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EV COMMUNICATION SYSTEM USING IOT MECHANSIM

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ABSTRACT

The mechanism for the implementation of the overall EV charging station uses the controller and communicate with the cloud using different IoT and MQTT protocols. This study is also completed by interface web-based and mobile for online monitoring. IoT-based communication system for Electric Vehicles (EVs) that utilizes a communication protocol that is MQTT. This system was designed using the Message Queuing Telemetry Transport (MQTT) protocol, which is a lightweight protocol that consumes very little system power. A Quality of Service (QoS) is the use of mechanisms or technologies that work on a network to control traffic and ensure the performance of critical applications with limited network capacity levels comparison was carried out to determine the suitable QoS level for this system. This result of this study is the enhancement of data quality and reliability using MQTT protocol. This system can detect lanes in real-time and store and send data to a remote location for vehicle monitoring.

KEYWORDS: *Electrical Vehicle; Internet of Things (IOT); Sensor; Cost*

INTRODUCTION

In recent days there are more changes in vehicle manufacturing, where all companies have advancement in production of vehicles and they are moving towards a smart vehicle environment. Thus, the usage of old engines has been replaced by new ones that produces much fewer hazards to the environment. In this way, electric vehicles which produce much less pollution have been introduced with many facilities which are very similar to normal vehicles that are present now. The speed, range and efficiency of electric vehicles are nearly equal when compared to diesel and petrol engine vehicles. In addition, these electric vehicles have a battery source which provides good benefits for travelling long distances. The users can select the type of battery and they can even monitor the charge in battery with the location of charging station. In this monitoring stage, a new monitoring device which replaces the old technology of Global Positioning System (GPS) has been integrated in necessary parts of the vehicles can be able to monitor the parameters like battery efficiency, distance of travelling, alert on charge and charging stations etc. The proposed work aims to provide an Internet of

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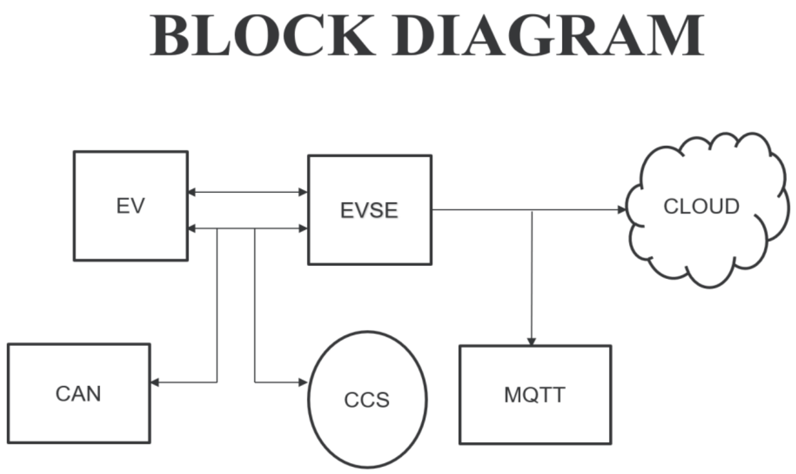
Things (IoT)-based solution for controlling the charges in vehicles and examines its usage in outdoor environments by transmitting data to long detachments. The purpose behind this projected method is to save the life of individuals because there is a possibility that the system will result in a short trail which in turn causes severe damage to human life. Therefore, the main findings of the proposed work are to analyze the maximum limits of charge capacity with limitations in voltage sets. These parameters will be calculated using a gradient boosting algorithm where prediction error will be lesser. Since this technique considers a data transfer methodology where the analyzed information will be transferred to control center it is necessary to use an IoT-based technology at low cost of implementation.



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Electric Vehicle

An EV is a shortened acronym for an electric vehicle. EVs are vehicles that are either partially or fully powered on electric power. Electric vehicles have low running costs as they have less moving parts for maintaining and also very environmentally friendly as they use little or no fossil fuels (petrol or diesel)

Electric Vehicle Supply equipment

A charging station, also called an EV charger, electric vehicle supply equipment (EVSE) or simply charger is a piece of equipment that supplies electrical power for charging plug-in electric vehicles (including hybrids, neighborhood electric vehicles, trucks, buses, and others) AC power goes into the enclosure, either through a plug (mostly for portable units) or a hardwired connection, and a cable comes out of the enclosure with a connector that connects to the vehicle's charging port. In the case of DCFC, the EVSE enclosure also contains components that rectify the AC power to DC.

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CAN

The Controller Area Network (CAN bus) is the nervous system, enabling communication. In turn, 'nodes' or 'electronic control units' (ECUs) are like parts of the body, interconnected via the CAN bus. Information sensed by one part can be shared with another. By the mid-1990s, CAN was the basis of many industrial device networking protocols, including Device Net and CAN Open. Examples of CAN devices include engine controller (ECU), transmission, ABS, lights, power windows, power steering, instrument panel, and so on.

CCS

Carbon capture and storage (CCS) is the process of capturing and storing carbon dioxide (CO2) before it is released into the atmosphere. The technology can capture up to 90% of CO2 released by burning fossil fuels in electricity generation and industrial processes such as cement production.

