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"SOLAR BASED WIRELESS ELECTRIC VEHICLE CHARGING"

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ABSTRACT :

Transportation with electrified motors can reduce worldwide dependence on fossil fuels and decrease the emission of green house gases. Recent improvement were focused on improvement of electric cars, hybrid electric powered cars and gas cellular motors. How ever the industrial improvement of electric cars has lagged behind due to technological troubles in related to the battery which include: charge, weight, extent, riding distance and restrained investment in charging infrastructure.

Wi-fi charging thru inductive coupling can be one of the next technology that carry the destiny closer. In this assignment it's been proven that it's far feasible to charge electric powered car wirelessly through inductive coupling. It minimizes the complexity that arises for using conventional twine machine. In addition, the assignment also opens up new possibilities of wi-fi systems in our different each day life uses.

Keywords: Electrified vehicles, Inductive coupling, Wireless charging, Battery technology, Sustainability

1. Introduction :

1.1. Electric powered motors provide superior strength performance while imparting an big capability for lowering CO2 emissions if the electricity is provided from a renewable or nuclear source. However, they're currently neither variety- nor fee-competitive compared to conventional motors, because of confined options for recharging, and expensive power garage (batteries).

1.2. This project aims at extending the wireless power transfer to the charging of shifting electric powered vehicles and static charging. The fulfillment of this application may prove to be a completely big step forward closer to the opportunity of unlimited range electric powered mobility. By means of extending the variety of electrical vehicles, this undertaking will make a contribution to overcoming a important difficulty of existing electric motors, by using offering range at aggressive expenses.

2. Objectives

1. develop efficient and less expensive battery era to address issues together with rate, weight, extent, and riding distance for electric cars.

2. establish a sturdy charging infrastructure to guide sizeable adoption of electric cars, addressing worries approximately accessibility and comfort for users.

3. look at and put into effect wireless charging technologies, including inductive coupling, to simplify the charging technique and enhance consumer revel in.

4. promote sustainability and reduce greenhouse gas emissions by using the aid of accelerating the transition from fossil gasoline-powered cars to electrified options.

3. Literature Survey

"Wi-fi Charging of Battery in electrical car the usage of sun power." Authors: Patil, Manoj D., et al.
The paper 1 describes the wi-fi charging of battery in electric automobile the usage of sun strength. This paper offers the knowledge approximately the charge of electrical vehicle thru wireless charging device. The maximum crucial of wi-fi charging era has designed with copper coil with running voltage of 5v.

