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Charging of Electric Vehicle using Wireless Power Transmission with Renewable Energy Source

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Abstract -
In this distributed energy storage. On the other hand, the electrification of person transport vehicle seems to be inevitable trend. Thus, an attractive way to store the energy of the grid is to use the onboard battery of these electric vehicles by connecting them to the grid "Vehicle to Grid". The conventional way to do this is to use a wired connection. In general, the driver connects his car mostly to charge and not to serve as a storage medium. An alternative is inductive power supply which permits an automated connection to the grid without interaction of the driver and meets the efficiency requirement of more than 90%. Combined with a PV-Module the bidirectional connection of an EV gets more attractive, when realized with an inductive wireless energy transfer system, since the automatic connection to the grid is more often and regular than with a cable connection.

INTRODUCTION:

Growing concern in the reduction of the polluting emissions due to the transportation means has led to the adoption of vehicles powered by comparatively cleaner sources of energy, such as batteries, fuel cells and so on, in place of internal combustion engine (ICE) based vehicles. Differently from ICE vehicles, electric vehicles (EVs) are not a matured technology in terms of vehicle autonomy, and a lot of research efforts is being carried out by academia and industries to improve the overall performance of these vehicles. Various solutions are being adopted to increase the autonomy of the vehicles such as conceiving batteries of higher energy density, relaxing the batteries being adopted to increase the autonomy of the vehicles such as conceiving batteries of higher energy density, relaxing the batteries Due to limited availability of resources it has become essential to develop alternative methods to generate energy. Wireless Power Transmission (WPT) is thus an approach to noiseless, cost efficient and convenient charging. It is estimated that losses incurred due to wires is about 20-30%. Hence WPT attempts to minimize these losses along with reduction in pollution levels caused due to resources used presently. Wireless Power Transmission can be used to charge electronic portable devices. The Solar Power Satellites (SPS), which are expected to operate in 2025-2030, are manufactured on the concept of capturing solar energy in space for utilization on Earth. The SPS designs are largely based on WPT. However, the current major application is the charging of electric cars, fuel-less rockets, fuel-less planes, etc.

a) The basic working principle of inductive WPT Charging is that there are two parts of the inductor. One part of the inductor acts as a primary winding and the other half acts as a secondary winding of the transformer. The role of the charger is to convert the low frequency AC power to high frequency AC power. The high frequency AC is transmitted from the charger to the secondary side and then is converted to DC power and is supplied to the battery pack. In the system uses a solar technology-based model is for the overall circuit supply when in the presences of sunlight the solar photovoltaic cell is charged and then it send the energy in the form of electric current.

b) Microcontroller continuously monitor the all system.

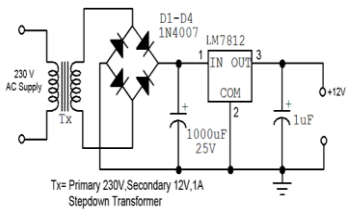
c) The magnetic coil used for Wireless Power Transfer relies on magnetic induction between planar receiver and transmitter coils. Positioning the receiver coil over the transmitter coil causes magnetic coupling when the transmitter coil is driven.

d) The overall system has an power of 12v and 5v the 12 is for the battery charging and the 5v for the electronic components and the circuitry.

Experimental Setup:

(A) Wireless Module: The 5v 2a large current wireless charger module has transmitter and receiver charging coil. Module is used for a variety of small electronic products, wireless charging, power supply development and design, with a small size it is easy to use, it has high efficiency and low-price characteristics.

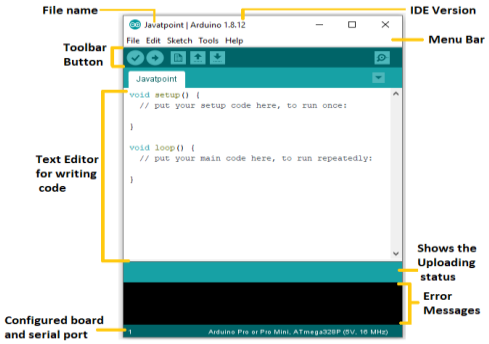
(B) Power supply:



The electrical power is almost exclusively generated, transmitted and distributed in the form of ac because of economical consideration but for operation of most of the electronic devices and circuits, dc supply is required. Dry cells and batteries can be used for this purpose. No doubt, they have the advantages of being portable and ripple free but their voltages are low, they need frequent replacement and are expensive in comparison to conventional dc power supplies.

Software used:

ARDUINO IDE



The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software.

This software can be used with any Arduino board.

Refer to the Getting Started page for Installation instructions.

The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in functions from C and C++

[2] It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards.

[3] The source code for the IDE is released under the GNU General Public License, version.

[4] The Arduino IDE supports the languages C and C++ using special rules of code structuring.

[5] The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main () into an executable cyclic executive program with the

GNU tool chain, also included with the IDE distribution.

[6] The Arduino IDE employs the program avrdude to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware.

