Survey on Smart Management of EV Charging Station with AI Chatbot And GMAPS API

Priyadarshini Patil, 1. Nayan Shrawane, 2. Heramb Kulkarni, 3. Sahil Take, 4. Sarfaraz Bobade

D. Y. Patil College of Engineering, Pune

Abstract—In Recent year's car companies like TATA, TESLA introduced and launches new electric cars in the market. For charging these cars some of the stations are also set up. But considering the current situation, these cars take at least 15 minutes to half an hour to charge. If station is full and all the slots are filled previously then other customers have to wait for a long time. Our idea is to develop a system which will solve these kinds of issues. We are developing a system in which we going to connect all the electric car charging stations together. By using our system user can find the station according to their choice and it will be useful for those who want to travel for long distance with their EV cars and it will be time saving. It will be very easy to use. If the given time slot is available then your place for the given slot will be booked. Otherwise system will ask to enter the new time schedule. In this system user has to pay some percent of amount online to confirm their booking. Our system will also provide shortest map route to reach at given station. Our system will also provide interface for charging stations to view all available slots as well as booked slot lists and manage slot timing. We are going to develop this system for Android based devices. To develop this system, we are going to use time-slot allocation techniques as well as Google maps API for direction sensing. Our chatbot system will Control software via vocal commands. With the help of online payment gateway user can pay money quickly. By using the system peoples will save their so much time and they can view and book appropriate station easily.

Keywords: Smart management, charging slot, EV Cars, Map.

I. INTRODUCTION

In recent years, global warming and the depletion of fossil fuels due to mass consumption of energy resource has become an increasingly recognized world problem. To control these problems, the installation of renewable energy systems, which do not depend on fossil fuels, is an effective countermeasure. In Japan, since the government has introduced Feed-in tariffs (Fit), the introduction of photovoltaic systems has been expanded rapidly. However, the output power from increased number of photovoltaic systems is extremely large and tends to have a bad effect on the system frequency and distribution voltage. To address this problem, the Japanese government has begun reconsidering the Fit system. Adding to this problem, the cost of PV installation is decreasing year by year. Therefore, in the future, the price of PV power is expected to decrease greatly.

In this study, EV charging stations that nearexclusively purchases power from PV systems on smart houses and sells

power to electric vehicles (EV) and smart houses is proposed as an aggregator. The EV charging station has the need to utilize a fixed battery for electricity trading.

- As we know EV Automobiles going to be future of the world but these machines need charging stations for charging.
- In this project work, system will provide the platform to book charging slots to available charging station according to need of customer.
- In this system user will get facilities like AI chatbot to book station via vocal commands, Maps features for direction sensing, Digital payment option, Notifications, Mails and SMS of each activity.

II. RELATED WORK

This paper [1] proposes the use of a coreless axial flux permanent magnet machine, which has the attributes of low stator mass, negligible core loss and virtually zero cogging torque, as the propulsion motor. A three-phase inverter with its dc bus fed from a three-port DC/DC converter, which accepts inputs from a solar panel and battery powers the propulsion motor. Galium nitride (GaN) devices are used in the threeport converter, allowing very high switching frequencies thereby reducing the size of the transformer which provides galvanic isolation between the two sources and output. The three-port converter ensures operation of the solar panel at its maximum power point and also allows bidirectional power flow between the propulsion motor and battery depending on operating conditions. Operation over a wide range of speeds, which is required by the solar race car application, is achieved by the new approach of current weakening. This method involves raising the dc bus voltage of the motor side inverter at speeds exceeding the rated.

As small-sized[2] superconducting magnetic energy storage (SMES) system is commercially available at present, the function and effect of a small-sized SMES in an EV charging station including photovoltaic (PV) generation system is studied in this paper, which provides a practical application of small-sized SMES. The comparison of three quick response energy storage systems including flywheel, capacitor (supercapacitor) and SMES is also presented to clarify the features of SMES. SMES, PV generation system, and EV battery are connected to a common dc bus with corresponding converters respectively. Voltage source converter (VSC) is

used for gridconnection. With characteristic of quick power response, SMES is utilized to maintain the dc bus steady. During the long-term operation of EV charging station, an energy management strategy is designed to control the energy transfer among PV units, SMES, EV battery, and power grid. The EV charging station system is modeled in MATLAB/SIMULINK and simulation tests are carried out to verify the function and performance of SMES.

