Turkish Journal of Computer and Mathematics Education Vol.12 No 13 (2021), 5307-5310

Research Article

Automatic Billing System for Electric Vehicle Charging

S Uthaya selva raja[a], J Ramprabhu[b]

[a,b] Kumaraguru college of technology, Coimbatore-641049

Article History: Received: 5 April 2021; Accepted: 14 May 2021; Published online: 22 June 2021

Abstract: In battery charging technique the absence of programming and its exploration charging framework that should be grown all things considered. The consequence of the charge estimated in the charging EV can be unique in relation to the charge sum professed to be charged in the charging station. The fact that the charge is estimated independently from one another utilizing its brilliant meters. Furthermore, if mechanical estimations are thought to be precise, it is conceivable to lie in one of the EV or charging station. Likewise, charging data can be controlled. To forestall those issues, this paper proposes the IoT based charging framework. The EV and the charging station store the charging data in the IoT based charging framework after common confirmation and forestall the adjustment. An IoT is a framework wherein all hubs have a similar record, consequently can't be altered in billing. This keeps a client from changing the record subsequent to charging.

Keywords: IoT, EV, Charging framework, Charging station, Billing.

1. Introduction

With the requirement for earth environmentally friendly power energy, the supply of electric vehicles (EVS) is expanding in frame. The speed of EVs prompted the improvement of EV's battery billing statements. At present, there are different charging techniques in wired or remote charging methods. EV charging advances are developing step by step. Be that as it may, the advancement of the innovations is predominantly acted in the equipment some portion of the charging field, and there isn't yet a product concentrate on the safe charging framework which is fundamental[3]. The current charging framework is momentarily acted in after interaction. The charging station demands instalment to the Mastercard organization with the charging data (i.e., EV client's card data, charging expense) given by the EV client and charging station after the charging station charged to the EV. As of now, the EV or charging station can give issue data, which may bring about invalid charging[5]. For instance, the charge profile estimated at the EV can vary from the charge sum gave from the charging station. This can happen on the grounds that EV and charging station measures the accuse measure of their own estimation gear. Subsequently, the EV or charging station can deliberately control the charging data. A blockchain was presented in 2008 by Nakamoto Satoshi to make a Bitcoin. The blockchain is a strategy that utilizes a dispersed record dependent on a hash work, empowering the exchange of trustless hubs without a confided in an outsider[10]. The current blockchain innovation is being considered for the utilization of the entire society past the field of cryptographic money. In light of the hash esteem contained in the square and having a similar record for each hub, the blockchain can forestall phoney in the untrusted relationship likewise it is conceivable to know when the record is produced by the specific node. In here, the common confirmation between the EV and the charging station depends on the footing of their exchange and allows the approval when the provisions of the exchange meet the interests of one another. The approval of the accreditation is affirmed by having a similar record and squirm the exchange[6]. The disappointment of the shared confirmation implies that the exchange isn't concurred close by. In this paper, it is expected that the EV and the charging station, which can record various measures of the charge, are commonly untrustful. The record with exchanges of the IoT based charging framework gives the protected charging framework by sharing non-modifiable square.

2. Survey assessment:

The various papers on electric vehicle metering and billing have been reviewed and its advantages and disadvantages of the technology used has been understood. Literature review gives comprehensive summary of previous research on our topic “Automatic billing system for e-vehicle charging”,the performance of our project formula is analyzed[3]. Then, supported the proposed the algorithimic formula of Lyapunov based on line distributed formula,for a best solution to achieve an attenuate MCS’s the cost and stabilized the queue backlog in every MCS[7]. The strength of the above methodologies is that they can limit the cost or boost the benefits, where pragmatic factors are considered dependent on the force interest furthermore, power supply. Simultaneously, there are likewise lacks as follows: I) The ideal methodology can't be straightforwardly utilized in the powerful conditions, wherein neither the irregularity of EV clients' appearance nor the unique component of force supply is thought off[8]. ii) The ideal techniques in these two methodologies are intended to limit the cost or boost the benefits,individually, where the limit of force supply is disregarded[4].In our work, not the same as the past works, we center on the powerful data of EV clients and the restricted inexhaustible force supply, through which a dynamic charging plot is proposed with MCSs in IoTs[2].

3. Proposed method:

The Internet of Things (IoT) includes fusing monumental quantities of heterogeneous finish frameworks whereas in giving one such information required to the advancement of a many digital services[1]. Detecting, preparing, correspondence, and management in IoT ar developing to be a lot of refined and present. The stage offers simple level programme (UI) with mental image apparatuses and alert system. Wireless charging mechanical arrangements ar chop-chop evolving to tackle the present difficulties endeavour e-mobility limitations and expenses. The cloud to edge IoT organization is actually viable with the pattern towards good vehicles[5]. IoT provides checking and management capacities to EVs within which robotization, through the connection of edge process hubs, assumes a significant half to encourage the progress. on-street dynamic charging for EVs is needed to encourage the general public to just accept the electromobility. The charging framework wants info and Communication Technology (ICT) to agitate the trail shoppers, method booking solicitations and issue bills[9] .In past distributions, we have a tendency to showed the e-mobility facultative stage material evaluating in-street of the ICTsystem for overseeing Dynamic Inductive Power Transfer (DIPT) street methods . In we have a tendency to explored the behavior and execution of 2 edge-handling devices whereas running the counterfeit vision sub system: GAAS.[6] The IoT views and instruments wherever documented nevertheless not fully bestowed nor assessed. customary communications protocols ar followed to remotely interface the vehicle to the road facet frameworks.