[7] By default, avrdude is used as the uploading tool to flash the user code onto official Arduino boards

[8] Arduino Pro IDE:

Developer(s) : Arduino Software

Preview release : v0.0.2 / 28 October 2019; 4 months ago [9]

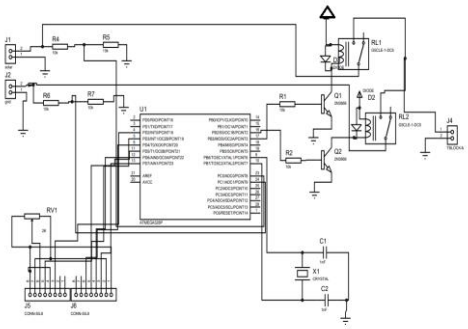
Proteus is ahead in simulating the circuits containing the micro controllers where we can simulate the circuit by uploading the hex code to the Micro-controller where as Multism can’t do this.

Netlist file (Written in Verilog Code) if needed for your usage can also be extracted from the tools option in this software.

PROTEUS

Repository : github.com/arduino/Arduino
Written in : C, C++ The Proteus is an electronic circuit design software which includes a schematic capture, simulation and PCB (Printed Circuit Board) Layout modules. But generally, now a days Eagle CAD is highly preferred over Proteus for PCB designing because of its flexibility.
Even though if you are not using for PCB designing u can view the PCB layout of the component individually while selecting the component it helps during the soldering of components in PCB.

CIRCITE DIGRAM:

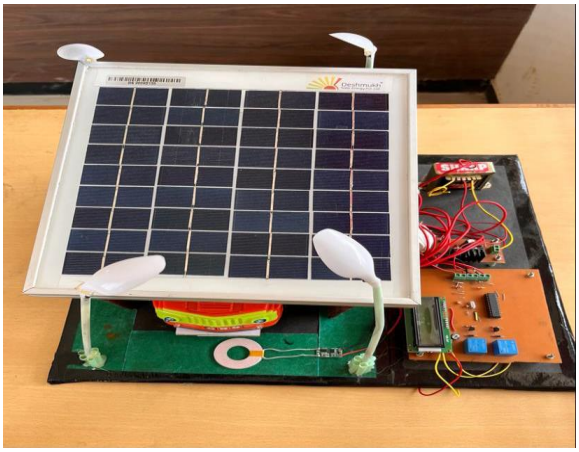


Working:

Microcontroller 328p is the heart of the system .the system uses a solar technology based model is for the overall circuit supply when in the presences of sunlight the solar photovoltaic cell is charged and then it send the energy in the form of electric current the output of solar panel is about 12v then this is then send to the battery for the charging of battery main board microcontroller continuously monitor the all system then ,when the vehicle is in contact with the coil then Wireless Power Transfer relies on magnetic induction between planar receiver and transmitter coils. Positioning the receiver coil over the transmitter coil causes magnetic coupling when the transmitter coil is driven. Flux couples into the secondary coil, which induces a voltage and current flows.as this process is done when the vehicle coils comes in contact as the contact of coils is fails the vehicle charging is stopped ,if the solar power is not available then the coils is contact with the main grid and the with help of grid the vehicle coil is gets energy and the charging is on of the battery storing is started and the continues system is running with no destruction the overall system has an power of 12v and 5v the 12 is for the battery charging and the 5v for the electronic components and the circuitry.

1. **Experimental Setup:**

RESULT :



Conclusion and future scope:

Conclusion:

It is seen that the distance between primary coil and secondary coil is decreases. When it comes to voltage generated on secondary side as the distance between two coils increases the induced voltage decreases. Hence for wireless charging, the trade-off is maintaining the distance between primary and secondary coil for smooth voltage characteristics. A voltage regulator is useful at receiver side for obtaining fixed voltage.

Future Scope:

We can add health monitoring and accident alert system.

We can build this all-wireless vehicle charging in rural area for the more efficient working.

Smart charging station.

Renewable energy-based charging station.

Cars such as the Nissan Leaf entering the market in 2011. However, there is no doubt that barriers to mass-market adoption still remain, primarily in terms of efficiency, cost and usability so these challenges are in future.

Applications

- Consumer electronics.
- Transport

Heating and ventilation

Industrial engineering

Model engineering

References:

[1] M Maqsood and N Nauman Nasir, Wireless electricity (Power) transmission using solar based power satellite technology, Journal of Physics, 2013
[2] Fariborz Musavi, Wilson Eberle, Overview of wireless power transfer technologies for electric vehicle battery charging, IET Power Electronics, 2013
[3] Sanghoon Cheon, Yong-Hae Kim, Seung-Youl Kang, Myung Lae Lee, Jong-Moo Lee, and Taehyoung Zyung**,** Circuit-Model-Based Analysis of a Wireless Energy-Transfer System via Coupled Magnetic Resonances, IEEE Transactions on Industrial Electronics, Volume: 58, Issue: 7, July 2011[4] Seungyoung Ahn, Nam Pyo Suh & Dong-Ho Cho, Charging Up the Road, IEEE Spectrum, Volume: 50, Issue: 4, 2013
[5] S.Y.R. Hui, Fellow, IEEE, W.X. Zhong and C.K. Lee, Member, IEEE, A Critical Review of Recent Progress in Mid-Range Wireless Power Transfer, Energy Conversion Congress and Exposition (ECCE), 2012
[6] André Kurs, Aristeidis Karalis, Robert Moffatt, J. D. Joannopoulos, Peter Fisher, Marin Soljac˘ic´, Wireless Power Transfer via Strongly Coupled Magnetic Resonances Science, Vol. 317, Issue 5834, 2007