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ADVANCE CHARGING STATION FOR ELECTRIC VEHICLES

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Abstract

Owing to the growth of civilization and rising emissions of pollution from automobiles and factories, the state of the atmosphere is getting worse every year. Air pollution is one of the big problems contributing to global warming, leading to global climate change that has caused the earth's surface temperature to rise and also leads to many health concerns. Electric vehicles (EV) are an integrated mobile intelligent energy storage terminal & power utilization system in the Smart Grid to overcome air pollution. For wide-area charging-swap systems for electric vehicles to address automation & intelligence support issues. This paper analyses functional specifications of electric vehicle charging-swap network activity service scenarios and explains the architecture of the Internet of Things (IoT) for broad-based electric vehicles, consolidating the management of work & monitoring in this paper. Then, develop a perception integration model in mobile scenes for real-time data collection of battery packs. Wireless charging is available in three different modes. Quasi-dynamic charging & dynamic charging, static charging. WPT is a more comfortable, reliable method of charging as well as shielded by electric shock compared to inductive power transfer. The WPT is a device that transfers energy through the air gap without any wires.

Keywords: *Air pollution, Battery, Charging, Environment, Electric Vehicles*

I. INTRODUCTION

The automotive industry's global growth trend is green, energy-saving and intelligent as it faces significant environmental crises and energy challenges. A battery-powered electric vehicle will eradicate pollution and reduce our reliance on oil in our cities. So, in recent decades, electric vehicles have improved their performance and made them suitable for commercial and domestic use. In the future, electric cars will eventually be common transport products. Electric vehicles are now prominently regarded in the Smart Grid as an evolving form of mobile intelligent power consumption unit and energy storage terminal. Therefore, the construction of

a unified, wide-area and large-scale charging-swap network is the basic premise to ensure wide electric vehicle propulsion.

Electric vehicle charging-swap network management companies primarily provide charging, swap, discharge, delivery of batteries, metering and billing, financial settlement, scheduling, etc. Generally, charging-swap services for electric vehicles that require highly automated, smart and interactive characters, support high-level and secure information communication technology (ICT) For perception, aggregation, interaction and visualisation of information. The electric vehicle domain, however, is complicated and not only affects the driver, but also opens up new market possibilities and opportunities[1].

The Internet of Things technology will provide numerous sensors and radio devices with pervasive perception capabilities and a real-time, interactive view of the physical world. Via existing networks and IT systems, physical objects are thus interconnected and accessible. For smart house, smart communities, the Internet of Things would be readily accessible for a wide variety of applications, but its application level is significantly lagging behind. In this paper, we concentrate on the goals of providing smart charging-swap service for effective and interactive electric vehicles to conduct application study in the management of critical intelligence charging-swap network operations with the IoT[2].

A. **Electric vehicle charging-swap network: -**

The electric vehicle charging-swap network is the indispensable energy supply system for the demonstration and commercialization of large-scale electric vehicles. Many cities have made efforts to encourage the development in China of charging-swap facilities for electric vehicles. Electric vehicle charging-swap networks consist of centralised charging stations, battery swap stations, distribution stations for batteries, AC charging piles, monitoring centres for operations, etc[3].

Centralized charging stations: Centralized charging stations are the places of providing electric vehicle battery charging and battery distribution stations. They should be able to charge, discharge, retain batteries, and detect large quantities of generic battery packs. Equipment is usually configured in a centralised charging station: charging equipment, charging rack, battery box equipment transfer, battery box inspection, and maintenance equipment. With power grid infrastructure building, centralised charging station sites can be completely scheduled. They are typically installed near substations. Normally, in slow charging mode, the engine batteries are charged slowly from the power grid via chargers at night. According to the battery power level, electric current can thus be automatically scheduled in advance[4].