Having a network [3] of fast charging stations seems necessary in order to make EVs more attractive and to achieve larger uptake of them. Currently, 50 kW quick chargers that can charge a typical EV in about an hour are commercially available. However, a 240 kW fast charging level which can charge a typical EV in 10 minutes has been introduced in standards. It is expected that this high power fast chargers will be available in near future. A charging station must supply charging power in multi-megawatt levels when multiple EVs are being fast charged simultaneously. Here, charging station topology plays a crucial role in enabling future growth and providing fast charging with best quality of service, lowest cost and minimum grid impact. This paper presents a topological survey of charging stations available in the literature. Various charging station topologies are presented, compared and evaluated based on grid support, power density, modularity and other factors.

Electric vehicles (EVs)[4] are being introduced by different manufacturers as an environment-friendly alternative to vehicles with internal combustion engines, with several benefits. The number of EVs is expected to grow rapidly in the coming years. However, uncoordinated charging of these vehicles can put a severe stress on the power grid. The problem of charge scheduling of EVs is an important and challenging problem and has seen significant research activity in the last few years. This review covers the recent works done in the area of scheduling algorithms for charging EVs in smart grid. The works are first classified into two broad classes of unidirectional versus bidirectional charging, and then, each class is further classified based on whether the scheduling is centralized or distributed and whether any mobility aspects are considered or not. It then reviews the key results in this field following the classification proposed. Some interesting research challenges that can be addressed are also identified.
In order to interface one PV port[5], one bidirectional battery port and one load port of PV-Battery DC power system, a novel non-isolated three-port DC/DC converter named Boost Bidirectional Buck Converter (B3C) and its control method based on three domain control are proposed in this paper. The power flow and operating principles of the proposed B3C are analyzed in detail, and then the DC voltage relation between three ports is deduced. The proposed converter features high integration and single-stage power conversion from both photovoltaic (PV) and battery ports to the load port, thus leading to high efficiency. The current of all the three port is continuous, so the electromagnetic noise can be reduced. Furthermore, the control and modulation method for B3C has been proposed for realizing Maximum Power Point Tracking

(MPPT), battery management and bus voltage regulation simultaneously. The operation can be transited between conductance mode and MPPT mode automatically according to the load power. Finally, experimental verifications are given to illustrate the feasibility and effectiveness of the proposed topology and control method.
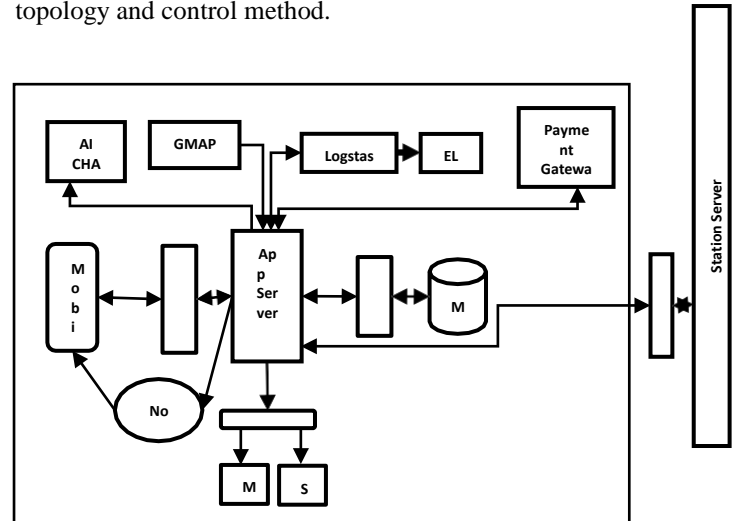

Fig. System Architecture

Technical outline of the work :

The main purpose of carrying out of this project is to develop a hybrid web-based android application for the EV car owners to avail the charging station slot booking system to book slot of charging station prior of going to charge the vehicle. In addition, we propose an AI chatbot in the system to interact user to system via vocal commands. As well as system also provides shortest route to reach to destination through GMAPS API.
We use chatbot also called chatterbots, is a form of Artificial Intelligence (AI) used in messaging apps. This tool is helps add convenience for customers they are automated programs that interact with customers like a human would and cost little to nothing to engage
GMAPS API. The Google Maps platform is a set of APIs and SDKs that allows developers to embed Google Maps into mobiles apps and web pages, or to retrieve data from Google Maps.

