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Static Wireless Charging System in Electric Vehicles

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A B S T R A C T

Wireless Power Transfer (WPT) with reverberation satisfaction is an innovation that can free people from tangled cables. In fact, WPT has a similar effect from point of view power exchange. Recently, WPT innovation has grown rapidly at the management level. This makes the WPT useful for electric vehicle (EV) charging applications in both static and dynamic charging states. This paper explores the progress of WPT for EV remote charging. Introducing WPT in EV, charging power can be reduced. Battery novelty does not affect the mass market entry of electric cars. It is believed that experts can use the achievements as support to encourage to improve WPT, just like the EV's sequel.

Keywords: Wireless Power Transfer (WPT), power exchange, management, static and dynamic charging

INTRODUCTION

People always use cars as a means of transportation when traveling from one place to another. The Internal Combustion Engine (IC) is used to power it. As the number of motor vehicles increases, the amount of environmental pollution increases rapidly. The concept of transporting them without polluting the environment will become clear in the coming days. Efficient use of electric vehicles and portable charging will be important in the coming year, as there will be more greenhouse gas emissions and less gasoline products. Electric vehicles do not need to use gasoline as fuel and produce negative levels of pollution compared to conventional vehicles. For this reason, electric vehicles and efficient payment methods gain importance. A total of 4,444 EVs are charged. That's why the concept of wireless payment was proposed, and cars can be charged on the go. The reason I came across this job is to let the electric car wireless transmission model know the electric load of the electric car, that is, to sail a lot. The idea presented in our project, toll booths, traffic lights, roundabouts, heavy traffic etc. It is to place transmitter coils on roads where traffic is very slow, such as A pickup coil connected to the hub of the car charges from the wire and battery. Electric cars have a engine and usually a backup battery to power the engine.

LITERATURE REVIEW

Wireless Charging System is one of the best ways to charge electric vehicles. Wireless charging has many advantages over wireless charging. Because there are many trips. It reduces the time they take to charge the car and allows the EVs to charge while driving. Initially this will cost a lot but eventually it will be less expensive to maintain.[1]

In this project [2], they designed a radio for the Electric Vehicle to have better transmission power. It extends the vehicle's battery life and solves the overheating problem due to plug- in charging. This has a lot of heat loss during charging, which directly affects the life of the battery, so battery thermal management is an important issue for electric cars.

In this article [3] continues to develop and refine the electric car technology and the payment method it created. Conventional phone charging Wireless charging is now complete. Compared with the traditional payment method, the traditional payment method is complex and must be combined with the socket and charging line at the same time to complete the payment, while wireless charging is to know the special electricity transmission. Operation of electricity is easy and fast.

This article [4] is about wireless charging technology for electric vehicle batteries. Design and assemble a Inductive Power Transfer (IPT) system for electric bicycle battery charging. The goal is to create a prototype of the toy car. After the magnetic field of the IPT coil is created, the electronic model of the connected model is obtained and obtained to complete the design of the whole system with the electronic simulation tool.

This article [5] provides details on wireless charging for the EV. WPT technology has advantages such as energy efficiency, lower environmental impact, lower cost of living and greater convenience and security operation advantages. EV penetration is expected to increase over the next decade as EV technology, electric charging and shared locations advance. In this context, the fact that wireless charging does not spark, that the is not affected by the environment and is suitable for unmanned operation has attracted the attention of many

WORKING

The system includes transmission and reception. The following parts are used in our project: The step-down transformer of the transmitter unit, the rectifier bridge, the filter, the high-frequency part, and the transmitter coil.

