VIVA-TECH IJRI
ANNUAL RESEARCH JOURNAL
VIVA-TECH INTERNATIONAL JOURNAL FOR RESEARCH AND INNOVATION
ANNUAL RESEARCH JOURNAL
ISSN(ONLINE): 2581-7280

DYNAMIC WIRELESS CHARGINF OF EV

Tanay Pimple[1], Yugan Sankhe[2], Bhavesh Thakare[3]
[1](Electrical Engineering, Viva Institute of Technology, India)
[2](Electrical Engineering, Viva Institute of Technology, India)
[3](Electrical Engineering, Viva Institute of Technology, India)

Abstract : *Dynamic wireless charging of electric vehicles is growing a favorite system since it enables power exchange between the vehicle and the grid while the vehicle is moving. Combining ultramodern dispatches between vehicles and state of the art technologies on energy transfer, vehicles can extend their journey time. Electrified transportation will help to reduce green- house gasemissions.Recent reactionary energy dearths and global warming related problems have caused a substantial shift from internal combustion machine vehicles towards EVs. Electrified transportation demands that a wide variety of charging network be set up, in a stoner friendly environment, to encourage relinquishment. Wireless electrical vehicle charging system can be implicit indispensable technology to charge electrical vehicle without any draw in problems*

Keywords - *Electric Vehicle, Wireless Power Transfer, Online Electric Vehicle, Charging Capacity.*

I. INTRODUCTION

The increase in price of oil and environmental issues has took in growing interest in clean vehicle technologies suchlike as EV. EV's are powered by electrical batteries, which need to be recharged with electricity from the grid. This system allows charging of battery storehouse device while in vehicle in movement. The vehicle requires smaller volume of high battery storage and the range of transportation is increased. It allows us more constantly charge of EV also in the sense it can be indeed good for battery health. EV charging methodologies called roadway powered electric vehicle (RPEVs), which are supplied with electricity from road in real time. The advantage of RPEVs are that they're perfectly, released from the constraints of charging time and speed, and gain extended avail by reduction in battery capacity.

The growing EV demand stimulates the demand for more accessible and dependable means to recharge the battery. The original ideal is replacing conductive charging system by the WPT technology, while maintaining a similar power position and effectiveness. The long- term thing is dynamically power the moving vehicles on road. This will lead to a important reduced battery pack but also extended driving range of an EV.

II. METHODOLOGY

The dynamic wireless charging system of Ev proposed during this work is implemented with basic open source microcontroller, motor driver, and transmitter and receiver pad. ESP32 Microcontroller is used in this system. The L293D motor driver gets signal from the ESP32 using which the motor driver drives the motors of the vehicle. In this system DC Geared Motors of 12V 10RPM are used. The wireless charging receiver circuit is connected directly to the battery while the transmitter circuit is connected throughout the road from a power source. When the car moves over the road the battery starts to charge. There is a extremely small gap between the transmitter and receiver coil. A voltage sensor is used to sense the battery voltage which is then displayed on the I2C LCD. The motor driver gets supply directly from the 12V battery while microcontroller and other circuits operating on 5V gets supply from 7805 Voltage regulator output.

