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PRIORITY-BASED EV CHARGING SYSTEM

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ABSTRACT

The growing popularity of electric vehicles (EVs) has led to an increased demand for electric vehicle charging infrastructure. However, - limited charging station availability and the need for efficient utilization have become significant challenges in ensuring seamless charging services for EV owners. In emergency situations, such as medical emergencies or other critical incidents, it becomes crucial to provide unimpeded access to EV charging stations for emergency vehicles. To address this issue, we propose a priority-based pre-booking system that enables emergency vehicle accessibility to charging stations. The priority-based pre-booking system utilizes advanced reservation mechanisms to allocate charging slots to EV owners based on their priority level. The system categorizes users into different priority tiers, with emergency vehicles assigned the highest priority. [When an emergency vehicle requires access to a charging station, it can initiate an emergency booking request, which will be immediately processed by the system, bypassing the regular reservation queue. The priority-based pre-

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booking system improves charging station utilization by optimizing the allocation of charging slots, reducing waiting times for EV owners, and ensuring emergency vehicle accessibility. The system contributes to the sustainable growth of EV adoption and supports emergency response services by providing reliable access to charging facilities.

I. INTRODUCTION

A priority-based EV charging strategy is developed. This strategy can be used to achieve grid peak load minimization by regulating charging priorities. In this paper, we propose an approach to implementing EV charging stations for multiple EVs with the aim of reducing the load on the power grid; We present a scheduling strategy for charging and discharging of EVs based on priority. EV user charging priority is based on user decisions; EV user charging time slots are allocated to users based on the game theory approach. In this paper, we propose a strategy to manage EV load demands to manage the load profile and minimize the cost of charging. A charging station strategy is designed to charge multiple vehicles at a time. Charging slots are allocated according to priority to balance the grid load, considering both user-side and grid-side constraints. Furthermore, to decrease the load on the grid, scheduled operation times are implemented to prevent unexpected peak loads. This can be achieved by shifting EV charging to off-peak hours. EV users can charge their vehicle during nighttime hours through the grid, or organizations can equip facilities with solar rooftops, enabling EV users to charge their vehicles for low rates during off-peak hours. In the latter scenario, stored energy can be fed back to the grid from EVs at

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workplaces in association with an incentive structure.

real time.

II.PROPOSED SYSTEM

In this proposed system, the Arduino Mega microcontroller plays a vital role as the central control unit, overseeing the operations of various sensors and devices. Serving as the brain of the system, it facilitates seamless integration and communication between these components. The Internet of Things (IoT) technology is a key component utilized in this system.The primary objective of this system is to enable efficient booking of EV (Electric Vehicle) charging slots based on priority, considering emergency vehicles and normal vehicles. To achieve this, three IR sensors are employed. One IR sensor is positioned at the fixed entrance of the EV charging station to detect approaching vehicles. Overall, the Arduino Uno microcontroller acts as the central control unit, overseeing the operations of the IR sensors, IoT web page for booking slots, authentication using OTP, toggle switches for time slot selection, and the LCD display for user interaction. This integrated system aims to efficiently manage EV charging slots based on priority and reduce crowd congestion, Relay is used to turned on the wireless charging module automatically. Delivery Experience: Provide a seamless and positive delivery experience for customers, including clear communication about delivery timelines, vehicle preparation, and any additional services offered. Resale Policies Implement policies to prevent speculative reselling of pre-booked vehicles, such as restrictions on transferring reservations or penalties for reselling at inflated prices.

III.KIT PROTOTYPE

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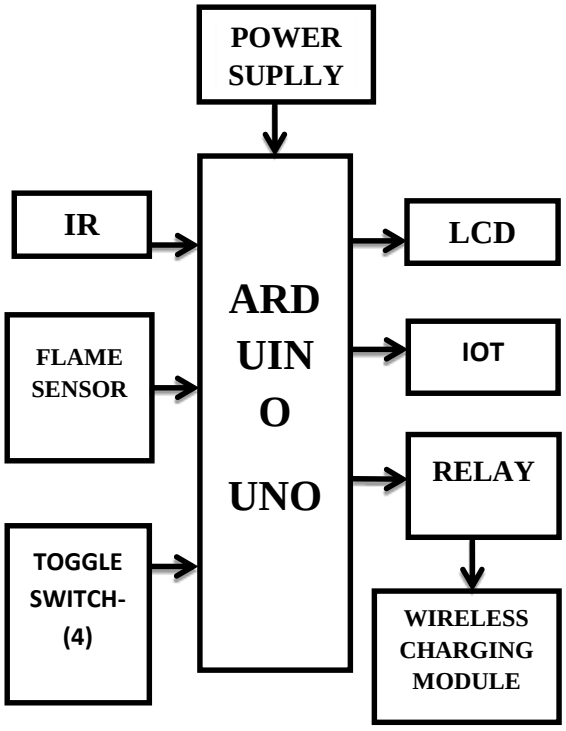
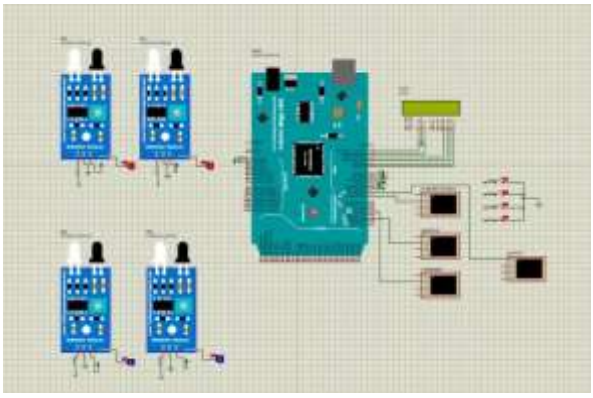
crowd at stations I real time.



IV. BLOCK DIAGRAM DESCRIPTION

This module handles the reservation process, allowing EV owners to pre-book charging slots based on their anticipated requirements and enabling emergency service providers to trigger emergency bookings. It also manages real-time updates on charging station availability, In this project there are four toggles also using for the prices variant based on EV owners their booking And each switch's for Morning, Afternoon, Evening and Night, this system for reducing the

V. SIMULATION PROTOYPE



VI. CONCLUSION

Electric vehicles can play a role of game changer to create a balanced electric network in future

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by using renewable energy sources. Furthermore, as the number of EVs is expected to increase, proper scheduling is important in the energy supply system. In this paper, we propose a new approach for balancing the grid peak load and scheduling charging according to EV user priority. Selection of priority by EV users will lead to a reduced cost of charging. Varying priority levels can be made available to reduce the peak-hour load on the grid by shifting the load to renewable sources or to off-peak hours for EV charging. This approach can be applied to achieve load minimization. Priority selection by EV users can help to flatten the peak load curve of the grid. Competition between users and the grid can be used to achieve a win–win situation. The game-game-theory-based approach gives provides an opportunity to use renewable energy sources and enhances the use of V2G technology. In the future, additional research should be conducted on cost optimization for EV users based on priority allocation.

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