4. Block diagram:

The square outline clarifies the circuits which are utilized in an arrangement. Here we have utilized charging circuit, flow sensor, voltage sensor, H-connect driver, ESP 8266 Wi-Fi module, LCD show and engine. The square graph of the programmed charging framework for e vehicle charging as shown in the fig.1.

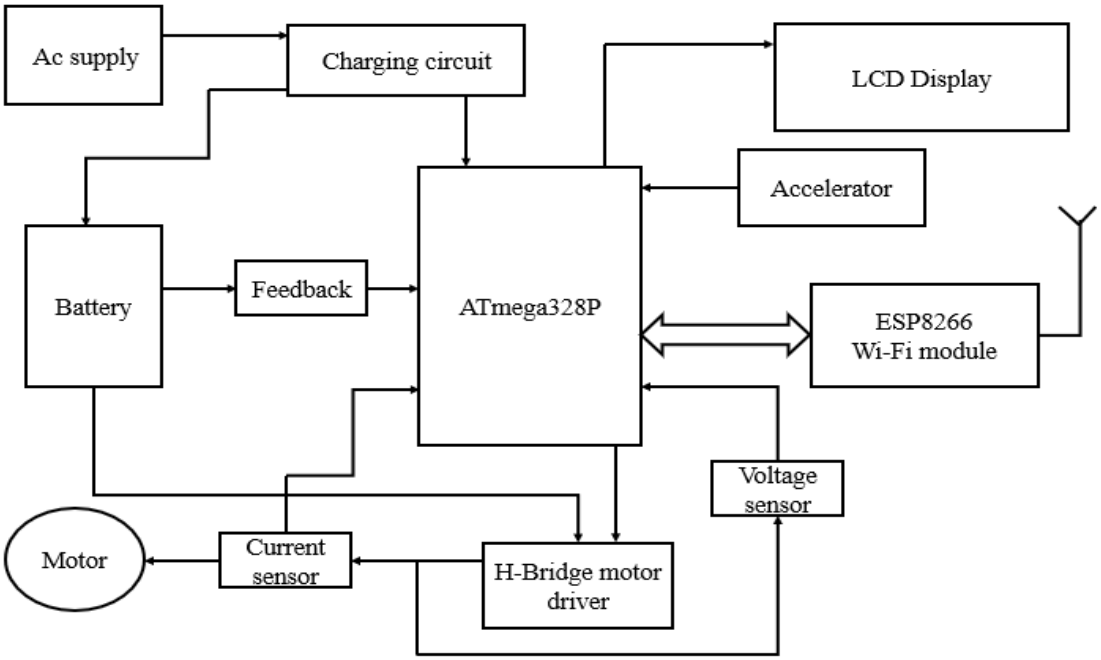

Fig.1. Block diagram

The microcontroller utilized here is ATMEGA 328P. The voltage and momentum sensor and input circuit and H-connect driver circuit, ESP8266Wi-Fi module send the information to cloud. The load will be a DC motor within a vehicle.

5. Results with discussion:

In this simulation process here, MQTT Algorithm. MQTT represents Message Queuing Telemetry Transport Protocol. It is a lightweight distributer and supporter framework where you can distribute and get the message as a client. MQTT is a distribute/buy in convention that permits edge-of-network gadgets to distribute to a dealer.

