



Real Time Wireless Charging For Ev Using Arduino Microcontroller

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Abstract: Wireless power transmission (WPT) is popular and gaining technology finding its application in various fields. The power is transferred from a source to an electrical load without the need of interconnections. WPT is useful to power electrical devices where physical wiring is not possible or inconvenient. The technology uses the principle of mutual inductance. One of the future applications finds in automotive sector especially in Electric Vehicles. 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 resonance coupling and to build the charging systems. The systems deal with an AC source, transmission coil, reception coil, converter and electric load which are battery.

Keywords: Arduino UNO, Bluetooth , DC Motor, Wireless power receiver coil, Solar panels

• 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.

Wired charging also have some limitations like socket points, spacing occupied by the charging station, limited range of wire, vehicle has to change its orientation to connect to the charger. These can be addressed by wireless charging systems for electric vehicles. This provides flexible and hassle-free charging and also systems can be built at home, parking lot, garage etc. Many wireless power transfer techniques are used to implement this technology.

These methods use coils to transmit power. Coil will produce a shortrange magnetic field, when a second coil is placed an electric current will flow through it. The magnetic field has transferred power from one coil to other called Induction. It is necessary to analyze these techniques based on the application to obtain optimum results for the system to function correctly.

LITERATURE SURVEY

- C. Lee, G. Jung, K. Hosani, B. Song, D. Seo and D. Cho, [1] Present a survey of duration of charging of electric vehicles is limited. Therefore, wireless charging is important for electric vehicles in order to overcome the charging duration problem this paper also provides a current scenario of the art in electric vehicle wireless charging and parameters that requires for charging section.
- F. Lu, H. Zhang and C. Mi, [2] Demonstrate a capacitive power transfer (CPT) technology is an effective and important alternative to the conventional inductive power transfer (IPT). It utilizes high frequency electric field to transfer electric power. The power level and efficiency of CPT systems has been significantly improved and as reached the power level suitable for electrical vehicle charging applications.
- C. Zhu, J. Jiang, K. Song and Q. Zhang, [3] This study representing the wireless charging technology, there are more static wireless technologies, while dynamic charging mode is only a perfection and supplement to it, which is crucial to the promotion of electrical vehicles and is able to make charging work faster and easy. S.

PROBLEM STATEMENT

Electric vehicle is a promising solution for rising emission and fuel price. The only issue with electric vehicles are with the large charging time required to charge the vehicle typically 4-6 hours to charge. Current system allows to charge vehicle when parked, there is no existing system when charge the electric vehicle in real time while it is moving.

METHODOLOGY

BATTERY

When you recharge a battery, you change the direction of the flow of electrons using another power source, such as solar panels. The electrochemical processes happen in reverse, and the anode and cathode are restored to their original state and can again provide full power.

Solar Panel

A solar cell panel, solar electric panel, photo-voltaic (PV) module or solar panel is an assembly of photo-voltaic cells mounted in a framework for installation. Solar panels use sunlight as a source of energy to generate direct current electricity.

Wireless Power Transfer coil

This coil is employed to transfer power to wireless power receiver coil in CAR SYSTEM. This gets power from Grid and solar panel.

➤ ROAD SYSTEM:

