International Journal of Advanced Technology in Engineering and Science
Vol. No. 12, Issue No. 03, March 2024
www.ijates.com
ijates
ISSN 2348 - 7550

Wireless Charging System for Electric Vehicle.

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ABSTRACT:

Wireless charging is considered to be environment and user friendly as the wires and mechanical connectors and related infrastructure are not required. Electric vehicles require fast, economical and reliable charging systems for efficient performance. This paper reviews the methods and techniques used for wireless charging in electric vehicles. First, the general techniques for wireless power transfer are described and explained. This paper deals with research and development of wireless charging systems for Electric vehicles using wireless transmission. The main goal is to transmit power using Arduino UNO, LCD display, Ultrasonic sensor, Relay, Tesla Coil.

Keywords: *Charging lane , Dynamic charging, Efficiency ,Electric vehicle, Wireless power transfer.*

I. INTRODUCTION:

Mankind has been using automotive vehicles for transportation from one place to another. These vehicles use internal combustion (IC) engines to drive it. Due to increased number of vehicles there is environmental pollution caused by IC engines and reduction in fossil fuels. The latest innovations in the Automotive Industry are helping to improve fuel efficiency and reduce emissions. One such technological advancement is Hybrid vehicles which use both IC engines and electric motors to drive the vehicles or a car in simple words, helping to reduce the amount of emissions produced maintaining the performance of the engine. However, in the future, the focus is on clean and green energy producing zero emissions. Design and manufacture of electric vehicles has led to major interest in current industry. Since these vehicles run on battery the main drawbacks are high cost, short distance travel and long charging time. Consumers are constantly looking for a better solution to improve the travel efficiency. Hence wired charging systems were built at every gas station. The development of various charging systems has been led by the increasing popularity of electric vehicles (EVs), with wireless charging emerging as a possible replacement for conventional wired charging. This study will concentrate on developing a wireless charging station for electric vehicles.

II. Methodology:

Now a days world is shifting towards electrified mobility to reduce the pollutant emissions caused by nonrenewablefossil fueled vehicles and to provide the alternative to pricey fuel for transportation. But for electric vehicles, traveling range and charging process are the two major issues affecting it's adoption over conventional vehicles. With the introduction of Wire charging technology, no more waiting at charging stations for hours, now get your vehicle charged by just parking it on parking spot or by parking at your garage or even while driving you can charge your electric vehicle. As of now, we are very much familiar with wireless transmission of data, audio and video signals so why can't we transfer power over the Air.

2.1 Working:

Utilizing advanced wireless charging technology, our system transfers power from the charging station to the vehicle without the need for physical connections. Through electromagnetic induction, energy is transmitted wirelessly, allowing for effortless charging while parked.

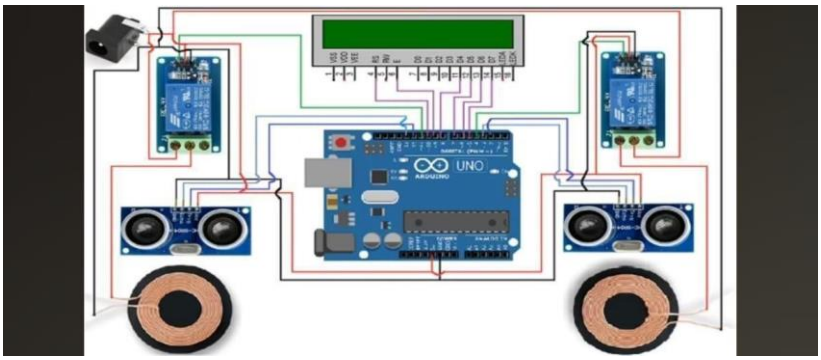

Fig 2.1.1. Circuit Diagram of Wireless Charging System of Electric Vehicle.