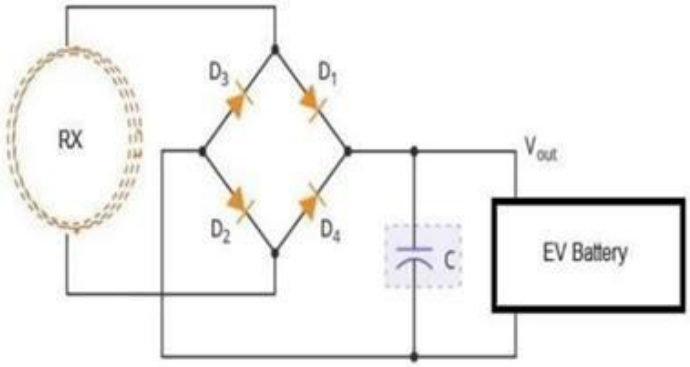

Fig 1. Transmission block

In the emitter section, a transistor generates a high frequency alternating current on a coil, which creates a magnetic field around it. When the coil is neutral, the starts charging from both sides of the coil. One side of the coil is connected to the resistor and the other side to the collector of the NPN transistor. During charging, the base resistor starts to move and eventually opens the transistor. Transistor then discharges the inductor when the emitter is grounded. This charge and discharge of the inductor causes a frequency oscillating signal to be transmitted, creating the magnetic field.

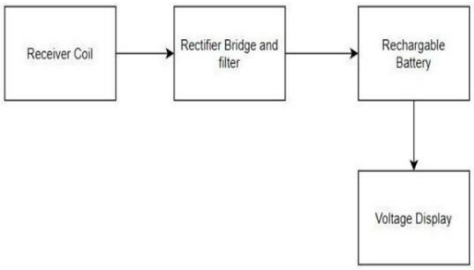

Fig 2. Receiver side block

On the receiving side, this magnetic field is sent to another coil and according to Faraday's law of induction, the receiving coil starts. to generate an EMF voltage of , which is also used to charge the battery.

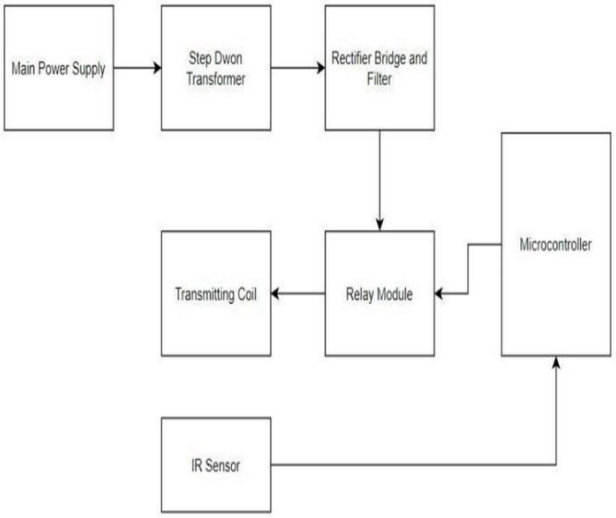

Fig 3. Internal working of the receiver block

On the receiving side: on the receiving side, after receiving power, on the receiving side, use the coil, rectifier bridge, filter, battery, rectifier bridge and filter to convert into pure current. It is then stored in the battery.

MAJOR TOOLS USED

1N4007

1N4007 is a PN junction rectifier diode. Such diodes only allow current to flow in one direction. Therefore, it can be used to convert current to direct current. 1N 4007 is electrically compatible with other rectifier diodes and can be used as a replacement for 1N400X series diode 1N-4007 has different applications in real life eg. Freewheeling diode application, general repair of power supplies, inverters, converters, etc.

Fig 4. 1N4007 DIODE

PCB Board

General purpose PCBs are, as the name suggests, a generalized version of the PCB. Generalized means we are free to make any kind of circuit as we want to use this PCB. This makes the suitable for small-scale electronics and new ideas before production. The is like a regular PCB, as a unit it offers a way to keep all the components in one place. However, it does not allow the equipment to be attached to the using screws from the custom PCB. Therefore, the user must make the connection himself using wire or soldering point.

TTC5200

Probably the most common type of transistor is the BJT. The assembly consists of three parts, which can be designed as NPN or PNP; where N selects n-type or negative voltage, and P selects p-type or positive voltage.

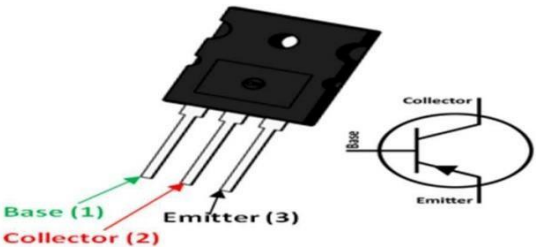

Fig 5. TTC5200 transistor

In addition, the BJT is designed with three terminals: collector, base and emitter, and the three types or operating zones listed below.