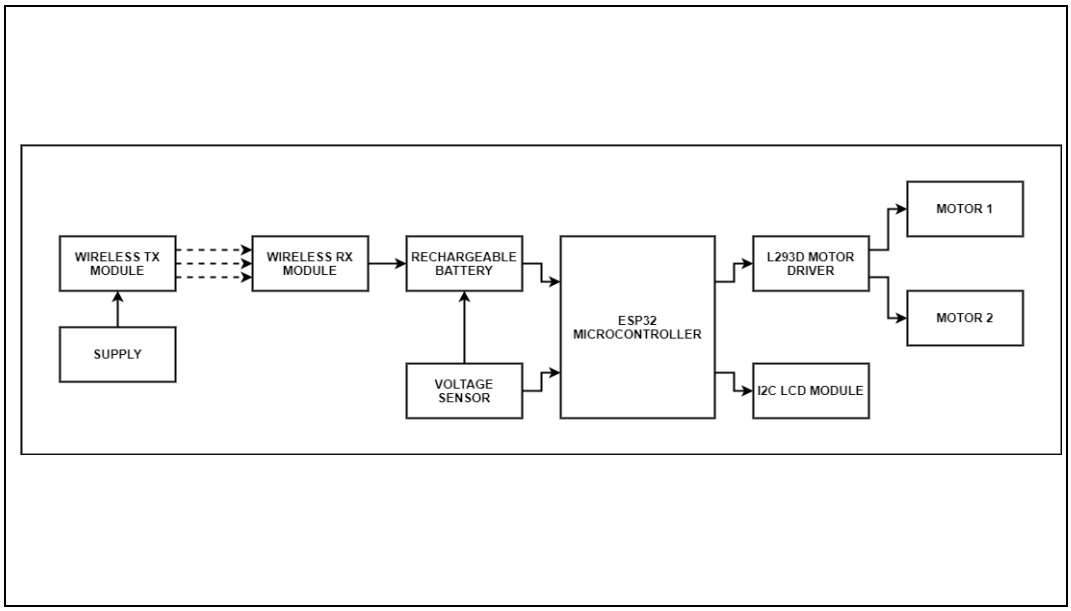

Fig.1 block diagram of system

In this type of wireless charging system, car batteries can be charged automatically while the car is in flexible mode where the transmission with large coils is fixed and additional power converters and their circuits. Here, the highest AC is transmitted from the transmission coil. The receiving coil is closed with a second coil connected under the AC receiving motor. The received power is converted from AC to DC using a power converter and transferred to a battery bank. For safety measurement, the receiving coil is fitted with a battery management system (BMS). The charging duration of an electric car depends on the size of the charging pad, the level of power supply and the distance between the transmission terminals and the receiver. The air gap between the coils is approximately 150 - 300mm.

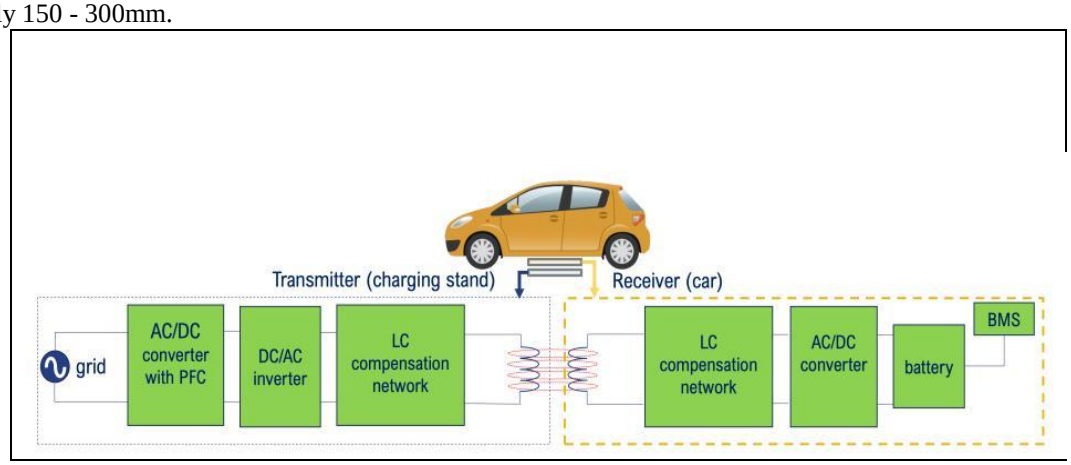

Fig.2 dynamic charging of EV

III. TABLES

Table. 1 description of components used

Components	**Value**
1.ESP32 Microcontroller	
Operating voltage	3.3 V
Operating current	80 mA
Memory	320 KB
Input voltage	3-5 V
Processor	14
2.l293D Motor Driver	
Operating voltage	5 V-DC
Operating current	1.2A
Input voltage	7 V
Peak output current	1.2 A
Total power dissipation	4 W
3.Voltage sensor	
Input voltage	0-25 V
Voltage detection range	0.02445-25 V
Analog voltage resolution	0.00489 V
Length	28 mm
Width	14 mm
4.12C LC	
Interface type	12C
Input voltage	5 V
Dimensions	36*80*18 mm
Weight	35 gm

IV. RESULT

We seen two main reasons which create an issues to build a infrastructure of wireless charging system of electric vehicle. One of the reason is higher cost, for WPT we need to put the transmission pads into a long portion of road. Second problem is about efficiency, use of longer coil for dynamic wireless power transfer more energy in that scene of efficiency would be lower compared to compact coil used.

