IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

ISO 3297:2007 Certified ⁜ Impact Factor 8.102 ⁜ Vol. 12, Issue 4, April 2023

DOI: 10.17148/IJARCCE.2023.12465

Wireless Vehicle Charging System

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Abstract: The problem with electric vehicle charging infrastructure is building enough charging stations in the right plac es and having the network support their smooth operation. However, not all EVs and plugs are created equal. In particular, EV charging connector or plug type standards vary by geographic region and modeA dynamic wireless vehicle charging system is a technology that allows electric vehicles to charge wirelessly while in motion. This system employs a series of wireless charging coils embedded in the road, which transfer energy to a receiver mounted on the vehicle's undercarriage.

I. INTRODUCTION

The development of wireless charging structures for electric automobiles has gained extensive momentum over the past decade. part of that is based on the preference of towns to push faraway from petrol and diesel powered automobiles to help provide purifier towns, given the extreme urbanization which is occurring globally, and partly because electric powered automobiles have become extra efficient and cost aggressive. With wi-fi charging systems properly included into automobiles, and situated strategically round a town in addition to at proprietors' homes there should be no want to ever plug in their vehicles. Drivers need to without a doubt park as normal over a coil located at the floor or buried in it. however adopting this generation additionally has the ability to remedy some of real and perceived issues. this sort of is that these days more youthful technology expects to be unshackled. there may be a natural choice to have the arena at its finger tips and with a purpose to flow and yet stay linked. yet it changed into no longer that long ago that towns and the USA facet have been stuffed with smartphone containers, and queuing to make a phone call at the same time as being tethered to a stressed out receiver became no longer unusual. today tethering for maximum verbal exchange needs would be unpalatable for most programs besides for excessive velocity internet and certainly no longer for primary internet or verbal exchange desires, while the idea of having to queue to make a name would ship most customers to any other community provider. The analogy for electric powered vehicles is apparent. today plug in charging is common but inside the destiny turns into the domain of excessive strength rapid charging where essential. The idea of queuing for such power is typically unwanted, and with enough wireless electricity charging structures, should be needless in future cities.

This constant connection facilitates reduce range anxiety because the battery is then better able to be saved in a terrific state of rate, and also facilitates the community, due to the fact private cars do not arrive domestic traumatic high strength beyond the utility community layout. In advanced nations, electric utilities use consumption history to count on that each household will use a positive amount of electricity approximately 2 kW, on average and they build their infrastructure for this reason. gift EVs can call for as plenty as eight-10kW in order that one or two EVs in a community could demand greater than the layout ability and overrate the road transformer. to house that call for utilities would ought to upgrade their transformers and different infrastructure, but if EVs are better controlled by constant connection during the day, the demand at night time may be minimized. hence the wireless domestic charger might handiest perform to top up the battery and can be less expensive and smaller as a result. Extending the variety of EVs is likewise critical for growing their marketplace past a gap. while current batteries are enhancing, still customers need in no way to have variety issues, and fleet proprietors especially have a challenge to maximise the time every car is in use. Dynamic harging gives some distance better car usage

II. LITERATURE REVIEW

S.Bhattacharya et.al [1], proposed on analytically discusses different factors that impacts static wireless charging of an electric powered vehicle and also offers the maximum green working regime of this wireless power switch. the primary goal of this paper is the use of magnetic resonance to deliver electricity wirelessly via air and to decide the dependency of electricity deliver on coil dimensions and different elements. specific sorts of supply and cargo coils are analyzed like circular, spiral and helical. unique shapes of the coils also are taken under consideration like square and round. From the analysis, it is found that the performance of power switch is derivable via the equivalent circuit factor of view and also the usage of coupled mode principle. The analysis shows that the efficiency is depending on the coil radius, distances among the coils and the Q-elements of the coils. From the analysis, a top level view of the top of the line design of the coils and distance among the coils has been given.

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X. Mou. et.al [2],Wireless strength transfer (WPT) technologies had been widely used in many areas, e.g., the charging of electric toothbrush, cell phones, and electric powered cars. This paper introduces fundamental ideas modern-day three WPT technology, i.e., inductive coupling-based WPT, magnetic resonant coupling-based totally WPT, and electromagnetic radiation-based WPT, collectively with discussions of their strengths and weaknesses. primary research topics are then supplied, i.e., enhancing the transmission performance and distance, and designing a couple of transmitters/receivers. The strategies are reviewed and categorized. several WPT applications are described. Open research demanding situations are then offered with a brief discussion modern day capacity roadmap.

Supriyadi et.al [3],Wireless electrical energy transfer has many advantages over the same through conducting cables. This research focusses on developing wireless power transfer circuitusing inductive coupling. The experiment has been done by changing the number of turns and the diameter of the wire of a coil with the aim of finding the maximum power and the longest distance that the energy can be transferred through wireless means. The power source is connected to a series of electronics components and a copper coil which form the primary source for the transmitter the power receiver consists of a copper coil, a rectifier and the load. In a system with the diameter of the wires of the two coils is0.5 mm, and the number of turns is 26 at the frequency of 470KHz the efficiency of power transfer about 1.51% at a distance of 1 cm. The transferred energy by wireless means could operate a 1 Watt LED at 1 cm.

