

Smart Wireless Charging Road System for Electric Vehicles

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Abstract: *In this work is proposed the design of a system to create and handle Electric Vehicles (EV) charging procedures, based on intelligent process. The Electric Vehicles charging should be performed in effective way. One of the significant challenges with widespread electric vehicle adoption is related to vehicle charging. Many potential EV drivers have range anxiety or don't want to spend much time charging an EV battery on long trips. Although dynamic wireless charging may seem like something out of a science fiction movie, it could be a viable way to overcome vehicle charging issues. These wireless power transfer systems work while the vehicle is in motion, providing numerous benefits.*

Keywords: Electric Vehicles, Intelligent Charging System, Wireless Power Transfer, Dynamic Wireless Charging, Continuous Charging, Range Anxiety, Vehicle Charging Infrastructure, Smart Transportation.

I. INTRODUCTION

The transportation sector contributes over a half of the oil consumption and a quarter of the CO₂ emissions, which is considered one of the factors resulting in the Greenhouse effect. Electric vehicles (EVs), by reducing the dependency on crude oil and minimizing the transportation-related pollutants emission, are regarded as an effective component in a sustainable transportation system and are becoming increasingly popular. However, the massive penetration of EVs brings the big challenge of EV recharge-related issues. As EVs grow in popularity and are used in a variety of applications, such as delivery vehicles, corporate fleets, and personal trips, it will be critical to keep EV batteries charged without hindering vehicle range. Although the capacity and driving range of EV batteries has expanded significantly in recent years, charging solutions can also make EVs more viable for widespread use. Therefore, it is helpful for EV professionals to understand industry developments to help implement innovative approaches in creating a carbon-neutral world.

II. LITERATURE SURVEY

Dr.K.Shivarama Krishna, International Journal of Creative Research Thoughts (IJCRT). WIRELESS POWER TRANSMISSION FOR ELECTRIC VEHICLE. Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested. The offered solution produced less ripple in input/ output voltage and current while utilizing a low value of dc link, and filter capacitance values, respectively

III. OBJECTIVES

Objectives of our Smart Wireless Charging Road System For Electric Vehicles are :

- To design and implement a wireless charging road infrastructure using Copper coils.
- To automate vehicle detection, charging, and payment processes.
- To enhance EV performance by maintaining stable battery power during motion.
- To improve charging efficiency through optimized transmitter-receiver coil alignment.



- It will show the voltage how much vehicle is consumed.
- Detects the vehicle for payment Purpose.
- After successful payment then only vehicle can exit.
- Detects the vehicle for payment Purpose.

IV. METHODOLOGY

Supply is the input and starting point of our implementation. Once supply will apply in the transistor, the transistor will start switching and it will generate the wireless power with help of cooper coil.

This number of transmitter cooper coil will fix on the road base.

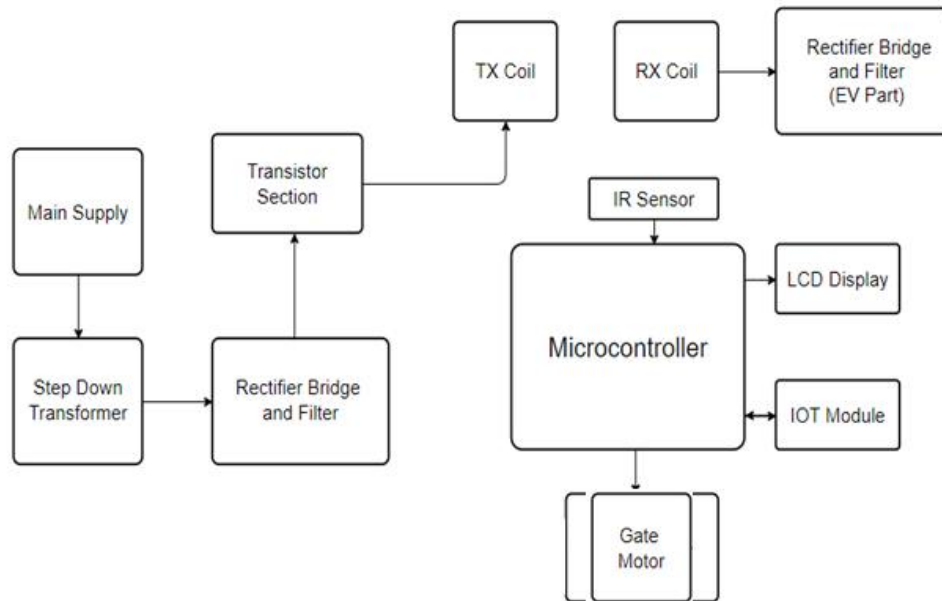
The receiver cooper coil will be inside the Electric vehicle. This receiving coil will receive the power without any physical connection.

Once vehicle will come on the end of this road, here user have to pay amount for charging.

The charging amount user will able to see in LCD display and user can pay this amount using smart phone.

