IoT Enabled Smart Charging Station For Electric Vehicles

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Abstract- *The fuel that we are using for our vehicles has limited supply in nature. So, everyone moving towards electrical vehicles to consume as much fuel as possible. But still, people are not ready to change electrical vehicles over present fuel vehicles. One of the reasons for this is because of price and lack of charging stations. Even if there are few charging stations available, people must have to spend extra time charging their vehicles. Also, car parking has become a major problem in urban cities. So, by looking at these issues we can provide smart parking with charging availability to most commercial buildings, petrol pumps, etc. This will reduce the efforts of finding a slot parking. Also, there is no need to invest more time in finding a charging station. This project gives you a brief idea about the wireless power transfer technology for EVs and charging systems with IoT. In this project, research of IOT-based smart parking methods which are implemented is studied and a comparison is done between combined parking and charging system with separated parking and charging system.*

Keywords- EV: Electric Vehicles, IOT: Internet of Things Keywords- Round water level, Prediction, Support Vector

I. INTRODUCTION

Nowadays, vehicles are important in daily life and for industrial use as well. Sufficient effort is being done to withdraw the combustion Engines By Electric MOTORS. Due To Increase In Carbon Dioxide (CO2) Caused By Industries And Transportation, The Kyoto Treaty Was Signed. THIS Treaty Was Aimed To Reduce The Level Of Co2. As A Finding Electric Vehicle Is A Solution To Reduce Co2 Emissions. Electric Vehicles Are Increasing Everyday Across The World. When The Number Of Electric Vehicles Is Increasing, There Is A Need To Implement Electric Vehicles Charging Stations. Previous Battery Monitoring System Only Monitor And Detect The Condition Of Battery And Notify The User Via Battery Indicator Inside The Vehicle. Due To The Advanced Design Of Notification systems, Internet Of Things (IoT)Technology Can Be Used To Notify The Manufacturer And Users Regarding The Battery Status Of Ev. In Ev's, it is important to monitor the battery's state of charge (SoC) although this is not always easy because of the properties themselves. The boom of the world wide web has sharpened interest in e-money that can be transferred over the internet. SO, IT is essential to do the transaction for the charging of the vehicle with an e-wallet or with e-money. For, an e-wallet SOME FORM of digital payment system is developed for faster and ease of transaction.

II. METHODOLOGY

Operation Of The Project Can Be Divided Into 4 Modules:

- Electric Vehicle
- Webserver
- Charging Station
- Android App
- The SoC of the battery.

The registered vehicle numbers and user details. The times charging started and ended. Money transaction details on the vehicle side as well as the charging station side using dummy bank accounts.

1. Working of Webserver

It can be considered the ultimate controller of the entire system. It stores the details of the following in the SQL database: It monitors the SoC received from the EV and when it goes below a predefined value it sends an alert message to the user. The user can search for the Nearest charging station using the app with data on the location of the charging station from the database. Users can book the charging port with the app and send the command to the database. Now when a user reaches the station, he needs to scan the QR placed above the charging port.

After the user scan, the charging station checks in its database whether the vehicle user is registered. When the matching details of the vehicle are found it sends a start charging command to the charging station else it aborts the process and the user won't be able to charge. While the EV is charging, if the SoC reaches an upper threshold value it sends a stop charging command to the charging station. It deducts the total charging cost from the user account's database and

sends it to the charging station's database. With the help of the charge timing table stored in the database, it calculates the total cost based on the following formula, Total Cost = (Start time - End time) * Cost of charge per unit time.

2. Working of charging station

On receiving enable message from the web server, it activates the charging port. When the EV stops in front of the charging station, it identifies the vehicle when the user scans the QR code with the APP. It sends the information of the vehicle to the webserver and checks whether the vehicle is registered on the Android App. After authentication and recognition of the vehicle, it waits for the WebHost to send the start charging command, and on the reception of the start charging command, it starts the charging process by connecting the charger to the EV. As soon as the charging begins it sends the details of the start of charging time to the WebHost and continues charging the vehicle until it receives a stop message from the WebHost. On receiving a stop message, it records the end of charging time and sends the information to the WebHost and disables the power supply. Also, it disconnects the charger from the EV which is now free to travel.