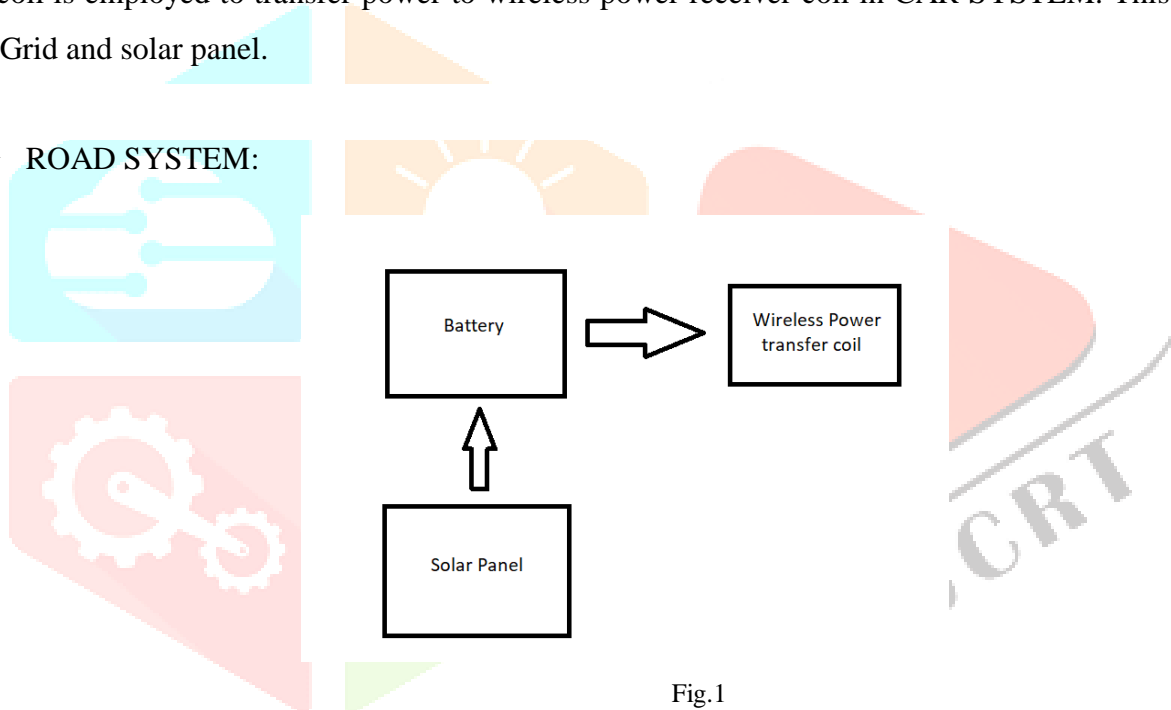


Fig.1

A. Arduino UNO

The ATmega328P-based Arduino UNO is a microcontroller board. It contains 14 digital I/O pins (six of which are PWM outputs), 6 analogue inputs, a 16 MHz ceramic resonator, a USB connection, a power connector, an ICSP header, and a reset button. It comes with everything you need to support the microcontroller; simply connect it to a computer through USB or power it is using an AC-to-DC converter or battery to get started. You can tamper with your UNO without fear of doing something incorrectly; worst case scenario, you could swap the chip for a few bucks and start anew.

B. Bluetooth

Bluetooth technology handles the wireless part's communication channel. Bluetooth modules may wirelessly transmit and receive data utilizing two devices. Using the host controller interface, the Bluetooth module may receive and transmit data from a host system (HCI). This is employed to steer the vehicle.

C. Motor Driver

Motor drivers serve as a link between motors and control circuits. The motor requires a high current, but the controller circuit operates on lower current signals. The role of motor drivers is to convert a low-current controller signal into a higher-current signal capable of driving a motor