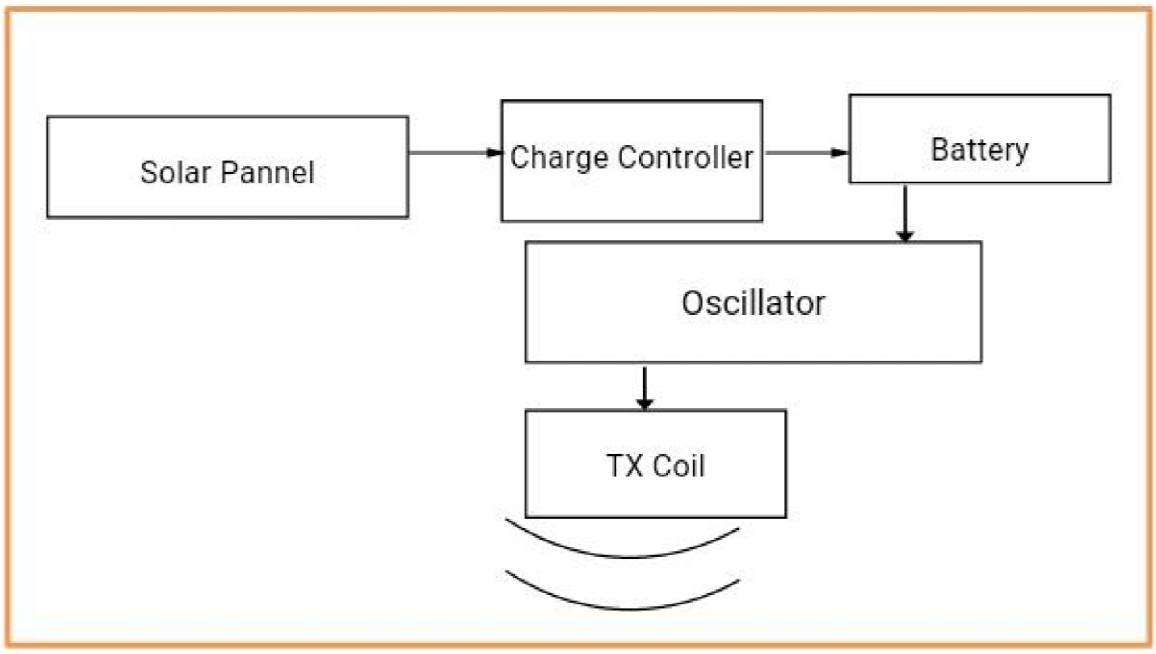
"Sun wireless electric powered car Charging gadget." (2022)
Authors: Prasad, Bugatha Ram Vara, M. Geethanjali, M. Sonia, S. Ganeesh, and P. Sai Krishna.
The paper 2 describes approximately the battery charging technique for electric motors from wired to on street wireless charging given the different sorts charging machine. The gives the difference between the wired charging and wireless charging.

"Wise wi-fi charging station for electric motors,"
Authors: A. Sultanbek, A. Khassenoy, Y. Kanapyanov, M. Kenzhegaliyeva and M. Bagheri, the paper three describes the evaluation experimental result and variety edition of magnetically wi-fi electricity switch. It gives the space among the primary coil and secondary coil. The parameter of coils is shown consistent with their distance.

4. Methodology

A solar-based wireless electric car charging station leverages the power of the sun to provide wire-free charging for electric vehicles (EVs). Here's a breakdown of the methodology. The system relies on IPT, which uses magnetic fields to transfer energy wirelessly between two coils. A transmitting coil, embedded in the ground at the charging station, generates a magnetic field when energized with electric current. A receiving coil, installed on the underside of the EV, interacts with this magnetic field, inducing an electric current in the EV's battery.
Solar Panels: Capture solar energy and convert it into electricity. The number of panels depends on factors like desired charging power, sunlight availability, and local regulations.
Power Conditioning Unit (PCU): Manages the incoming solar power. Includes an inverter to convert DC (Direct Current) from the solar panels to AC (Alternating Current) for further processing. May also incorporate a Maximum Power Point Tracking (MPPT) system to optimize solar power output.
Transmitting Coil: Designed to create a strong magnetic field within a specific charging zone.