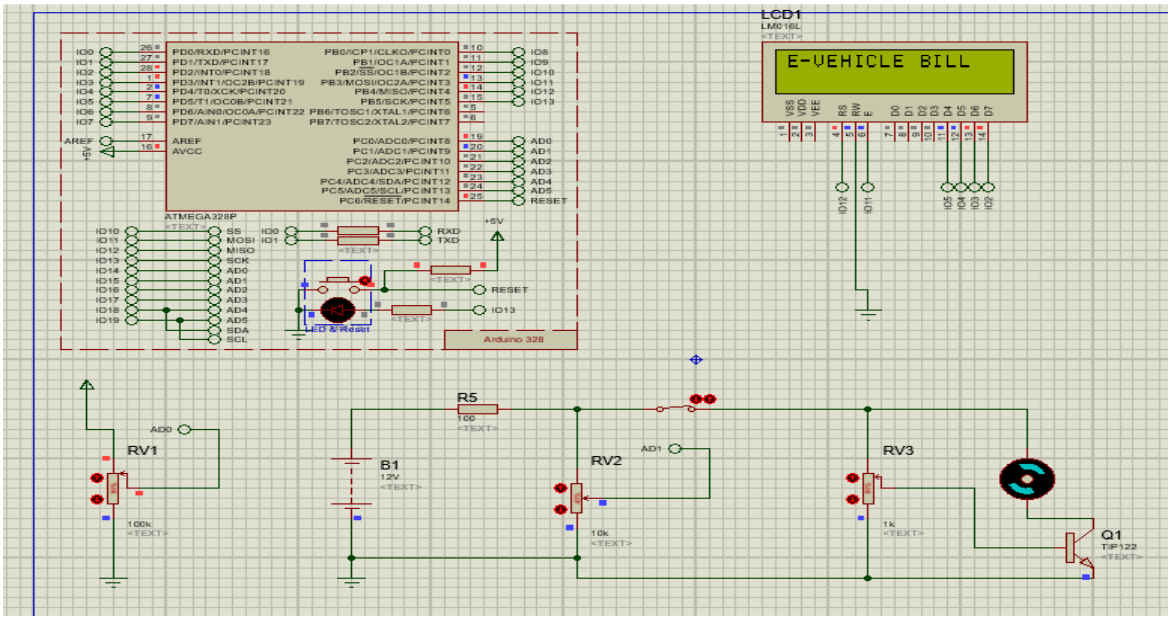

Fig.2. Simulated output

In this simulation proteus professional software is used to analysis the final output. The 12V supply is given to the complete circuit. The next to the power connection the Potentiometer is fixed, to avoid the overcurrent. The Darlington pair NPN transistor (TIP122) is used to driven to charge the battery, here in this module transistor is a diode, whenever the battery is fully charged its connection will be cut off automatically as shown in fig.2.

From source contribution as 230V ac supply is given through the charging circuit. the yield of the charging circuit is given through the battery. To screen the battery level input is taken from the battery to regulator. In this manner the regulator utilized here is ATmega2560 and the yield of the battery is given through the contribution of the engine drive, flow sensor to gauge the momentum and voltage sensor is associated corresponding to the ebb and flow sensor the yield of the H-connect engine driver is given through the engine. At that point we get the info structure the quickening agent to the regulator and the PWM(Pulse width balance) age is rely on the yield of the quickening agent and the utilization of current and voltage is given through the ATmega2560 and its given to the ESP8266 transfer to the cloud.

6. Conclusion:

The ideas of this project has been implemented successfully in both the software and the hardware prototype module and by the development of the product is easy to implement and its cost is compactable. The communication also made too simple as compared to standing in a queue for a long time to pay the amount.In this system the architecture is easy to implement in electric vehicle system and it can save time,money and energy. The fast growth of electric vehicle with attached electricity charge billing statement will be more efficient in recent years.Moreover transferring of money and giving change for the particular rupee can be avoided and by growing the digital system all over the world to make our country grow better.

References

1. Ahmad, A, Alam, M, Chabaan, R, “A Comprehensive Review of Wireless Charging Technologies for Electric Vehicles,” in IEEE Transactions on Transportation Electrification, vol. 4, no. 1, pp. 38-63, March 2018.
2. Amditis, A, Karaseitanidis, G, Damousis, I, Guglielmi, P,Cirimele, V, “Dynamic wireless charging for more efficient FEVS: The fabric project concept,” MedPower 2014, Athens, 2014, pp. 1-6.
3. Giang, N, Lea, R, Blackstock, M, Leung, V, “Fog at the Edge: Experiences Building an Edge Computing Platform,” 2018 IEEE International Conference on Edge Computing (EDGE), San Francisco, CA, 2018, pp. 9-16.

4. Zanella, A, Bui, N, Castellani, A, Vangelista, L, Zorzi, M, "Internet of Things for Smart Cities," in IEEE Internet of Things Journal, vol. 1, no. 1, pp. 22-32, Feb. 2014.
5. Richardson, A., "Automating & Testing a REST API, A case- study using: Postman, Tracks, cURL and HTTP Proxies," Leanpub, 2017.
6. Losant: https://www.losant.com/iot-platform
7. Musavi, F, Eberle, W, "Overview of wireless power transfer technologies for electric vehicle battery charging," in IET Power Electronics, vol. 7, no. 1, pp. 60-66, January 2014.
8. Jain, R, Tata, S, "Cloud to Edge: Distributed Deployment of Process-Aware IoT Applications," 2017 IEEE International Conference on Edge Computing (EDGE), Honolulu, HI, 2017, pp. 182-189.
9. Ma, S, "The solution of an IOT application: Smart vehicle," IET International Conference on Communication Technology and Application (ICCTA 2011), Beijing, 2011, pp. 636-641.
10. Divyapriya, S, Amutha, Vijayakumar, R, "Design of Residential Plug-in Electric Vehicle Charging Station with Time of Use Tariff and IoT Technology," 2018 International Conference on Soft-computing and Network Security (ICSNS), Coimbatore, 2018, pp. 1-5.