International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 05 | May - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

DYNAMIC WIRELESS POWER ALLOCATION FOR SELF SUSTAINABLE SUBSTATIONS

Mr. V. GOKULAKRISHNAN[1] M.E., M.B.A., (Ph.D).,
[1]Department of CSE, Assistant Professor, Dhanalakshmi Srinivasan Engineering College (Autonomous), Perambalur.

ABISHEK A[2], ARUNKUMAR S[2], BALAMURUGAN P[2], GOKUL S[2]
[2]Department of CSE, UG Student, Dhanalakshmi Srinivasan Engineering College, (Autonomous), Perambalur.

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Abstract: Wireless charging is considered one of the best and easiest methods to charge EV's anywhere, even during the driving of cars. Employing resonant inductive coupling and smart charging pads, this system facilitates wireless charging without physical connections, ensuring seamless, efficient, and convenient charging experiences for EV users. The cloud connectivity feature ensures seamless data exchange with cloud platforms, enabling data storage, analysis, and remote monitoring. A user-friendly mobile app empowers users to monitor and control the charging process.

Keywords: Electric Vehicle, wireless, Charging pads.

1. INTRODUCTION

In the era of rapid technological evolution and growing reliance on wireless connectivity, the demand for efficient and adaptive charging solutions has become paramount. Traditional static charging methods, while functional, often fall short in addressing the dynamic energy requirements of modern devices. This necessitates a paradigm shift towards innovative systems capable of adapting to real-time changes in power demands. Unlike conventional systems, it not only provides a continuous and adaptive power supply but also actively responds to environmental factors and user preferences. This introduction outlines the pressing need for a more dynamic and responsive charging paradigm and introduces the key features of the proposed system. It becomes evident that this dynamic wireless charging system holds the potential to reshape the landscape of wireless power transfer, offering a more intelligent, efficient, and user-centric charging experience.

1.1 OBJECTIVE

An innovative approach to electric vehicle (EV) charging while in motion on roads. The dynamic charging method aims to enhance the practical of EV's by eliminating the need for charging stations.

2. EXISTING SYSTEM

The Electric vehicles involves charging the battery at designated charging stations. By this, Electric vehicles users can connect their vehicles to these stations to replenish the battery's charge, allowing for convenient and efficient charging. Different manufactures may use different connectors and communication protocols, leading to compatibility issues for some electric vehicle users.

2.1 CHALLENGES

- Doesn't have any sustainable power supply.
- The sensor nodes will shutdown in case of power failure.
- Doesn't provide a reliable solution so not suitable.

3. PROPOSED SYSTEM

The current system integrates wireless power transfer technology for EV battery charging, providing a convenient and cable-free charging experience for electric vehicles. For dynamic power management to optimize energy transfer based on real-time battery conditions, environmental factors, and grid demands, ensuring efficient and adaptive charging processes. The Electric Vehicle can be controlled through an Mobile Application with the connection of IOT module.

3.1 ADVANTAGES

- Potential for Automation and Smart Features.
- Convenience and User-Friendly Experience.
- High power in output.
- Low maintenance.
- Pollution free.

