WIRELESS SMART CHARGING HUB USING IOT

Project Reference No.: *49S_BE_0030*

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Keywords:
Wireless Charging, IoT, Magnetic Resonance, Multi-device Charging, Power Transfer

Introduction:

Industrial and consumer device charging systems are evolving rapidly with the need for efficiency and convenience. This project focuses on developing a wireless smart charging hub using IoT, capable of charging multiple devices such as smartphones, smartwatches, and earpods simultaneously. Wireless charging reduces cable dependency, enhances safety, and improves environmental sustainability by reducing plastic usage. The system uses magnetic resonance coupling for power transfer and integrates IoT for monitoring and control.

Objectives:

1. To demonstrate wireless charging of multiple smart devices.
2. To utilize magnetic resonance for wireless power transfer.
3. To implement safety mechanisms such as voltage regulation, overcurrent protection, and overvoltage protection.
4. To analyze and evaluate charging efficiency.
5. To enable simultaneous charging of various IoT devices.

Methodology:

The project uses ESP32/ESP8266 microcontrollers with Wi-Fi capability. A wireless power transfer circuit is developed using transmitter and receiver coils. IR sensors detect device placement on the charging pad. Safety mechanisms such as voltage regulation, overcurrent and overvoltage protection are implemented. The system is tested for efficiency, power transmission, and multi-device charging capability.

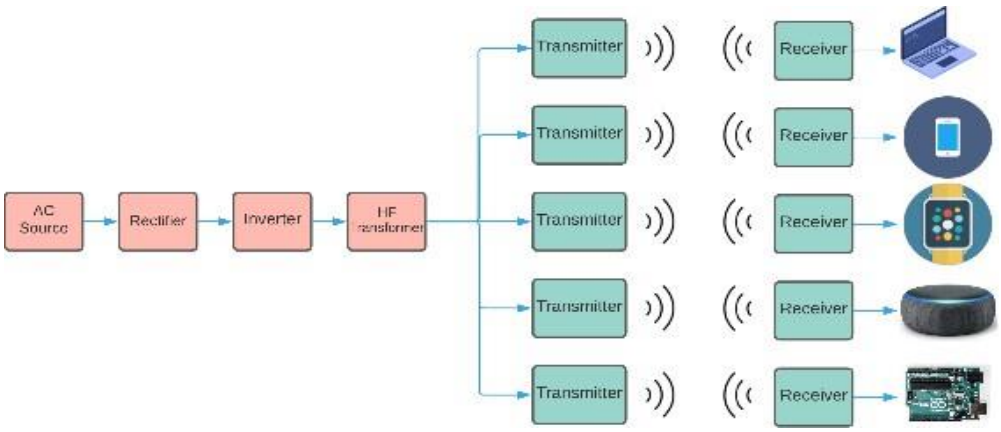

Figure 1: Block Diagram of Wireless Smart Charging Hub

Result and Conclusion:

In conclusion, the system successfully demonstrates wireless charging for multiple devices. It highlights efficient power transfer using magnetic resonance and shows that charging efficiency decreases with increased distance between coils. Additionally, safety features including voltage regulation, as well as protection against overcurrent and overvoltage, are incorporated to ensure secure operation. The integration of IoT enhances monitoring and control capabilities

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Future Scope:

The future scope of this project includes:

1. Enhancing charging speed while improving overall efficiency.
2. Integrating advanced IoT monitoring systems.
3. Reducing system cost for large-scale adoption.