P.Magudeswaran et.al [4],Wireless strength transfer(WPT) utilising attractive reverberation is the innovation which can set human unfastened from the annoying wires. certainly, the WPT embraces a similar crucial hypothesis which has just been created for some thing like 30 years with the term inductive energy trade. lately WPT innovation is developing swiftly . At kilowatts manage degree, the trade separate increments from a few millimeters to 3 hundred millimeters with a lattice to stack proficiency above ninety%. The makes the WPT very useful to the electric automobile (EV) charging programs in each desk bound and dynamic charging conditions. This paper surveyed the improvements within the WPT territory fabric to EV far flung charging. with the aid of presenting WPT in EVs, the snags of charging time, variety, and price can be efficiently relieved. Battery innovation is by no means once more pertinent in the mass market entrance of EVs. it's miles trusted that professionals may be supported through the slicing aspect accomplishments, and push forward the further development of WPT simply because the extension of EV.

H.S. Das et.al [5],Transportation electrification is one of the main research areas for the past decade. Electric vehicles (EVs) are taking over the market share of conventional internal combustion engine vehicles. The increasing popularity of EVs results in higher number of charging stations, which have significant effects on the electricity grid. Different charging strat2egies, as well as grid integration methods, are being developed to minimize the adverse effects of EV charging and to strengthen the benefits of EV grid integration. In this paper, a comprehensive review of the current situation of the EV market, standards, charging infrastructure, and the impact of EV charging on the grid is presented. The paper introduces the current EV status, and provides a comprehensive review on important international EV charging and grid interconnection standards. Different infrastructure configurations in terms of control and communication architectures for EV charging are studied and evaluated. The electric power market is studied by considering the participation roles of EV aggregators and individual EV owners, and different optimization and game based algorithms for EV grid integration management are reviewed. The paper specially presents an evaluation on how the future EV development, such as connected vehicles, autonomous driving, and shared mobility, would affect EV grid integration as well as the development of the power grid moves toward future energy Internet and how EVs would affect and benefit the development of the future energy Internet. Finally, the challenges and suggestions for the future development of the EV charging and grid integration infrastructure are evaluated and summarized.

S. Priyadharshini et.al [6],Wireless Power Transfer(WPT) utilizing attractive reverberation is the innovation which could set human free from the irritating wires. Indeed, the WPT embraces a similar essential hypothesis which has just been created for something like 30 years with the term inductive power exchange. Recently WPT innovation is growing rapidly . At kilowatts control level, the exchange separate increments from a few millimeters to a few hundred millimeters with a lattice to stack proficiency above 90%. The makes the WPT very useful to the electric vehicle (EV) charging applications in both stationary and dynamic charging situations. This paper surveyed the advancements in the WPT territory material to EV remote charging. By presenting WPT in EVs, the snags of charging time, range, and cost can be effectively relieved. Battery innovation is never again pertinent in the mass market entrance of EVs. It is trusted that specialists could be supported by the cutting edge accomplishments, and push forward the further improvement of WPT just as the extension of EV.

Partha Sarathi Subudhi et.al [7],Electric cars (EV) are found to be a very good alternative for the traditional inner combustion (IC) engine vehicles in transportation zone due to its diverse blessings. Now-a-days, wi-fi charging of EV battery is preferred a few of the diverse methods used for charging EV battery. in this paper, huge assessment is carried

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out on diverse strategies used for wireless charging of an EV battery. Different techniques used for transferring power in wi-fi mode to rate the EV battery are static EV charging approach and dynamic EV charging technique. Static wireless EV battery charging method adopts inductive and capacitive technique for transfer-ring power whereas, dynamic wireless EV battery charging technique adopts handiest inductive method for transferring strength. these strategies are discussed thoroughly on this paper and wide evaluate is finished with a focus at the compensation circuit topologies, varieties of middle for magnetic coupled inductors, different converter sand controllers used for wireless power switch (WPT) device. additionally, design aspects of an static wi-fi EV battery charging device along side its equal circuit analysis is offered in this paper. Challenges and future improvement in wi-fi charging of EV battery is likewise explained in this paper.

Altynay Smagulova et.al [8],Energy pulsations are one of the elements that hinder the adoption of electrical cars (EVs) prepared with dynamic wi-fi power transfer (WPT) structures. The volatile output voltage, modern-day and electricity parameters, which can be not unusual for such systems, may be mitigated by incorporating a DC-DC converter and a controller into the machine. The given manuscript analyzes the performance of the Proportional-necessary (PI) feedback controller and a Fuzzy controller, that are applied to manipulate the output of the dollar-increase converter of the wi-fi charging structures for EVs. The dynamic WPT device under consideration is simulated using a graphical programming surroundings. It turned into discovered that both controllers extensively lessen the energy pulsation. however, PI controller reduces the power pulsation ratio from forty% to almost 0% after 0.45 s, while Fuzzy controller decreases the electricity pulsation ratio from 40% to almost 5% after 0.09 s.