Three types of CCS

There are three main types of carbon capture and storage (CCS) technology that could eventually help reduce emissions from power stations and other industrial sites: pre-combustion, post-combustion and oxyfuel

MQTT

MQ Telemetry Transport is a lightweight open messaging protocol that provides resource-constrained network clients with a simple way to distribute telemetry information in low-bandwidth environments

Hardware Equiments;

Arduino UNO

Raspberry pi modal 4

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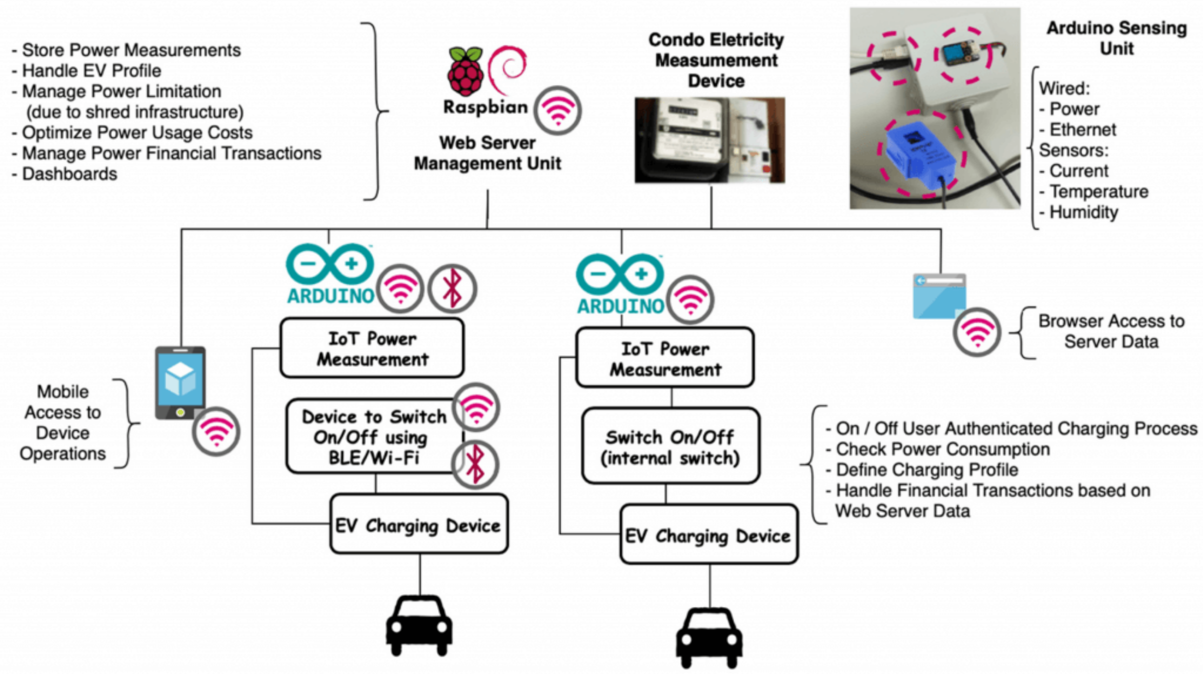
IOT

The Internet of Things (IoT) describes the network of physical objects things that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet.

There are two types of IoT: CIoT and IIoT. The differences between CIoT and IIoT are: CIoT often focuses on convenience for individual customers, whereas IIoT is strongly focused on the industry sector, improving the efficiency, security, and output of operations with a focus on Return on Investment (ROI).

Figure;



Conclusions

The work presented in this paper explores different approaches based on IoT, mobile devices and MQTT to create a novel solution for the EV charging process in shared spaces with authentication and security features, accounts and a transaction system. This approach can contribute to the proliferation of EVs, because one of their current barriers is the charging process at condominiumsand rented houses. Moreover, from this solution, it is possible to identify EV charging profiles,

This approach can also be applied to handle energy transactions in other application scenarios, such as micro-generation without a central supervision control mechanism, although the use of open public cryptocurrency platforms like Bitcoin or Ethereum, due to high transaction costs, can create some barriers to the acceptance of the model. The proposed solution demonstrated the robustness of the developed prototype for an EV charging process in shared spaces in the context of the presented case study at a condominium. During the 3.5month of operation, there was only one failure of an IoT sensor unit due to a general power failure ,and the problem was corrected by simply delaying the start of the charging process. Although no network-related limitations were identified while using traditional wired (Ethernet) and wireless(Wi-Fi) local area network (LAN) technologies to establish communication between the IoT devices and the Management Unit for the presented case study environment, the implementation of the systemin wider geographical environments or other building topologies may require the use of wireless communication technologies more suitable for that context, for instance, low-power wide-area network(LPWAN) technologies such as LoRa, Sigfox, NB-IoT or LTE-M.Author Contributions :J.P.M. is a Master student that performed all development work. J.C.F. is a the issu pervisor and organized all work in the computer science subject, and the other authors revised the document and collaborated on energy and power electronics, as well as in IoT topics Funding: This work has been partially supported by Portuguese National funds through FITEC programa Interface, with reference CIT "INOV—INESC Inovaçao—Financiamento Base". Conflicts of Interest: The authors declare no conflict of interest

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