3. Working of Android Application:

It displays the nearest charging station from the user's current vehicle location. It consists of a nearby charging station button on click of this button it will display the nearby charging stations by redirecting to the Google Map which shows the travel path of user location to that particular charging station selected by a user from the list of the nearest charging station. It consists of a Book port button on which the user will send the Booking command of the port so that no other user can use that port until this user teaches at that location. It also consists of a History button on the click of this button it will fetch all the transaction history from the webserver.

III. MODELING AND ANALYSIS

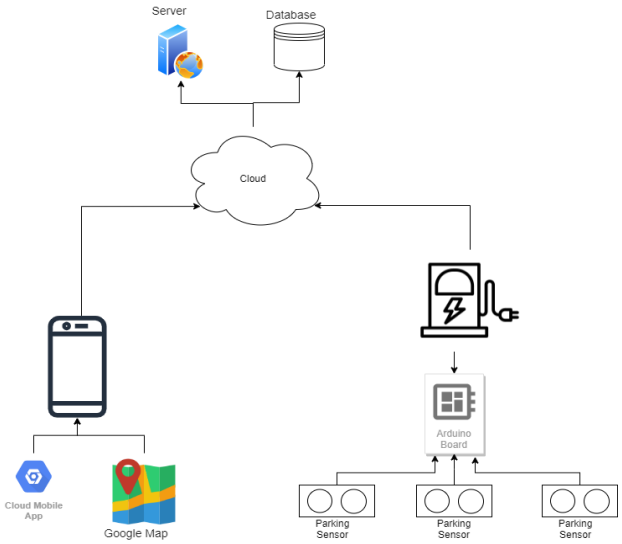
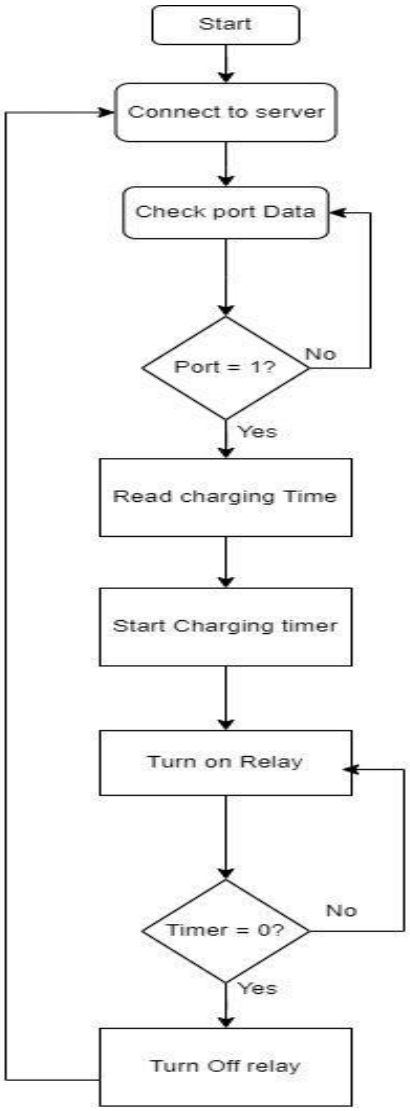


Figure 1: System Architecture.