4. SYSTEM ARCHITECTURE

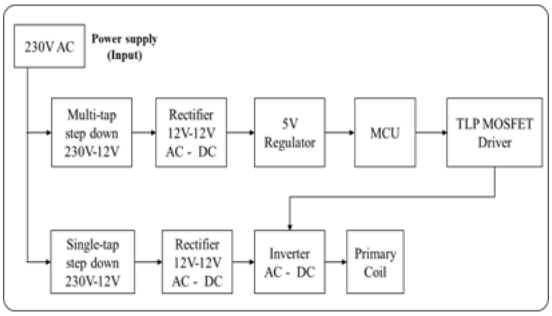


Fig 4.1 Power supply

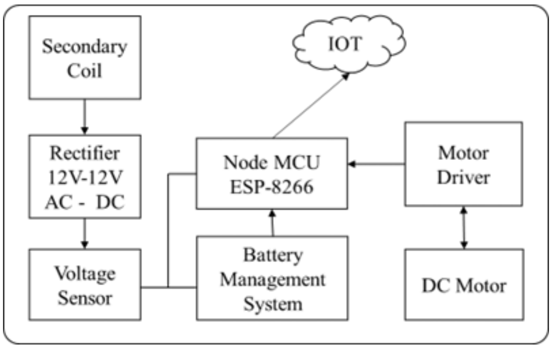


Fig 4.2 Vehicle side

5. HARDWARE DESCRIPTION

The transmission of electrical energy from a power source to an electrical load without connecting wires. A circuit which transforms AC 230V 50Hz to AC 12V, High frequency (HF). The minor coil develops a voltage of HF 12volt.Thus the power transfer can be done by the primary to the secondary that is divided with 5cm distance. So, the transfer could be seen as the primary transmits and the secondary receives the power to run a load.

5.1 TRANSFORMER

A transformer is an electrical device that changes the voltage of alternating current (AC) without changing the frequency of AC between circuits. It does this by transferring electric energy from one circuit to another, either increasing the voltage (stepping up) or decreasing it.

5.2 RECTIFIER

A rectifier is an electrical component that converts alternating current (AC) to direct current (DC). A rectifier is analogous to a one-way valve that allows an electrical current to flow in only one direction.

5.3 ESP 8266

It is a low-cost Wi-Fi microchip that allows microcontrollers to connect to Wi-Fi networks and communicate with the Internet.

5.4 VOLTAGE SENSOR

A voltage sensor is a device that measures the voltage of an electrical circuit. Voltage sensors are used in many applications, including monitoring and controlling equipment and machinery.

5.5 REGULATOR

A regulator is a circuit or device that maintains a constant voltage in a power source, even when the input voltage or output load changes. Regulators are used in many applications, including motor vehicles and electronic equipment.

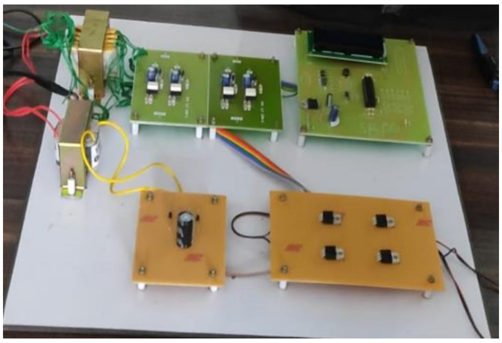
5.6 PRIMARY COIL

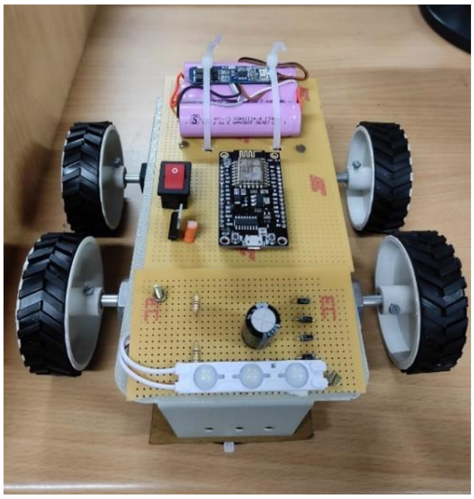
A primary coil is a coil in an electrical circuit that receives an alternating current (AC) excitation and induces a current in a neighboring circuit.

5.7 SECONDARY COIL

It receives high frequency AC power transmitted by the Primary coil.

6. OUTPUT





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7. CONCLUSION

The inductive or resonant wireless charging technology, coupled with IoT-enabled charging stations, facilitates real-time monitoring and control. Through a robust communication network and cloud platform, the system can manage the entire charging infrastructure, providing scalability, flexibility, and advanced data analytics.

8. REFERENCES

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