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IOT BASED CHARGING STATION SELECTOR FORELECTRIC VEHICLE

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ABSTRACT

In Electric vehicles, electrical energy is stored in batteries. The required time to charge the EV is more.The charging stations of EV play a major role in this. Currently, people are unaware of how many charging stations are there in the journey. So, to find a chargingstation and slot availability extra time will be wasted and also inconvenience will occur. The paper providesa solution technique to save time and avoid the inconvenience of EV users. This system will indicate the availability of charging slots at each charging station in our journey. Also, it will show from what time the vehicle is plugged to the charging station so that we can plan our journey accordingly.

Keywords: IOT, electric vehicle, GSM, GPS

INTRODUCTION

Now-a-days Electrical vehicle is a trending topic and it is also an important part of this smart world. Drawback of electric vehicles is cruising range is typically limited. So, it requires frequent recharging. Not only for electric vehicle but Population is increasing exponentially and the problem is due to this is, increasing traffic volume. All we know that wehave limited stock of the fuel on our earth so it is needof time that we must switch to another way and electricity is the best option for it and electric vehicle is example of it. For charging the electric vehicles, Now-a-days mostly used charging method is plug in charging, this method consists of a plug which needs to be connected to the vehicle for start charging. In wireless charging there is no need to ON-OFF the plug.

Hence there will be less human interaction; it reducesrisk of electric shock due to wired connections. Plug- in EVs have limited travel range and need large and heavy batteries. The wireless charging technology has main advantages is, it increases the traveling range, reduces the battery size and waiting time for charging the vehicle will mitigate. Such advantages will increase the economic and environmental benefits aswell as the adoption rates of EVs [16]. Electrical vehicles require a charging station similar to current fuel car require a petrol pump and obviously charging takes some time so it is better to charge the car when it is parked, therefore it is efficient to combine both the charging and parking system which is based on the IoT technology which makes the system user friendly.One can upload information on cloud and simultaneously on smart phones. Car safety while parking is one of the issues faced by people. The internet of things (IoT) is best platform for monitoring the status of WPT system which is able to provide the wider connectivity, modified sensing, information processing and greater flexibility [17]. So, With the help of IoT, it is easy to monitor vehicle parking as wellas charging of vehicles when they are parked at the same time that means it helps in synchronized parking. Another important factor of using IoT is we can store data on cloud that we can access anytime from anywhere, which makes life easy and simple. [15] Give an idea about, for charging the car we will need some station where the car can be charged, so we can merge the parking concept as an electric station where the car can be parked as well as it will get charged. Thus, there are many advantages of this system.[1] also mentioned that, the current transportation infrastructure and parking facilities are unable to cope with the influx of vehicles on the road, leading to high ecological and economic damage caused due to time spend in searching for parking spots, for instance. Thus, approaches to support electric vehicles and their charging demands are needed which should be able to use parking and charging infrastructures as efficiently as possible. Proposed model is designed for modification of original WSN and RFID system with ZigBee technologywhich is applied in parking garages. The RFID technology is used for checking in and out of vehicles due its fast and secure operation. There are two sections in proposed system one is monitoring and another is control section. Control section contains sensing element, processing element and display devices. The sequence is sensor nodes, LED display and information and

management center respectively. The last one information and management center is main part of the system. In the hardware part it contains ARM7/LCP2148 controlled, ZigBee modules for communication, the reflection sensors and LCD panel. The software used is Keil microvision, flash magic and express PCB. A centralized electrical vehicle (EV) recharge scheduling system for parking lots is developed by.

This system based on the realistic vehicular parking pattern which focus on individual parking slot.It considers two types of EV based on their mobility. One is regular EVs and another is irregular EVs. Electrical Vehicles require sufficient time for charging. This paper suggests a PLRS system which notices arrival and departure time of vehicle, battery state of EV, distance travelled by it. Then system deigns its own schedule of charging for EVs. This system works for day and night time period. This system contributes to increase the number of recharged Electrical Vehicles as well as parking lot revenues. Proposed system has two layered PLRS system for recharging EVs based on parking patterns of these vehicles. An IoT based cloud integrated smart parking system is presented by.

This proposed smart parking system is on site development of IoT module. IoT is one of the most applicable idea of Smart City. This IoT model is used to monitor and provides information about availability of parking space. It also has one mobile application which provides information about availability of parking space to the user. User can book a parking space using this mobile application. For controlling parking system sensors like Infrared, Passive Infrared (PIR) or ultrasonic sensors are used. Processing unit used is Raspberry pi which communicate between cloud and sensor. The mobile application is platform to connect the system and user. This application is developed in Apache Cordova and Angular Js framework using JavaScript as a programming language. The IBM MQTT cloud server is used for store all data. This system gives real time information regarding the parking space availability inparking area.