After successfully payment, the gate will automatically open and user can exit from charging road.

V. BLOCK DIAGRAM



VI. RESULTS AND DISCUSSION

Efficient Wireless Charging: Vehicles received power effectively from Tesla coils embedded in the road.

Accurate Detection: The IR sensor reliably identified vehicles exiting the charging lane.

Seamless Automation: Notifications and payment processing were smooth, with the gate opening post-payment without delays.



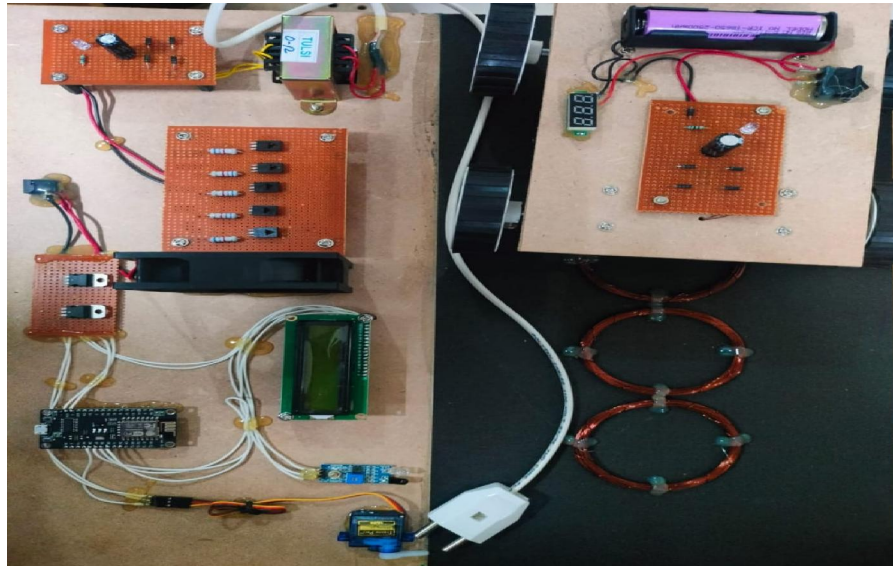


Fig 6.1 Hardware Connection

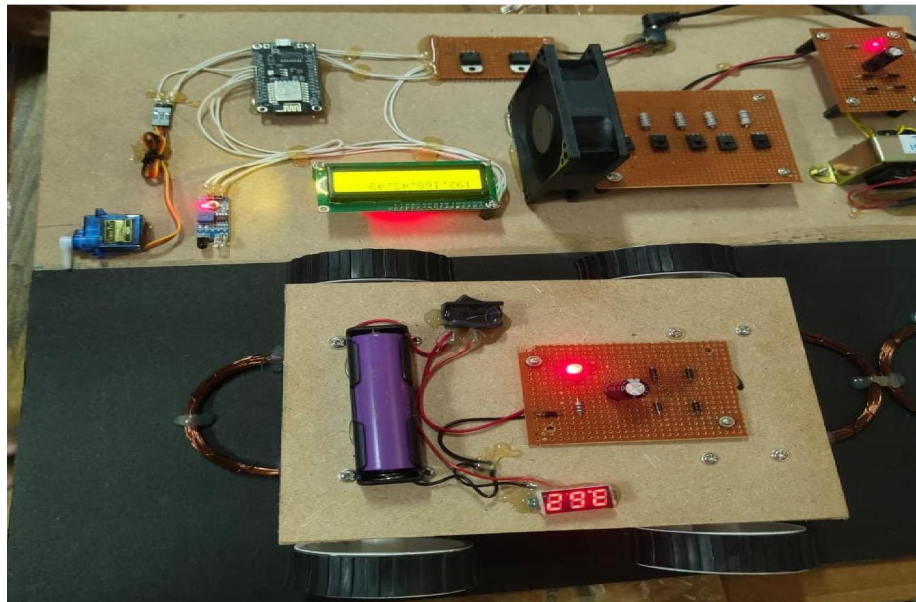


Fig 6.2 Vehicle is Charging

VII. CONCLUSION

This project presented a design of wireless charging of electric vehicle. It is clear that automobile electrification is unavoidable because of surroundings and electricity associated troubles. Wireless charging will offer many benefits as compared with wired charging. Especially, when the roads are electrified with wireless charging capability, it will provide the foundation for mass market penetration for EV regardless of battery generation. With technology development, wireless charging of EV can be brought to fruition. Further studies in topology, manage, other design, and human safety are nevertheless needed in the close to term. As per power saving this slot system will be very useful.



VIII. FUTURE SCOPE

Increased Efficiency: Improving energy transfer efficiency between Tesla coils and vehicle receivers.

Dynamic Charging: Supporting continuous charging for moving vehicles at higher speeds.

AI Integration: Predicting traffic patterns to optimize energy usage on charging roads.

Global Implementation: Adapting the system for diverse climates and road conditions.

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