In that project we overcome previous system drawback, by placing two transmitter pad close to each other. As the pads are closed to each other the power drop between two pads. The power drop that the receiver would be reduced by that process we got a seamless transmission between two consecutive pads. And give a high efficiency power transfer between transmitter and receiver pad.

V. CONCLUSION

This design presents the design and analysis of wireless electricity technology which is a mode of energy transfer, counting on the glamorous near field. Glamorous fields interact veritably weakly with natural organisms, people and creatures and are scientifically regarded to be safe. Wireless electricity products are being designed to misbehave with applicable safety norms and regulations. Hence wireless electricity technology is safe. Wireless electricity transfer depends on the distance between source and receivers. However, effectiveness can exceed 95 percent, If it's fairly close to one another. Effectiveness is primarily determined by the distance between the transmitter and receiver. Lower the distance of separation between transmitter and receiver, high is the efficiency.

Acknowledgements

We shall be failing in our duty, if we'll not express our sincere gratitude to all or any those distinguished personalities with the assistance of whom we've successfully completed our project. My deep gratitude to Dr. Arun Kumar, PRINCIPAL, VIVA INSTITUTE OF TECHNOLOGY, who always been playing an excellent role altogether round development of the scholar . My deep gratitude to Prof. Bhushan Save, THE HEAD OF ELECTRICAL DEPARTMENT and also our project guide Prof. Mukeshkumar mishra and our project coordinator Prof. Mukeshkumar Mishra for her valuable guidance, advice and constant aspiration to our work, teaching and non-teaching staff for their kind support, help and assistance, which they extended as and when required.

REFERENCES

[1] Chirag Panchal," Review of static and dynamic wireless electric vehicle charging system", IEEE 2018.
[2] Vigna K.Ramachandra Murthy, "Latest Electrical Vehicle Charging Technology For Smart Grid Applications", IEEE 2018.
[3] Kishori Naik Mude, "Battery Charging Method For Electric Vehicles From Wired To On Road Wireless Charging", IEEE 2018.
[4] K. Aditya, V. Sood, S. Williamson "Magnetic characterization of unsymmetrical coil pairs using archimedean spirals for wider misalignment tolerance in IPT systems", IEEE 2017.
[5] Cristian Thomsen, "Modeling & Analyzing Electric Vehicle Charging", IEEE 2016.
[6] M. Chinthavali, W. Zhiqiang, S. Campbell "Analytical modeling of wireless power transfer (WPT) systems for electric vehicle application", IEEE 2016.
[7] Leandros A. Maglaras," Dynamic wireless charging of electric vehicles on the move with Mobile Energy Disseminators", IEEE 2016.
[8] M. Chinthavali, W. Zhiqiang, S. Campbell, ''Analytical modeling of wireless power transfer (WPT) systems for electric vehicle application", IEEE 2016.
[9] K. Ahmed, M. Aamir, M.K. Uddin, S. Mekhilef, ''A new coil design for enhancement in misalignment tolerance of Wireless Charging System", IEEE 2015.
[10] H. Feng, T. Cai, S. Duan, J. Zhao, X. Zhang, and C. Chen, "An LCC compensated resonant converter optimized for robust reaction to large coupling variation in dynamic wireless power transfer," IEEE 2016.
[11] M. S. Chinthavali, O. C. Onar, J. M. Miller, and L. Tang, "Single-phase active boost rectifier with power factor correction for wireless power transfer applications," Proc. of IEEE Conf. on Energy Conversion Congress and Exposition(ECCE) 2013.
[12] A. Khaligh, and S. Dusmez, "Comprehensive topological analyses of conductive and inductive charging solutions for plug-in electric vehicles," IEEE Transactions on Vehicular. Technology 2012.
[13] F. Musavi, W. Eberle, and W. G. Dunford, "Efficiency evaluation of single-phase solutions for AC-DC PFC boost converters for plug-in-hybrid electric vehicle battery chargers," Proc. of IEEE Vehicle Power and Propulsion Conference (VPPC) 2010.