Another approach to smart parking system is presented by Proposed system uses ultrasonic sensor, Arduino Uno, ESP8266-01 Wi Fi module and cloud server i.e. ThingSpeak, mobile application. This IoT based parking platform able to connect and analyses real time situation. This system automatically generate data and execute smart parking. Availability of free space is detected by ultrasonic sensor. The sensor is connected to Arduino module which interface with Wi Fi network. Arduino uno is connected to cloud server via internet connection and upload data on it. The android app is run by software system for this user need to install this application ontheir smart phone.

Parking slot can be booked if needed using this application. presented a review on Intelligent Wireless Charging Station for Electric Vehicles, induction or magnetic coupling techniques are suitable methods in WPT, for EV charging. In this study, an intelligent WPT system is introduced and simulated to charge EV. The charging process is proscribed by misalignment, innovative method is required to improve flexibility of the EV wireless charging. using finger print method, this technique is able to align transmitting coil with receiving coil automatically. Proposed system is able to saverequired time, minimize mistakes done by human, minimize use of energy and also able to charge car based on real time information about system. It's quite beneficial in energy saving and electricity cost reduction for EV consumer. For EV charging, Wireless power transfer is a new field of development. The efficiency of resonant inductive coupling for EV charging is showed in this paper and discussed techniques to improve wireless charging performancefor high-frequency and high-power application. Various coil alignment methods were discussed and fingerprint method was presented as an economical technique for creating WPT intelligent. In recent time smart cities are under development and IoT plays main role in it. Problems like traffic jam, limited car parking space and road safety can overcome by IoT.

proposed a smart parking system which is on site development of IoT module. This system monitors and analyses the availability of parking slot. In this system all data generated by it is stored on cloud therefore it is known as perfect platform for IoT.Due flexibility of cloud, it can add or remove data from IoT system on real time basis. Suggested system consists of microcontroller, IR sensor, mobile application, buzzer, LED and LCD display.

Another approach to Electrical Vehicle (EV) charging scheduling problem is presented byThis paper studies charging problem under a parking garage which involves total use if time. When EV arrives at entrace of garage it takes information such as arrival time, suggested departure time, current and required battery SOCs and garage's charging management system (CMS). This CMS able to take decision about to admit or to decline the customers charging requirement. It manages the required power supply based on the decision. After completion of process it deactivates the power supply. All the charging unit is under control of an intelligent charging network. The power supply is controlled by CMS and all charging activities are automatically switched.

The EVs whose charging service is not accepted by system are parked at non charging area described research review of static and dynamic wireless electric vehicle charging system. It describesinformation regarding wireless charging as it is proposed in high power application, including EVs. Wireless charging has many advantages over plug in charging cause of its simplicity, reliability and user friendliness.

The limitation is it can be utilized when vehicle is in stationary mode, like in parking.provided a snapshot of wireless charging technology. This paper mentioned that electricity is going to be major part of transportation, due to EVs. While wireless charging plays important role in charging facilitate to EV, since it provides an efficient and flexible means of charging. Also, standardization of this technology is underway which will give more.

EXISTING SYSTEM

Electrical vehicle is a trending topic and it is also an important part of this smart world. Drawback of vehicles is cruising range is typically limited. So, it requires frequent recharging. Not only for electric vehicle but Population is increasing exponentially and the problem is due to this is, increasing traffic volume. All we know that we have limited stock of the fuel on our earth so it is need of time that we must switch to another way and electricityis the best option for it and electric vehicle is exampleof it.

PROPOSED METHOD

The proposed methodology discussed a dedicated interface to predict and estimate the battery energy consumed at different locations and the bill payment process. Project discusses the information about the charging time for the energy storage devices of the electric vehicles. Once the user knows about the statusof his car battery, he can easily decide whether to proceed with power delivering charging stations basedon the tariff rates using IOTAnyone can book from their current location using IOT web page. SMS link will send through the corresponding mobile number. Location details of the selected charging stations can get via SMS.The retrieved information is shared via the internet at each electric charging station with the original equipment manufacturers to analyse the vehicle's charging cost through integration of IoT operated devices. At each charging location, the EV metering architecture acquires real-time data to provide current information about the functions and behaviours of thecost calculation . Thus, the platform provides an optimal way for the system to provide an execution framework for the EVsusers to provide energy demand solutions to all entitiesoperated at a smart chargers infrastructure facility charging station.

