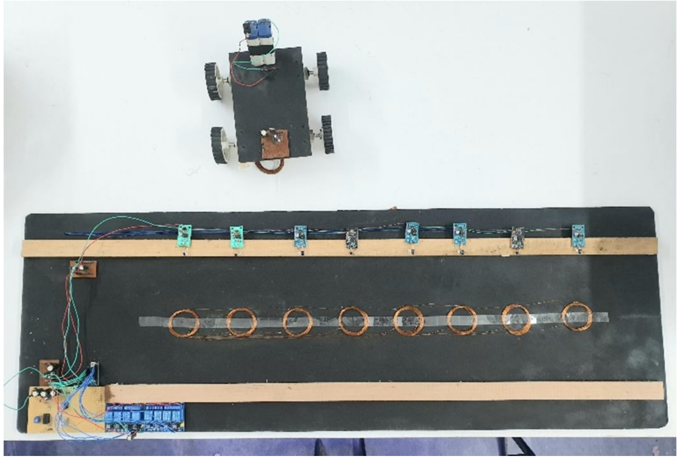

Fig. 2 Project image

## IV. CONCLUSION

Hence, in this paper, a wireless charging system form road to vehicle is demonstrated using Arduino, IR sensor and relays. The increased usage of electric vehicles necessitates the development of new technologies that simplify the charging process by making it more autonomous and requiring less human involvement. This article discusses the technology used to wirelessly charge electric vehicles. It is particularly interested in technologies based on the induction principle, capacitive sensing, radiofrequency waves, and laser powering. As previously stated, the convenience of each method is determined by the needs for wireless power transmission.

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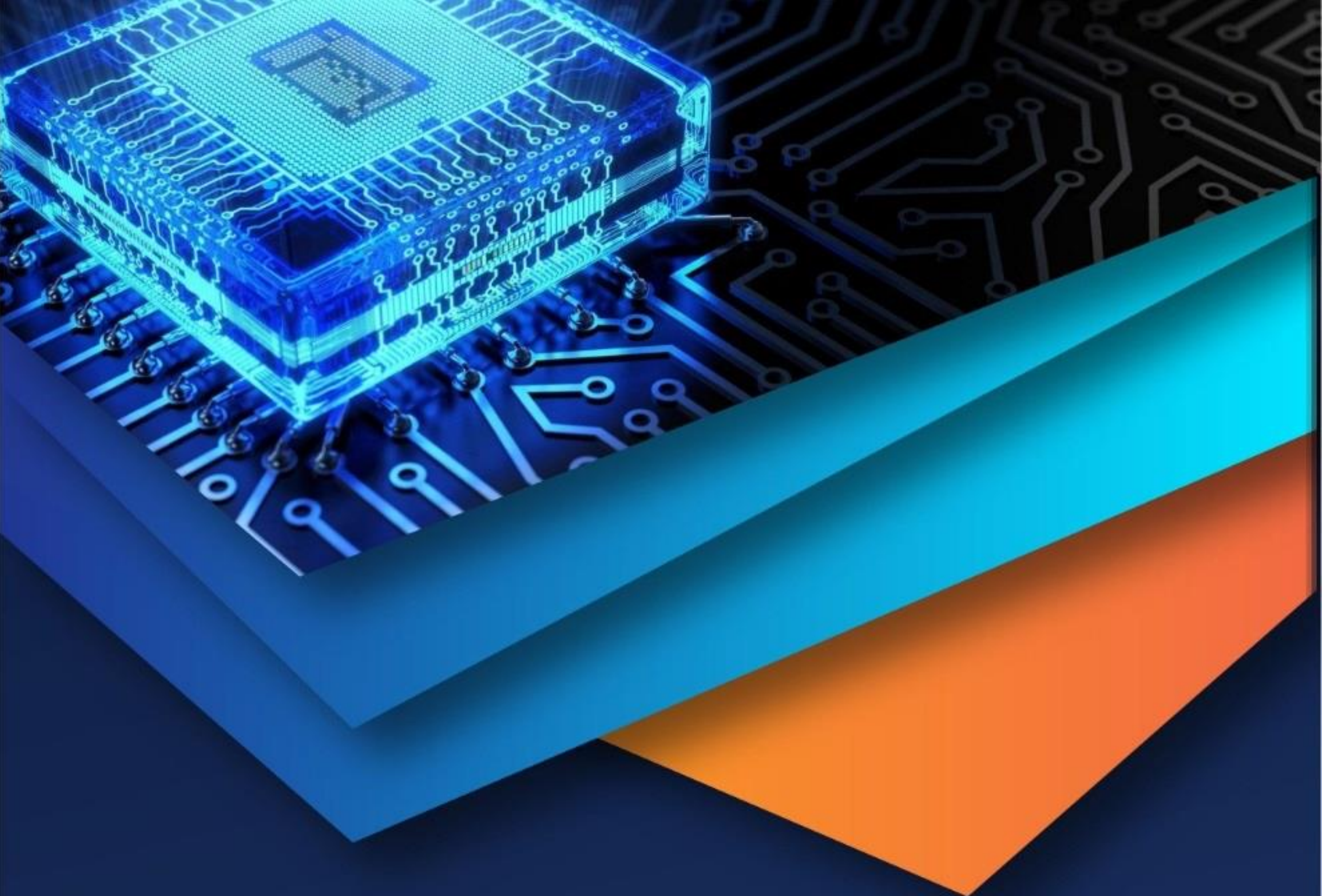

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