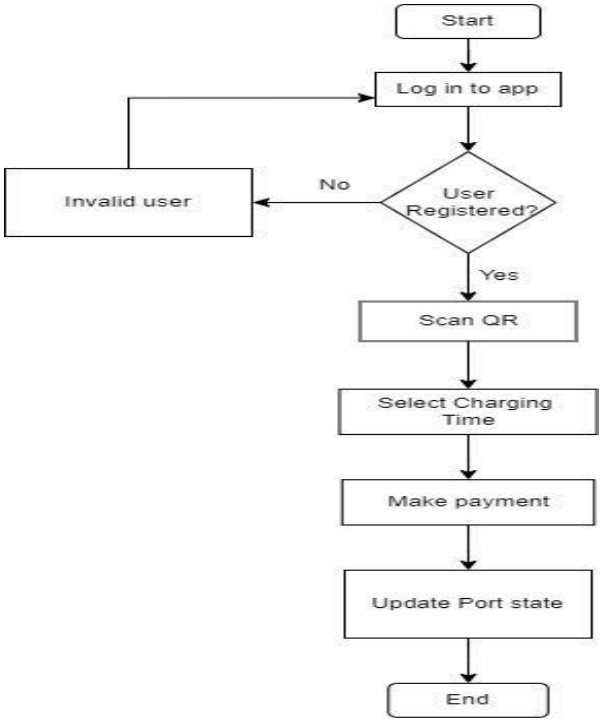
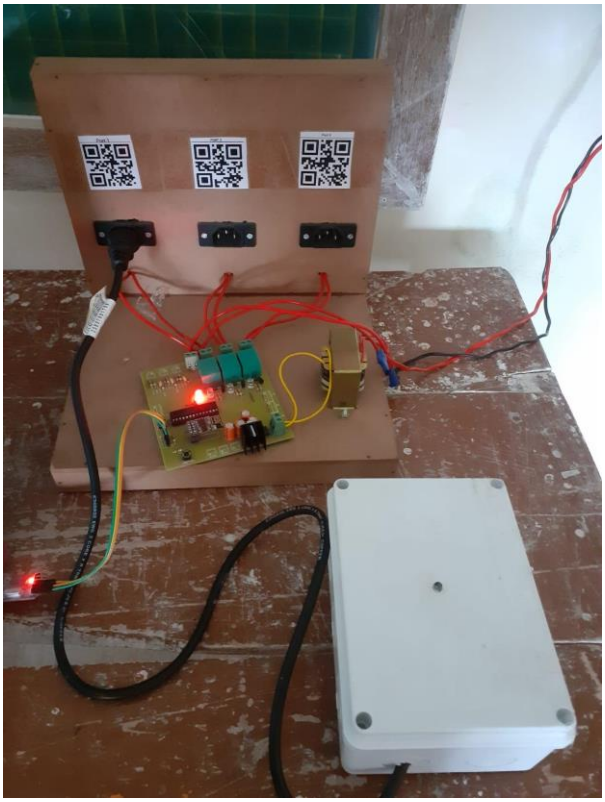


Fig: Flow Chart

IV. RESULTS AND DISCUSSION



1. The project involves hardware as well as software.
2. Hardware includes Microcontroller, Wi-Fi Module, Relay, Power supply
3. Microcontroller is programed to control relay circuit depending on user inputs
4. Wi-Fi module communicate with server and send commands to controller
5. The EV app is developed to control and activate charging station
6. In app user will scan for QR code for specific port
7. After that user need to select charging time and depending on that user need to pay price
8. After payment Wi-Fi module will read data from server and sends command to micro controller
9. Micro controller will turn on relay and charging poet will be activated for selected time
10. After that time micro controller automatically turn off the charging station.

V. CONCLUSION

In this project, it is concluded that, improvement of battery vehicle performance analyze here. The project described the design and development of an IoT-based battery monitoring system for an electric vehicle to ensure the battery performance degradation can be monitored online. The objective is to proof that the concept of the idea can be realized. The development of the system consists of developing the hardware for the battery monitoring device and a web-based battery monitoring user interface. Further modification can be done to improve the system by adding more functions into the system. The system is capable to show information such as location, battery condition and time via internet by incorporating GPS system to detect the coordinate and display it on the Google Maps application check the health of his car battery and he can easily make a decision whether to take power from grid or to sell power to grid. For future work, handling of multiple users could be implemented so as to compare the status of different users

All the main points of the research work are written in this section. Ensure that abstract and conclusion should not same. Graph and tables should not use in conclusion.

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