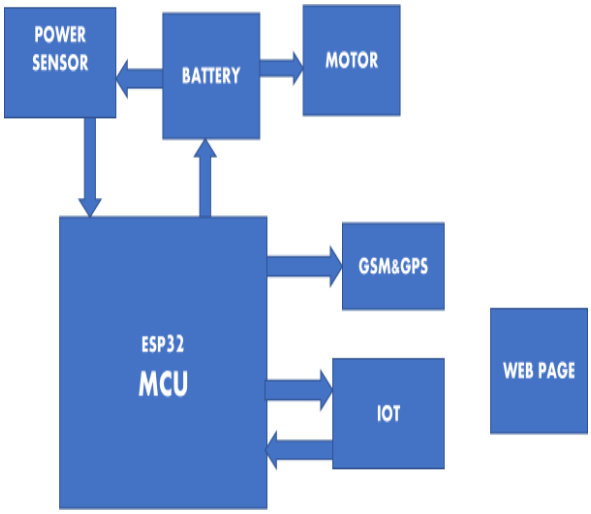

Fig 1: Proposed Block diagram

ADVANTAGES OF PROPOSED SYSTEM

- minimize the difficulty in building charging stations for electric vehicles.
- Vehicle(EV) owners will have the facility to charge the vehicle or sell the excess energy stored from their vehicle battery back to the another vehicle.
- assure some gains to the energy management, eminently to supply major and important loads like manufacturing shops during power failures and any emergencies.

MICROCONTROLLER

The ATmega16 is a low-wind power CMOS 8-bit microcontroller based on the AVR RISC architecture. By executing wind powerful instructions in a single clock cycle, the ATmega16 achieves throughputs approaching 1 MIPS per MHz, allowing the system designed to optimize wind power consumption versus processing speed. The AVR core combines a richinstruction set with 32 general-purpose working registers. All the 32 registers are directly connected to the Arithmetic Logic Unit (ALU), allowing two independent registers to be accessed in one single instruction executed in one clock cycle. The resulting architecture is more code efficient while achieving throughputs up to ten times faster than conventional CISC microcontrollers.

The device is manufactured using Atmel's high- density non-volatile memory technology. The Flash Program memory can be reprogrammed In-System through an SPI serial interface, by a conventional non- volatile memory programmer, or by an On-chip boot program running on the AVR core. The boot programcan use any interface to download the applicationprogram in the Application Flash memory. Software in the Boot Flash Section will continue to run while the Application Flash Section is updated, providing true Read-While-Write operation. By combining an 8-bit RISC CPU with In-System Self- Programmable Flashon a monolithic chip, the Atmel ATmega8 is a wind powerful microcontroller that provides a highlyflexible and cost-effective solution to many embedded control applications. The ATmega16 AVR is supported with a full suite of program and system development tools, including C compilers, macro assemblers, program debugger/ simulators, In-Circuit Emulators, and evaluation kits.

ESP8266

The micro-controller used in this project is ESP32 microcontroller board. It is an open-source platform used for making electronic products allows beginners to freely explore the rich libraries to obtain desire outcome. It has its own piece of software with IDE (Integrated Development Environment) used to write, compile and upload the code. This board has been designed with set of digital and analog input and output pins that may be interfaced with various expansion boards and breadboards. It has six analog input and fourteen digital input/output pins which includes six PWM output pins with 16 MHz resonator. Arduino Uno is controlling unit of the entire system get matched, the operation will not be performed.

GPS module

Here GPS receiver module (satellite-based navigation) is used for tracking the current location of the boat [4]. Figure 3 shows NEO-6M GPS receiver module. It has very powerful chip NEO-6M. This NEO-6M chip can track to the max of 22 satellites to identify the locations all over the world. It works in any weather condition anywhere in the world. This GPS receiver isbuilt in battery type. The NEO-6M GPS receiver module uses USART communication to communicate with micro controller. It receives information like latitude, longitude, altitude, UTC time, etc. from the satellites in the form of NMEA string. This string needs to be parsed to extract the information like latitude and longitude that we want to use. This GPS receiver makes use of three least distant satelliteinformation to figure out exact position of the ship. This entire process is called Trilateration.

LCD

A Liquid Crystal Display is an electronic device which is used to display text i.e., latitude and longitude coordinates along with alert message on the screen [5]. portraits LCD display. In lcd, liquid crystals are used for the purpose of displaying clear visible image/text. Here in this application a 16 x 2 LCD is used. It has two lines and each line display a maximumof 16 characters. It also has 19 different functions like lcd.begin(), lcd. write(), lcd.display() etc., on Liquid Crystal library. LCD is connected to micro controller (Arduino UNO). Micro controller will command the LCD to display the alert message along with location coordinates when the fisherman is in the warning zone. Alert information like "You are in warning zone" with location coordinates will be displayed on LCD display.

CONCLUSION

Various types of electric vehicles have been discussedalong with their advantages and disadvantages based on fast battery charging convenience and suitability of driving. Literature review of the state of the art of on-board battery chargers reveals that the current chargertopology is a power conversion system and it also lacks bi-directional power flow capabilities. This project focuses on three problem statements. Firstly, asingle phase, single stage, isolated, fast charging dC- DC converter is proposed. Finally, single stage, isolated, Fast charging DC-DC converter for wind energy is proposed and analyzed.

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