BJT Mode Operation

- □ Close Circuit

The BJT is electrically isolated in this mode and no current flows between the source and the emitter. This state is used as a closed system for application changes.

- □ Saturation Region

The Saturation mode is the exact cut mode. Here the maximum current flows through and the transistor acts like a short circuit.

▪ For Working Area to be used as a noise source, the BJT must be in the active cut-off and saturation region of

. In this mode characteristic IV is determined by the collector current and the voltage from the collector to the emitter; At the extremes of cut off and saturation, amplification will occur with characteristic.

Microcontroller

Arduino is an open-source electronic device based on easy- to-use hardware and software. Arduino boards can read inputs - light from a sensor, finger on a button, or a Twitter message - and turn that into an output - activate a motor, turn on an LED, they can announce something online. You can tell your board what to do by sending the command to the microcontroller on the board. For this, you can use the Arduino programming language (wiring based) and follow the Arduino software (IDE).

Over the years, Arduinos have been at the center of thousands of projects, from everyday tools to complex research tools. Students, amateurs, artists, professionals and professionals from around the world - gather around this open platform, and contributions add a lot of accessible information that can be shared by both novices and Professionals. The Arduino was created by the Ivrea Interaction Design Institute as a simple tool for rapid prototyping for students without electronics and programming backgrounds. As they entered the wider community, Arduino boards began to evolve to suit the new needs and challenges of the, diversifying its offerings from simple 8-bit boards to products used for IoT applications, wearables, 3D printing, and embedded environments.

Atmega 328

Atmega 328 has 1KB electronically erasable programmable read-only memory (EEPROM). This device demonstrates that the microcontroller can store data even if the power supply is cut off and provides results when powered. Additionally, the ATmega- 328 has 2KB of static random-access memory (SRAM). Other features are described later. The ATmega 328 has many different features that make it the most popular device on the market today. These features include RISC architectural quality, high performance, low power consumption, real-time with independent oscillator, 6 PWM pins, programmable serial USART, programmable serial USART, dongle for software security, 20 MIPS throughput up to takes place. The ATmega-328 is mainly used for Arduino. More details on the ATmega 328 and are provided later in this section.

Voltage Divider Circuit

A voltage divider circuit consisting of two resistors in series will divide the input voltage to bring it within the range of the Arduino analog inputs. The voltage divider equation assumes that you know three values of the above circuit: the input voltage (Vin), and both resistor values (R1 and R2). Given those values, we can use this equation to find the output voltage (Vout)

$$V_{out} = V_{in} \cdot \frac{R_2}{R_1 + R_2} \quad (1)$$

This equation states that the output voltage is directly proportional to the input voltage and the ratio of R1 and R2.

IOT Module NODEMCU

The Node MCU is a great device versatile enough for us to do most of the development. It is Arduino compatible, has built- in Wi-Fi, and has pulses, enough to power three IoT devices. Connect to our gateway or cloud solution.

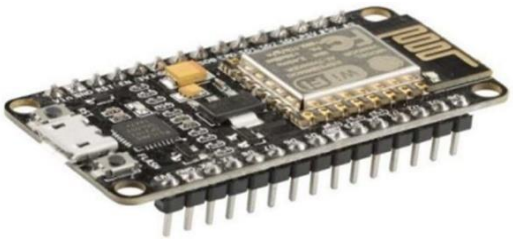

Fig 6. IOT Esp8266 Node MCU

" Node MCU is an open source IoT platform. It contains firmware and hardware-based ESP-12 module running on Espressif ESP8266 Wi-Fi SoC. By default, the term "Node MCU" refers to the firmware, not the device. The firmware uses the Lua scripting language.

LCD Display 16X2

Time LCD means Liquid Crystal Display. It is an electronic display module, is widely used in various circuits and devices, such as model, circuit, mobile phone, calculator, computer, TV and other things. This instruction is used only with multi-segment LEDs and seven segments. The main advantage of using this module is that it is inexpensive, easy programmability, animation, screen special symbols, custom and even animation etc.