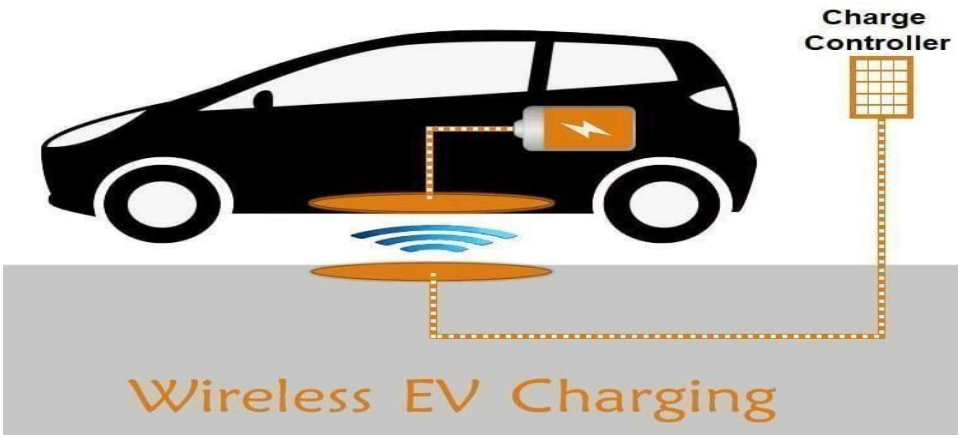

Fig. 2.1.2. Wireless EV Charging System

2.2 Components:

2.1.1. Ardiuno UNO:

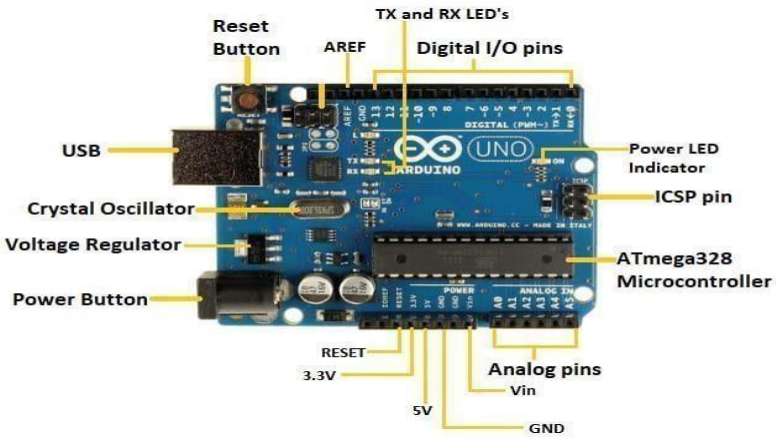

Fig. 2.1.1.1. Ardiuno UNO Board.

Arduino UNO is based on an ATmega328P microcontroller. It is easy to use compared to other boards, such as the Arduino Mega board, etc. The board consists of digital and analog Input/Output pins (I/O), shields, and other circuits. The Arduino UNO includes 6 analog pin inputs, 14 digital pins, a USB connector, a power jack, and an ICSP (In-Circuit Serial Programming) header. It is programmed based on IDE, which stands for Integrated Development Environment. It can run on both online and offline platforms.

2.1.2. LCD Display:

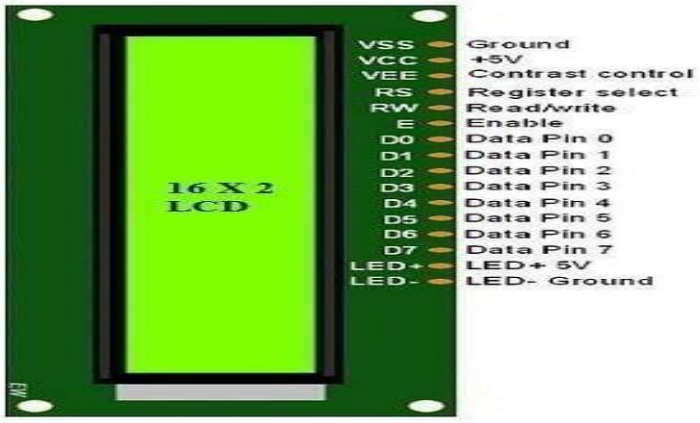

Fig.2.1.2.1. LCD Display

The term LCD stands for liquid crystal display. It is one kind of electronic display module used in an extensive range of applications like various circuits & devices like mobile phones, calculators, computers, TV sets, etc. These displays are mainly preferred for multi-segment light-emitting diodes and seven segments. The main benefits of using this module are inexpensive; simply programmable, animations, and there are no limitations for displaying custom characters, special and even animations, etc.