III. METHODOLOGY

Inductive wi-fi charging of electric cars can be executed using Inductive power transfer (IPT). Requirement is on the way to price a single device quickly and effectively on a dedicated charging mat so inductive charging is favored over others. IPT uses alternating magnetic fields as a style of strength transfer from primary coil to secondary coil. utilization of suitable material for primary and secondary coil have to be ensured for better strength switch. Windings of primary and secondary coil must be determined as it should be to lessen loss and for powerful electro-magnetic induction. Alternating discipline produced links with the on-automobile pick out-up pad, thereby permitting wi-fi power transfer. In stationary/static charging, parking plenty can be upgraded to charging EVs simply without dealing with any charging cable with fee-pads. street ought to be constructed that includes prefabricated concrete modules with cells laid on the ground with a layer of tempered glass that is translucent to light. system specially has two sections, wireless power transmitter & a wireless power receiver sections. The transmitter segment of the proposed system consists of a strength source and a transmitter coil while the receiver phase includes a receiver coil, rectifier and filtering circuit, and a chargeable battery. The AC energy from the transformer is given to the number one coil which is implanted at the charging station. The flux is radiated out from the primary coil and this flux is connected with the secondary coil which induces modern in the secondary coil within the EV. The alternating contemporary caused within the secondary coil is converted to direct modern-day that's then used to charge the battery of the EV

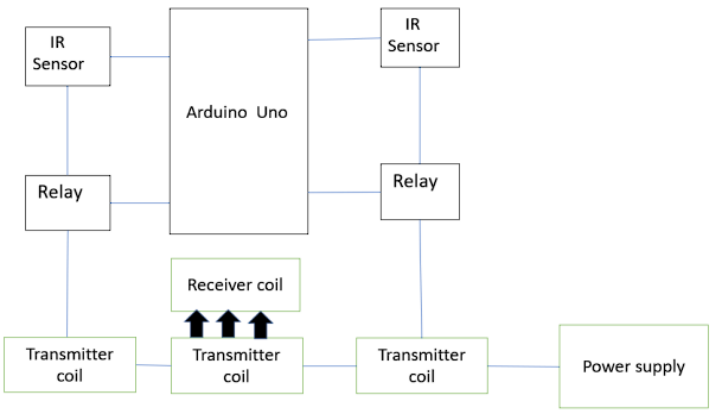

Fig1 : Block diagram

ARDUINO UNO

The Arduino Uno is a microcontroller board based totally at the ATmega328P is the Arduino Uno. It has 14 digital enter/output pins, 6 analog inputs, a sixteen MHz quartz crystal, a USB hyperlink, a strength jack, an ICSP header and a

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reset button (of which 6 may be used as PWM outputs). figure 3 indicates the photo of Arduino UNO. It contains the entirety you need to help the microcontroller; just plug it right into a tool with a USB cable or power it to get started out with an AC to DC adapter or battery.

IR SENSOR

Trilateration Infrared era is used in normal life in addition to in enterprise for a ramification of functions. TVs, for instance, use an infrared sensor to decode the alerts transmitted by remote manipulate the main advantages of IR sensors are their low strength consumption, simple layout, and useful capabilities. IR signals are undetectable to the human eye. inside the electromagnetic spectrum, IR radiation can be located inside the seen and microwave areas. The wavelengths of these waves typically variety from 0.7μm to 5 to one thousand μm. near-infrared, mid-infrared, and a long way-infrared are the 3 areas of the IR spectrum. The wavelength degrees from 0 seventy five to three um within the near infrared region, 3 to 6 um inside the mid-infrared area, and extra than 6 um inside the some distance IR vicinity.

RELAY

Relays are used in which it's far vital to control a circuit with the aid of an independent low-strength sign, or where several circuits ought to be controlled via one sign. Relays were first used in long distance circuits as sign repeaters: they refresh the signal coming in from one circuit by means of transmitting it on another circuit. Relays have been used appreciably in smartphone exchanges and early computers to carry out logical operations

COPPER COIL

This copper coil acts like a receiver and it detects the magnetic discipline. It then passes the current through the tool's circuitry, changing it returned to energy that then costs the battery.

IV. CONCLUSIONS

Electrical automobile traveling range will be improved with the continuous charging of its battery even as using on roadways and highways. It reduces the need for big strength garage which in addition lessen the weight of the vehicle.Higher performance than plug-in charging for electric powered vehicles by using decreasing the dangers triggered because of plug-in charging. ensuring the green way of charging in a less cost. better air high-quality may be ensured so that it will cause much less fitness troubles resulting from air pollution.

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