RESULTS

The input and output voltages were measured when the battery was charged in CC and CV mode. Note that Input power is the product of the DC input voltage and the current measured at the DC power supply. The product of battery voltage and current is specified as the output voltage. Input and output voltage measured choke coil in parallel position and 75% misaligned System efficiency comparison in parallel position and 75% misaligned.

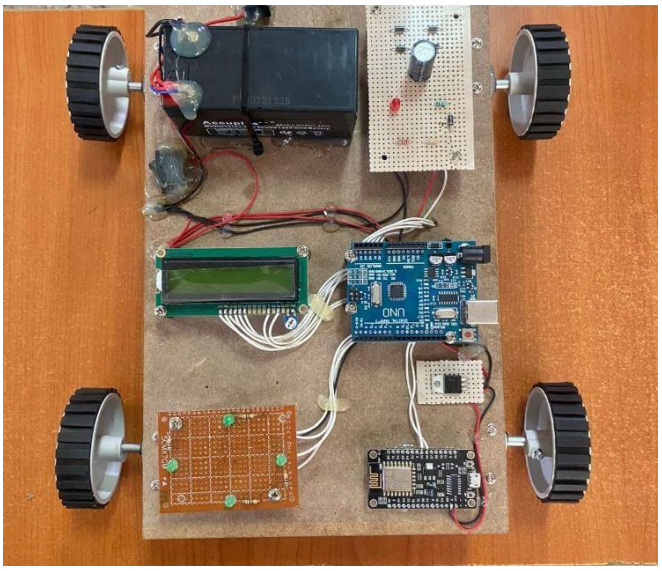

Fig.7 (a) Receiver side set up

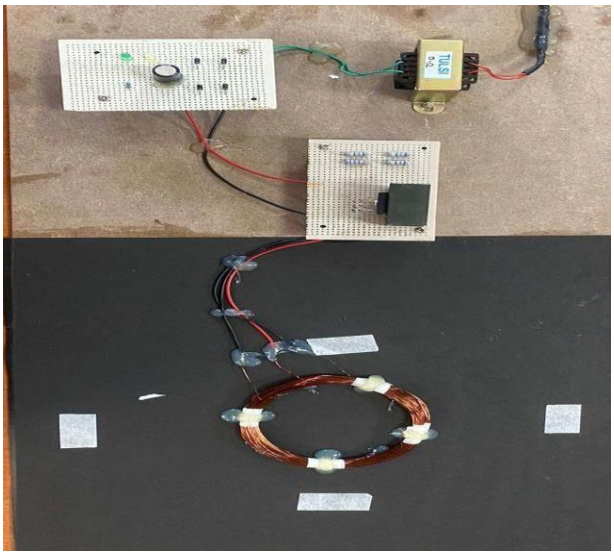

Fig.8 (b) Transmission side hardware set-up

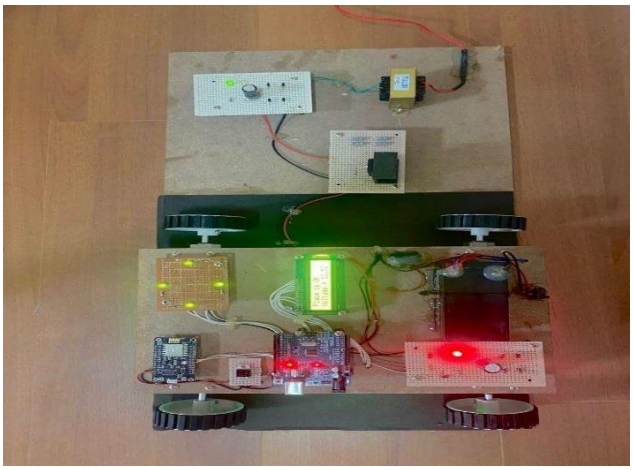

Fig 9. Overall working hardware

CONCLUSION

This paper offers a wireless charging model for an electric vehicle. It is true that the electricity use of cars is impossible due to the environmental and electrical problems of them. Wireless charging offers many advantages over wireless charging. Whether or not the battery produces electricity, especially when using wireless charging on the road, will provide the basis for a broad EV market. With the development of technology, wireless charging of electric vehicles is recommended. More research needs to be done on the topology, management, other design features, and human safety in the near term of the

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