Fig 4.1: Transmitter Side



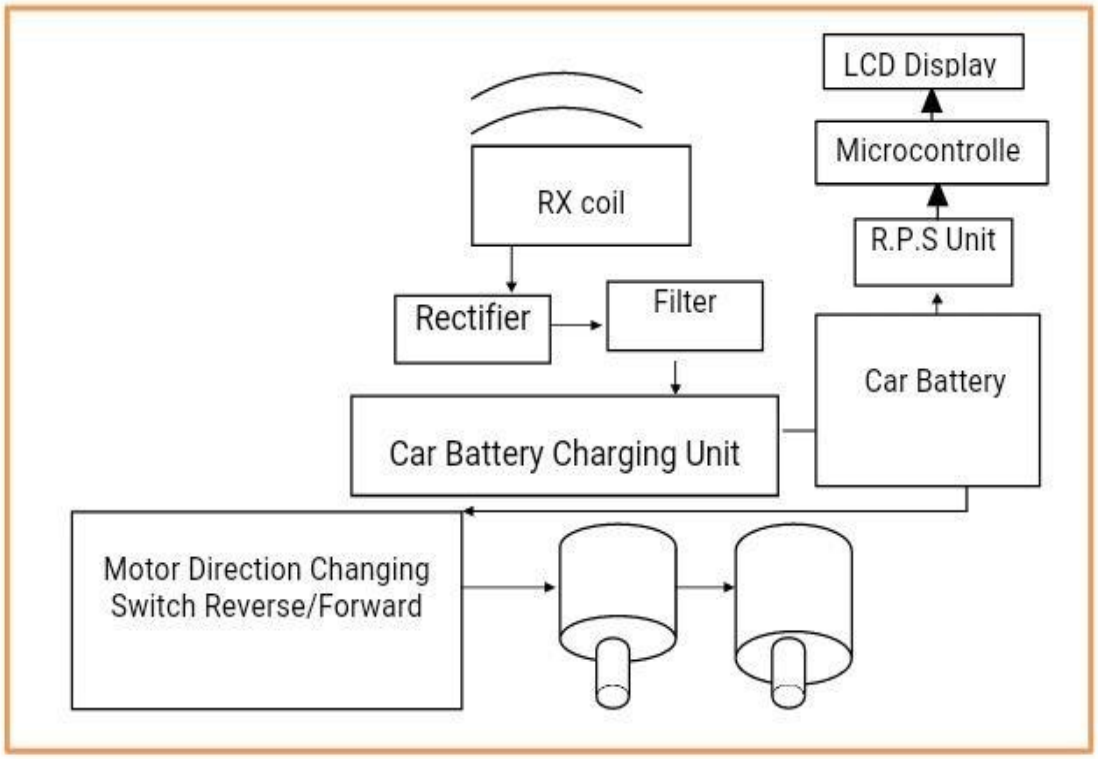


Fig 4.2: Receiver Side

5 HARDWARE COMPONENTS

5.1Arduino Uno Module

The Arduino Uno is an open-supply microcontroller board based totally on the Microchip ATmega328P microcontroller and developed by way of Arduino. cc. The board is equipped with sets of virtual and analog enter/output pins that may be interfaced with various enlargement forums and different circuits.

Fig 5.1: Arduino Uno

5.2 Rectifier

The characteristic of the rectifier is the conversion of AC to DC current or voltage, in the rectifier circuit a full wave bridge rectifier is used. all through superb half of cycle of secondary voltage on the give up P of the secondary winding becomes wonderful and stop Q is terrible. This makes diodes DI & D3 ahead biased whilst diodes D2 and D4 reverse biased. So handiest diodes DI and D3 conduct. these 2 diodes could be in collection through the weight RL.

In the course of poor half of cycle of secondary voltage quit p of the secondary winding becomes bad and cease Q is wonderful. This makes diodes D2 & D4 forward biased while diodes D1 and D4 opposite biased. hence diodes D2 and D4 behavior.

Fig 5.2 Rectifier

5.3 Solar Pannel

Solar panels are devices which use silicon to generate electricity from daylight. they arrive in various kinds, inclusive of monocrystalline and polycrystalline, with extraordinary efficiencies. established on rooftops or structures, they generate direct present day (DC), which is transformed to usable alternating contemporary (AC) through inverters. solar electricity is environmentally pleasant, with minimum maintenance, and can be value-effective through the years.

5.3 Solar panel

5.4 Battery

A battery's a source of energy. consisting of 1 or greater electrochemical cells and terminals on each ends referred to as an anode (-) and a cathode (+). right here for the project, 9V battery has been used.

Fig 5.4 Battery

5.5 Charge Controller

A sun rate controller is an important aspect in solar energy systems, To regulate the voltage and current day from solar panels to the battery financial institution. It prevents overcharging and deep discharge, ensuring efficient and safe battery charging. price controllers come in two most important kinds: PWM, which rapidly switches strength to hold voltage, and MPPT, which maximizes energy harvested from panels. They consist of protection functions and battery control features, optimizing performance and increasing battery lifespan.