OUTPUT :
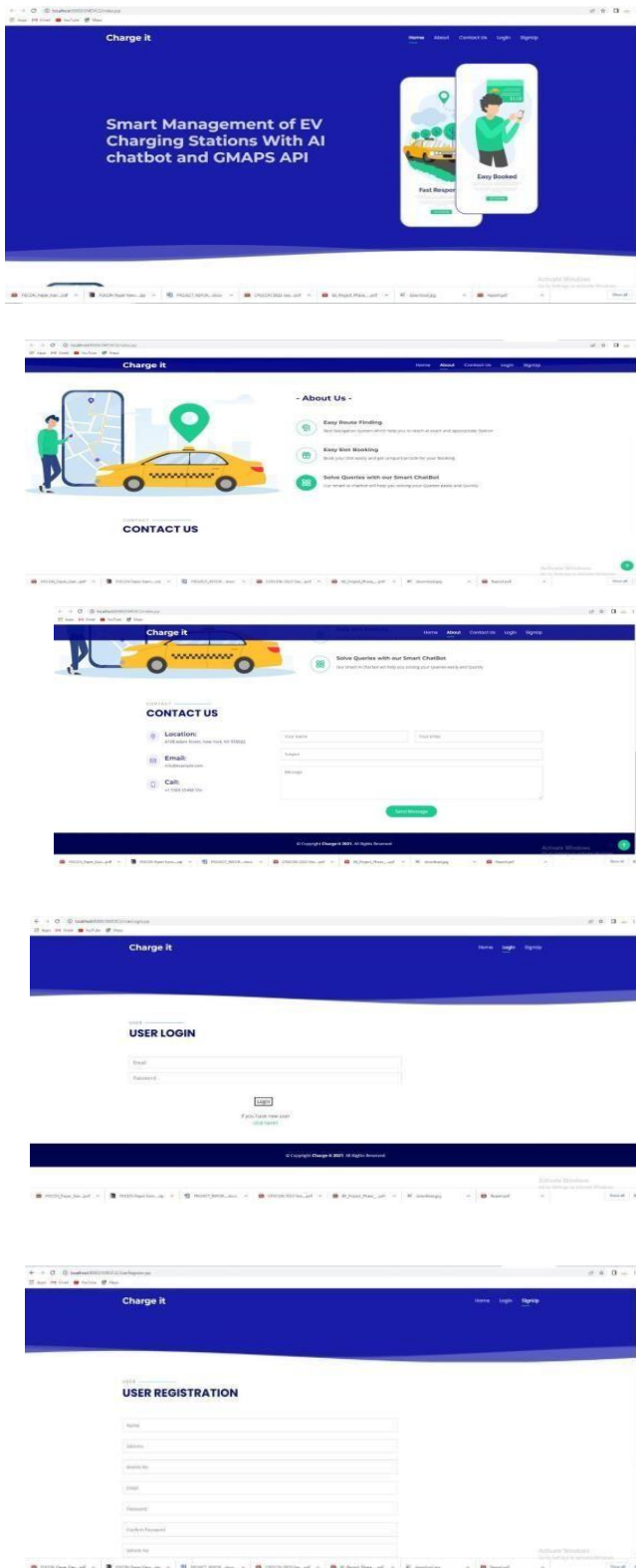
OPEN ISSUES

A lot of work has been done in this field thanks to its extensive use and applications. This section mentions some of the approaches that have been implemented to achieve the same purpose. These works are mainly differentiated from the techniques for smart management of EV charging stationssystems.

CONCLUSION

In this research work, we have learned effective reservation management and efficient allocation of time slots of charging stations. We learned to develop Virtual Personal Assistant (VPA). This research has given the idea of shortest route search system by modifying the combination node algorithm to the dynamic location used in general such mobile phone as online transportation. Along with that we got the knowledge about the implementation of payment gateway in a system.

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