EV SMART CHARGING STATION

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ABSTRACT -

The EV SMART CHARGING STATION, integrating IoT, stands as a initiative poised to transform the EV charging infrastructure. By implementing wireless charging pads, IR sensors, and the ESP32 microcontroller, this project redefines the traditional charging experience, eliminating cables and introducing friendly process for user. The integration of IoT with the Blynk platform not only allows for control and remote monitoring but also empowers users to efficiently manage charging for their EV. Addressing practical challenges in EV Station, this project holds significant implications for environmental and societal aspects. Its applications extend from public charging stations to commercial EV Station infrastructure, contributing to the adoption of sustainable transport practices. Equipped with features like smart detection, energy management, and emergency support, the project champions accessibility, efficiency in the realm of electric Vehicles. In essence, the Wireless EV Charging Station with IoT Integration emerges as a pivotal catalyst in advancing the sustainability and accessibility of electric transport systems.

Index Terms: Wireless charging Pads, Infrared(IR)Sensors, Microcontroller(ESP32), Blynk IoTPlatform.

1. INTRODUCTION –

To overcome the demand for transportation solutions, our wireless EV charging stations with integration of IoT represent the gender intersection of latest wireless charging technology. This concept is to innovate the EV charging system by incorporating technology that will provide simple and reliable control. At the centre of the project is a wireless charging pad that get rid of the use of cables and provides contactless charging. These pads also includes IR sensors that intelligently detect the vehicle on charging pad. A microcontroller powered by ESP32 acts as the charging station's central nervous system. It controls the input from the infrared sensor and controls the operation of the charging pad. Essentially, the ESP32 seamlessly communicates with the Blynk IoT platform, and provides users with remote monitoring and control. Through the Blynk app, users are easily able to check payment status, receive notifications and manage payments whenever and wherever they want. In addition to the direct benefits for individual users, the potential applications of the project are also diverse. Public toll booths in cities, private toll booths in residential areas and commercial establishments such as hotels or shops can benefit from this technology. In addition, the management of the fleet of companies with electronic equipment will also benefit from an effective payment management system.

2. TERMINLOGIES-

2.1 Wireless Charging Pads

Latest charging pads used in wireless charging provide a solution for electronic devices without any use of cables. These pads copper wire that is wounded to distribute power. Users can easily place the device on the charging pad, and wireless technology controls the charging process. This gives an excellent experience and user satisfaction, but also offers a simple and effective way to power our daily devices.

2.2 Infrared (IR) Sensors

An infrared is a specialised sensor designed to identify the appearance of any entity using infrared light beyond the capability of the human eye. Sensors sense by sending infrared rays and measure its reflection and detecting the return of infrared light whenever an entity is present. This reflection allows sensor to accurately identify and record the appearance of an object.

2.2 Microcontroller (ESP32)

Microcontroller, exemplified by the ESP32, is a compact, integrated computing device tailored for specific functions within embedded systems. The ESP32, developed by Espressif Systems, encompasses a processor (CPU), memory, input/output peripherals, and often integrates built-in features such as WiFi and Bluetooth. Microcontrollers find widespread application in various electronic devices like IoT devices, sensors, and gadgets, serving to control and coordinate their functionalities. The ESP32 known for its energy efficiency, and capacity for wireless internet connectivity, positioning it as a preferred choice for a diverse array of projects demanding both computational power and wireless connectivity.

2.3 Blynk IoT Platform

Blank platform is an IoT based platform streamlining the creation and management of IoT projects. Through its user-friendly mobile app, Blynk caters to individuals, hobbyists, and developers, enabling them to effortlessly build and control IoT applications without delving into extensive coding. Users leverage Blynk to establish connections between various hardware devices, including Arduino, Raspberry Pi, and ESP8266, and the cloud, facilitating remote control through smartphones or tablets.

3. LITERATURE SURVEY -

3.1 Charging Station of Electric Vehicle Based on IoT:A Review

Mahmood H. Qahtan, Emad A. Mohammed, Ahmed J. Ali

The proposed model addresses the simplicity of EV use by integrating efficient parking and charging solutions. It emphasises the importance of managing free parking slots and pricing schedules, essential in preliminary designs and feasibility studies. Unlike previous systems limited to specific vehicle types, the suggested model caters to all, responding to high demand for parking and charging for electric vehicles.

3.2 Smart Electric Vehicle Charging System

Joao C. Ferreira, Vítor Monteiro, Joao L. Afonso, Alberto Silva Member

This project aims to extend the realm of computer science work, covering software development, Web 2.0, geographic information systems, mobile computation, and wireless communication, to the emerging domain of Smart Grids and Electric Vehicles (EV). As Electrical Markets become more intricate, users involved in EV charging processes require assistance, particularly through mobile devices. In response, our paper outlines proposals for conceiving and developing a mobile application and an integrated system to guide users in EV charging or discharging procedures and EM participation.

3.3 Smart EV Charging: A Global Review of Promising Practices

Julia Hildermeier , Christos Kolokathis , Jan Rosenow , Michael Hogan, Catharina Wiese and Andreas Jahn

The Recent studies emphasise the advantages of strategic EV integration, asserting that EV charging can enhance renewable energy utilisation, optimise existing network infrastructure, reduce EV operating costs, and diminish the necessity for new investments. A growing body of literature, spanning various research efforts, delves into the costs and benefits associated with EV grid integration. Consensus among studies, conducted by stakeholders and researchers alike, suggests that the grid can effectively handle the anticipated surge in electric vehicles, provided that charging is effectively managed. This involves incentivising users to shift their vehicle charging to off-peak hours, thereby enhancing the efficiency of existing grid assets.

3.4 Joint Planning of Smart EV Charging Stations and DGs in Eco-Friendly Remote Hybrid Microgrids

Mostafa F. Shaaban , Sayed Mohamed , Muhammad Ismail, Khalid A. Qaraqe and Erchin Serpedin

The existing literature primarily delves into the operational facets of Electric Vehicles. Studies such as and examine the impact of electric vehicle charging on regional power generation and electric transmission systems, respectively. and explore coordinated charging for parked and mobile EVs, while investigate schemes considering distribution transformer limits. Price control and demand-side management mechanisms, introduced in literature, aim to meet micro grid supply capacity amid EV charging requests. Notably, proposes an energy management framework utilising dynamic pricing to maximise profits.Ancillary services, specifically reactive power support, are explored in through coordinated EV charging to bolster the grid during voltage sags.

4. CONCLUSION

The EV SMART CHARGING STATION, which includes IoT technology, represents a groundbreaking effort to revolutionise the EV charging infrastructure. By using wireless charging, ESP32 , and the IR sensors, this initiative reimagines the charging process, removing away the cables and introducing a friendly experience for users. The inclusion of IoT with the Blynk platform not only enables control and remote monitoring but also empowers users to effectively manage their charging for EV. This project tackles real-world challenges in EV charging and has profound implications for the society and environment. Its potential applications are from public EV stations to commercial EV infrastructure, promoting the adoption of sustainable transport practices. With features such as smart detection, energy management, and emergency support, the project prioritises accessibility and efficiency in the realm of electric vehicles. Ultimately, the Wireless EV Station with IoT Integration emerges as a pivotal force in advancing the accessibility and sustainability of electric transport system.

5. REFERENCES

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