5.5 Charge Controller

5.6 LCD Display

An lcd (Liquid Crystal display) is a flat-panel era usually used in digital gadgets inclusive of computer video display units, television monitors, and virtual clocks. It consists of a layer of liquid crystal solution sandwiched among two layers of glass or plastic. whilst an electric present day is implemented to specific regions of the liquid crystal layer, it alters the orientation of the crystals, modulating the passage of mild. This modulation produces pictures or textual content at the show.

Fig 5.6 LCD Display

5.7 5V SPDT Relay

The 5v SPDT relay is a high -satisfactory single pole double throws scaled relay. The relay coil is rated as much as 5v dc with a minimum switching voltage of 5v. it is an electromechanical switching tool can manage the each ac and dc gadgets. through the 5v dc relay coil the specification of 5v relay are the contemporary capacity is 10A and the coil contemporary is 50mA for the 5v .

Fig 5.7 5V SPDT Relay

5.8 Transformer

A transformer is a magnetic static device that transfers electrical energy from one circuit to another, at the same voltage or at an extraordinary voltage, but at the same frequency.

TRANSFORMER is a STATIC (manner that does not have a ROTATING component)

The Transformer that transfers electrical energy from one circuit to another or which converts A.C electric strength from better voltage to decrease voltage and vice versa with corresponding lower or boom in present day without any exchange in frequency.

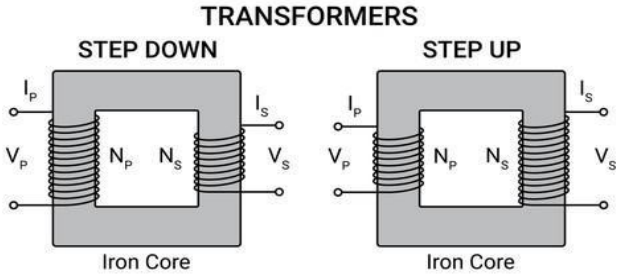
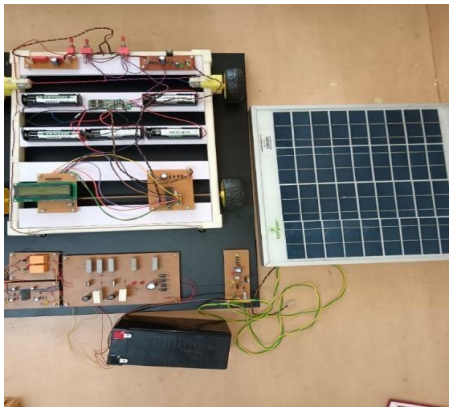


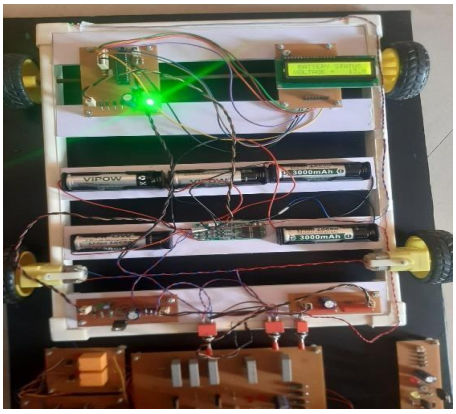
Fig 5.8 Transformer

Result And Discussion

Wireless power switch for electric cars One of the unique ways to use ATmega328 microcontroller is by using inductive coupling or resonant coupling, which uses ic555 circuit and energy MOSFET circuits with primary and secondary coil are well suited. The results of the task will depend on certain characteristics, such as performance, variety and energy transfer capacity, in addition to accurate usage and design options. Remembering the safety,

electromagnetic interference and ordinary operation of a machine is very vital. The result will depend on the fulfillment of hardware integration, firmware programming, strength storage for the EV battery on each facets wherein the coils are energized, and this automobile is sun powered,both wi-fi and sun power is stored within the battery. every other rationalization of the venture is how long the battery lasts. This method might be completed with the operation of the ATmega328 microcontroller