2.1.3 Ultrasonic Sensor:

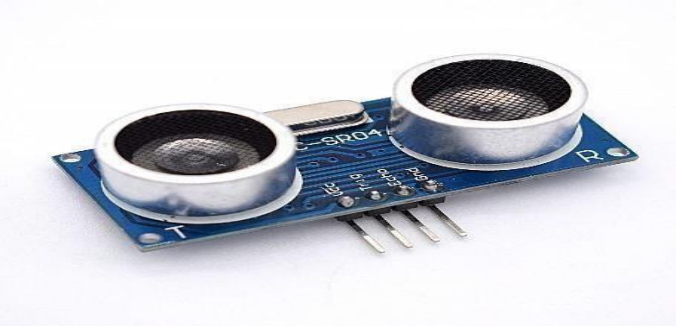

Fig.2.1.3.1. Ultrasonic Sensor.

Ultrasonic sensors work by sending out a sound wave at a frequency above the range of human hearing. The transducer of the sensor acts as a microphone to receive and send the ultrasonic sound. Our ultrasonic sensors, like many others, use a single transducer to send a pulse and to receive the echo. The sensor determines the distance to a target by measuring time lapses between the sending and receiving of the ultrasonic pulse.

2.1.4. Relay

Fig. 2.1.4.1. Relay Circuit

A 5v relay is an automatic switch that is commonly used in an automatic control circuit and to control a highcurrent using a low-current signal. The input voltage of the relay signal ranges from 0 to 5V.

2.1.5. Adapter:

Fig. 2.1.5.1. Adapter.

DC 5V/2A, means that the input voltage, to recharge the battery is 5 volts of direct current. 2A Is the amount of amperage that is suggested to recharge the battery. 5V/2A charger, which could charge a phone up to 40% fasterthan conventional 5V, 1A chargers.

2.3. Features:

- Wireless Charging: Charges electric vehicles without the need for physical cables, offering a convenient andcable-free experience.
- Compatibility: Compatible with a wide range of electric vehicles, ensuring versatility and accessibility forusers.
- Smart Technology: Incorporates intelligent features for efficient energy transfer and optimal chargingperformance.
- Safety Features: Equipped with safety measures to protect against overcharging, overheating, and otherpotential hazards, ensuring user safety and vehicle integrity.
- User-Friendly Design: Designed for easy installation and operation, with intuitive controls and indicators fora seamless charging experience.

2.4. Benefits:

- Convenience: Say goodbye to tangled cables and manual plugging with our wireless charging system, makingcharging hassle-free.
- Efficiency: Streamlined charging process saves time and effort, allowing users to quickly recharge theirvehicles.
- Safety: Eliminating exposed connectors reduces the risk of electric shock and damage, ensuring a

safe chargingexperience for both users and vehicles.

- Environmental Impact: By enabling electric vehicle adoption and leveraging solar energy, our systemcontributes to a cleaner and greener transportation ecosystem.
- Future-Proof: Designed to accommodate evolving electric vehicle technologies, our system offers a scalableand adaptable charging solution for current and future electric vehicles.

III. Result:

Wireless Power Transmission (WPT) is the efficient transmission of electric power from one point to another pointthrough a vacuum or an atmosphere withe ut the use of wire or any other substance. This can be used for applications where either an instantaneous amount or a continuous delivery of energy is needed, but where conventional wires are unaffordable, inconvenient, expensive, hazardous, unwanted or impossible. The power can be transmitted using Inductive coupling for short- range, Resonant Induction for mid-range and Electromagnetic wave power transfer for high range. WPT is a technology that can transport power to locations, which are otherwise not possible or impractical to reach. Charging the battery of electric vehicles by means of inductive coupling could be the next big thing.

Fig. 3.1. Final Model.

IV. CONCLUSION:

In this study, wireless charging of electric vehicles was investigated. Wireless charging for electric vehicles is themost effective technology. Wireless charging has many advantages over wired charging. Due to his extensive travels. It reduces the time required to charge the car and even allows charging EVs on the go. Although the initialcost is high, the cost of treatment will decrease over time. It is used more frequently due to its superiority over traditional cable systems can reduce the effect of power and reduce power loss by using WCEV. It is predicted that the world will be completely wireless in the

future. With further advancements in technology, wireless charging ofelectric vehicles could become a reality. Inverter design control, topology, and personal safety still need further research in the short term.

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