Battery Swap Station: Battery swap stations are power supply places by exchanging batteries for electric vehicle users, which includes power supply area, charging area, battery replacement area, battery inspection and maintenance area, control room, parking lot, and so on. A battery

swap station's basic functions include battery charging, battery replacement, tracking, metering, etc. Battery swap stations from a single battery logistics system receive fully charged batteries. Battery swap stations replace depleted batteries with robot systems artificially or intelligently, and cool battery replacements. The entire battery box replacement and charging process should always be tracked and should not harm individuals or the environment. In public car parks, next to public roads or fleet parking areas, etc., battery swap stations are suitably placed.

Battery distribution station: Battery distribution stations can provide battery replacement and logistics services for battery distribution, and do not have charging functions. There are mobile battery compartments, battery storage racks, battery box replacement devices and other equipment in a battery distribution station which is usually constructed near public parking facilities.

AC charging pile: AC charging pile is a type of economically slow charging device for electric vehicles. Charge piles provide pacing, charging degree calculation, cost measurement. In addition, the AC charging stack can upload running state parameters, monitor the measurement of fault status and power consumption, and receive remote control commands. They are ideal for charging stations, public open parking, residential parking, private parking for businesses and underground parking[5].

Operations and monitoring management of electric vehicle charging-swap network covers main requirements including information IntelliSense (identity, anti-counterfeiting, metering, status monitoring, etc.), billing, real-time monitoring and early warning of battery, electric vehicle status information acquisition and display, charge-swap intelligent navigation, wide battery distribution, charging service automatic guidance centralized equipment monitoring, client management, resources optimization configuration. At present, there are still many key technical problems restricting the large-scale commercial development and application of electric vehicles in charging-swap network operators. The following are some of notable problems:

1. Lack of open, scalable and integrated management platform to support inter-city, large-scale electric vehicles charging-swap service.
2. Lack of intelligent, two-way interactive, on-going technologies support between electric vehicles, battery, charging-swap facilities and power grid.
3. Current communication networks cannot cover both urban and rural areas, intercity, complex electric vehicle operations[6].

The Internet of Things is the network created by identity-based things/objects, virtual identities operating in smart spaces using smart interfaces to communicate and interact with users, social and environmental contexts. But one of the key IoT problems is that it is so large and so broad a definition that there is no standard architecture that is proposed. Thus, IoT for electric vehicles

is a new example of an application that will incorporate a large part of these IP networked devices by implementing wireless networking, power broadband communications, GPS, GIS, and other information sensing equipment to introduce information perception, sharing and productive applications for electric vehicle context awareness and charging-swap network services. The IoT architecture for electric vehicles can be divided into three layers according to the bottom-up approach: perception layer, network layer and application service layer. The IoT architecture for electric vehicles. Multiple safety protection measures and strategies will be applied from the perception layer to the application service layer.

Perception layer: The networks are commonly deployed with sensors, in-car terminals, mobile devices, video cameras, capture devices and RFID tags. Types of information such as battery status, object identity, electric vehicle driving state information, geographic location, and charging-swap system activity status can be obtained separately by the information sensing equipment. The information can be transmitted to the network layer via aggregation gateways. Network layer: Wired communications (communications with fiber-optic control, PLC, etc.) and Wireless communications are used to complete the transmission of information between electric vehicle charging-swap network components in the layer. In the network layer, the data routing mechanism and the constructive information push mechanism need to be involved. Application layer: All types of sensing data obtained from the network layer are cleaned,

Stored, processed and analyzed, and the layer will define a set of interactive interfaces, available applications and smart charging-swap service for management staff and electric vehicle users[7].

II. CONCLUSION & DISCUSSION

This paper discusses the work that has been designed to provide a conceptual system to manage Electrical Vehicles (EV) & assist the process of charging. This proposed Smart electric vehicles charging System uses Vehicle-to-Grid (V2G) technology, to connect not only Electric Vehicles, but also renewable energy sources, to Smart Grids (SG). The new model of Electrical Markets (EM), with denationalized electricity production & their use is also explained in this proposed system, in order to gain the prices of buying & selling electrical energy, to or from the electrical network. In the proposed Smart EV Charging System, the introduction of mobile applications will facilitate connectivity user's interaction.

III. REFERENCES

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