Conclusion And Future Scope

Wireless charging technology for motor vehicles (EVs) has the capability to be a game- changer for the EV industry. whilst stressed charging is presently extra not unusual, wireless charging offers numerous advantages, along with greater comfort, ease of use, and decreased put on and tear on charging ports. With the improvement of extra advanced and effective wireless charging structures, EV drivers can count on to peer massive upgrades in charging times, making long-distance journey more viable than ever earlier than . Although wireless charging is more luxurious than stressed charging, it's expected that the fee will be reduced as this generation becomes widespread. consequently, wireless charging generation has the capability to significantly improve the EV charging enjoy and assist accelerate the adoption of EVs, which, in the end, may contribute to reducing carbon emissions and helping mitigate weather change.

The metropolis and united states of america must prepare to have energy inside the future. it's miles primarily based on the commands of the government and the trendy generation. imparting the nice overall performance, protection, and economy, electric automobiles have the ability to alternate the way transportation. (Dynamic electric automobile charging is important; The era can also electricity biomedical implants, allow supersonic hyperloop journey, and create humanoid robots. The possibilities presented by commercial enterprise troubles are infinite. (these days, the electrical vehicle marketplace is growing rapidly. WEVC can also become greater aggressive as new technology and equipment are evolved. (strength electronics also can benefit from superior gadget. in addition to leakage currents, switching losses are any other vital energy waste in WEVC systems. Static WEVC can release people after eliminating the job from the ledger, but not the pay change.

REFERENCES :

1. Patil, Manoj D., et al. "Wireless Charging of Battery in Electrical Vehicle using Solar Energy." International Journal of Engineering Research & Technology (IJERT) 9.03 (2020): 394-397.
2. Prasad, Bugatha Ram Vara, M. Geethanjali, M. Sonia, S. Ganeesh, and P. Sai Krishna. "Solar Wireless Electric Vehicle Charging System." (2022).
3. Sultanbek, A. Khassenov, Y. Kanapyanov, M. Kenzhegaliyeva and M. Bagheri, "Intelligent wireless charging station for electric vehicles," 2017 International Siberian Conference on Control and Communications (SIBCON), Astana, Kazakhstan, 2017, pp. 1-6, doi: 10.1109/SIBCON.2017.7998497.
4. Shahin, J. -P. Martin, S. Pierfederici and A. M. Sharaf, "Integration of Renewable Energy Sources to Wireless Charger of Electrical Vehicle," 2021 22nd IEEE International Conference on Industrial Technology (ICIT), Valencia, Spain, 2021, pp. 397-402, doi: 10.1109/ICIT46573.2021.9453645.
5. R. de Silva and K. Fisk, "Charging electric vehicles from distributed solar generation," 2015 IEEE PES Asia-Pacific Power and Energy Engineering Conference (APPEEC), Brisbane, QLD, Australia, 2015, pp. 1-5, doi: 10.1109/APPEEC.2015.7380914.
6. M. A. Al Mamun, M. Istiak, K. A. Al Mamun and S. A. Rukaia, "Design and Implementation of A Wireless Charging System for Electric Vehicles," 2020 IEEE Region 10 Symposium (TENSYMP), Dhaka, Bangladesh, 2020, pp. 504-507, doi: 10.1109/TENSYMP50017.2020.9230952.
7. M. C. Falvo, M. Manganelli, C. Moscatiello and F. Vellucci, "Electrical Vehicles and Charging Stations: State of Art and Future Perspectives," 2022 IEEE International Conference on Environment and Electrical Engineering and 2022 IEEE Industrial and Commercial Power Systems Europe (EEEIC / I&CPS Europe), Prague, Czech Republic, 2022, pp. 1-7, do: 10.1109/EEEIC/ICPSEurope54979.2022.9854740.