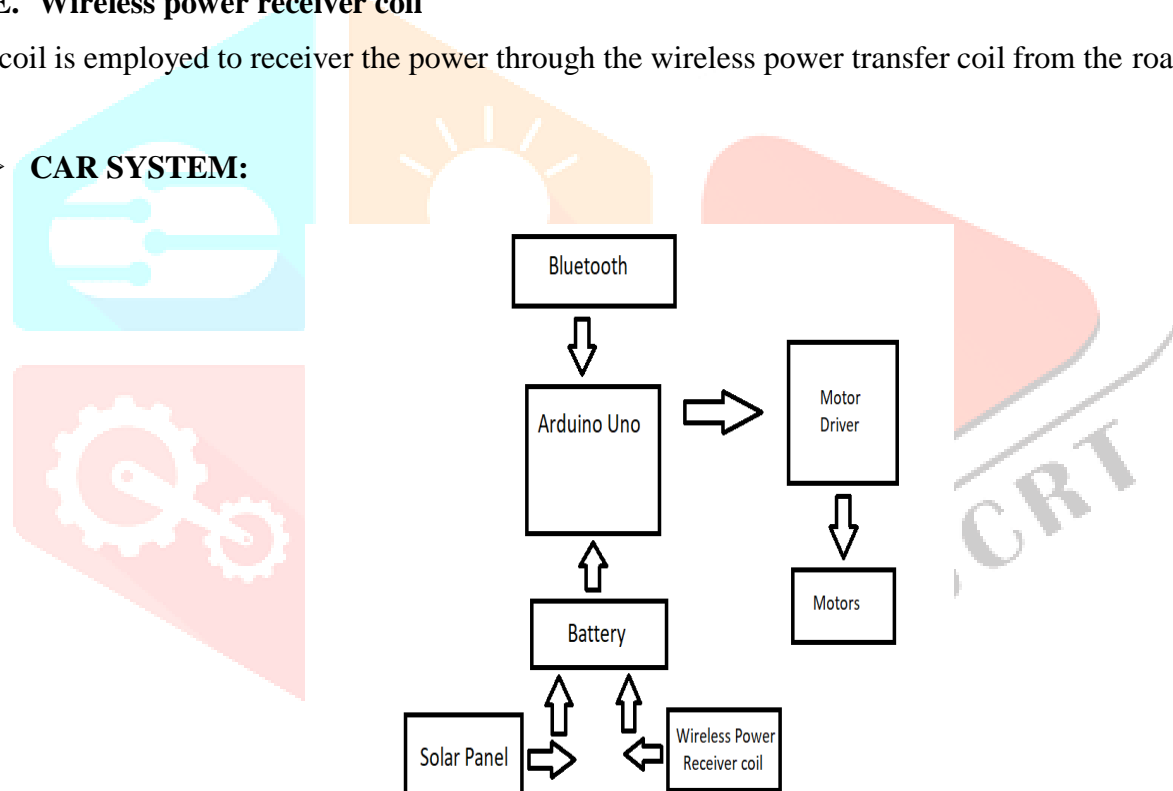
D. Solar Panel

A solar cell panel, solar electric panel, photo-voltaic(PV) module or solar panel is an assembly of photo-voltaic cells mounted in a framework for installation. Solar panels use sunlight as a source of energy to generate direct current electricity.

E. Wireless power receiver coil

This coil is employed to receiver the power through the wireless power transfer coil from the road system.

➤ CAR SYSTEM:



Result and discussion

There is a lot to be said of Arduinos software capabilities, but its important to remember that the platform is comprised of both software and hardware. The two work in tandem to run a complex operating system.

Code → Compile → Upload → Run

At the core of Arduino, is the ability to compile and run the code.

After writing the code in the IDE we need to upload it to the Arduino. Clicking the Upload button (the right-facing arrow icon), will compile the code and upload it if it passed compilation. Once the upload is complete, the program will start running automatically.

Advantages

- Avoid the man power
- Lower maintenance cost than gas power vehicles
- Height weight vehicles
- Charging is convenient
- 80% reduced operating cost than equivalent gas power vehicles
- Zero recharging time and unlimited range (when operating an grid road).

Disadvantages

- Initial installation cost is very high
- Replacing the battery is expensive
- Compatibility of electric vehicles from different manufactures towards a wireless charging station.

Application

- Commercial charging station
- Home charging unit
- Passenger car

CONCLUSION

This research demonstrated a unique wireless charging method that integrates a charging system with a wireless communication technology. The wireless communication technology allows the system to act as the ZigBee and communicate without the need for human involvement. Wireless charging allows the electric vehicle battery to be charged wirelessly using a transmitting coil and a receiving coil in static wireless power transmission (SWPT). The electric vehicle is parked at a designated charging location in this single transmission and a single receiving coil is used for transmitting power. The charging is done while the vehicle is in motion in the numerous transmitting coil and the single receiver coil is used for power transfer the transmitting coil is installed below the road in the Dynamic wireless power transmission. This project was created in the belief that charging an electric car wirelessly without the need for a physical connection would be highly handy and beneficial.

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