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Embedded Based Smart Charging Unit For Electrical Vehicle

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Abstract

Electric vehicles are a relatively recent technology that is seeking for its place in the market. It has several advantages, such as the reduced greenhouse emissions, fuel savings and its ease of use. The increase of the electric vehicles in the roads raises issues about their exact charging time and exact charging cost.. This project presents the main considerations about monitoring and displaying the charging data and its cost easily for the person providing charging facility. This unit can be used on high side hotel and residential customers to calculate exact cost of charging . We will also provide mobile App so that the customer can also keep the track of charging cost.

I.INTRODUCTION

Nowadays, electric vehicle (EV) is becoming popular since the fuel prices becoming more expensive. Due to these scenario, many vehicle manufacturer looking for alternatives of energy sources other than gas(1). The use of electrical energy sources may improve the environment since there are less pollution. In addition, EV produces great advantages in terms of energy saving and environmental protection.(2) Most EVs used rechargeable battery which is lithium ion battery. It is smaller to be compared with lead acid. In fact, it has a constant power, and energy's life cycle is 6 to 10 times greater compared with lead acid battery.(3) Lithium ion battery life cycle can be shortened by some reasons such as overcharging and deep discharges. On the other hand, EV usually has limited range of travelling due to battery size and body structure. (4)Now, an important reason that limits the application of EV is the safety of existing battery technology. For example, overcharging battery not only could significantly shorten the life of the battery, but also cause a serious safety accidents such as fire. Therefore, a battery Charging monitoring system for EV that can notify the user about battery condition is necessary to prevent the stated problems. Previous battery charging monitoring system only monitor and detect the condition of the battery and alarmed the user via battery indicator inside the vehicle. (5)Due to the advancement of the design of notification system, GSM module technology can be used to notify the manufacturer and users regarding the battery. GSM utilizes internet connectivity beyond traditional application, where diverse range of devices and everyday things can be connected via the internet, making the world is at the user's finger tips. (7)Motivating by the stated problems, in this work, the design and development of a battery Charging monitoring system using GSM module technology is proposed.

II. LITERATURE REVIEW

S. Yonghua Lin.et.al[1] "Present Status and Development Trend of Batteries for Electric Vehicles," Power System Technology, Vol. 35, No. 4, pp. 1-7, 2011. This paper describes the application of Internet-of-things (IoT) in monitoring the performance of electric vehicle battery. It is clear that an electric vehicle totally depends on the source of energy from a battery. However, the amount of energy supplied to the vehicle is decreasing gradually that leads to the performance degradation. This is a major concern for battery manufacture. In this work, the idea of monitoring the performance of the vehicle using IoT techniques is proposed, so that the monitoring can be done directly. The proposed IoT-based battery monitoring system is consists of two major parts i) monitoring device and ii) user interface. Based on experimental results, the system is capable to detect degraded battery performance and sends notification messages to the user for further action.

L. Xiaokang, Z. Lin.et.al[2] "Battery management system for electric vehicles," J.Huazhong Univ. Of Sci. & Tech. (Nature Science Edition). Vol. 35, No. 8, pp. 83-86, 2007. In real-time monitoring of lithium ion batteries based on Internet of things is proposed system monitors and stores parameters that provide an indication of the lithium ion battery's acid level, state of

charge, voltage, current, and the remaining charge capacity in a real-time scenario. The current state of the battery is sent to the e-vehicle company's cloud and the current location of the nearby charging station is received from the cloud. The proposed IOT based battery monitoring system consists of two major parts 1) Battery monitoring device 2) User Interface based on the experimental results, the system is capable to detect degraded battery performance and sends notification messages to the cloud and retrieves the location of the charging station.

D. S. Suresh (2012) Lin.et.al [3] "Battery Monitoring system Based on PLC", International Journal of Science and Research, vol. 3 issue 6. pp. 128-133. Battery powered electric vehicles are gaining popularity worldwide. This trend is driven by several factors including the need to reduce air and noise pollution, and dependence on fossil fuels. The main drawback of today's electric vehicle is its limited range, and the long time duration that is required to charge the electric batteries. In recent years, significant progress (through research and development) has been made to accelerate the charging time of the electric vehicle batteries through pulse charging rather than supplying continuous current and/or voltage. The part to be focused on estimation of electrical parameters of the battery in the electrical vehicle, which is the most important factor to get information about possible available driving range. If the amount of remaining battery capacity can be displayed for the driver then it is possible to make decision on the time of recharging the battery. To know battery behavior under different conditions, it is necessary to know various battery performance parameters.

III. BLOCK DIAGRAM

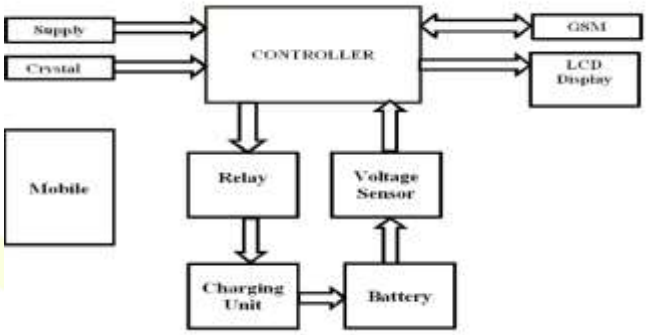


Figure 1

IV. OPERATION

It is embedded based Smart charging unit for E- vehicle circuit design.
It is block diagram aurdino is main component it will be operate on 12v to 5v converter supply. Crystal circuit is required 16 MHz. Here were operating and monitoring or the recharge through GSM module communication with aurdino circuit. GSM module is communicated with Web server and mobile app. Whenever going connect with charging circuit for Ev bike battery. Then we can directly turn on switch and it will the turn on relay switch, Relay with turn on charging unit and battery will get started for charging and Charging is full get automatically is sense for the charging circuit then cut off relay is will be directly get turned off the battery and will be disconnected for main supply. Because of that extra charging it's not to be provided battery. This intimation will be provide through the gsm module to the mobile app.So that we can get EV bike is already charged within how much number of unit consumption that is displayed by LCD display and mobile app or web server.

V. SIMULATION DESIGN

1.In our project EV charging system for vehicle is designed ,here 1st stage we are going to check circuit in proteus simulator.

Figure 2

2. Here arduino atmega 328p are main IC, which can be interfaced with all out put devices, 1st we will take trial on LCD display interface.
3. Here arduino and LCD are interfaced with 4data lines D4 to D7, RSand enable contral signals are interfaced with poet pins, RS is signal to differentiale data and commands,enable is lateh to get data fetch from poet pins to data lines.
4. Arduino is programmed in cc compiler the code is includes #liquid crystal .h header files that has all initilisation function included in it.
5. After click on arduino on compilier, verify option code gets compiled.

Figure 3

6. The code verification droll and its hex file is generated in compilier.
7. The hex file is need to upload in to proteus simulator i.e. after double click on IC the program upload tab will open.

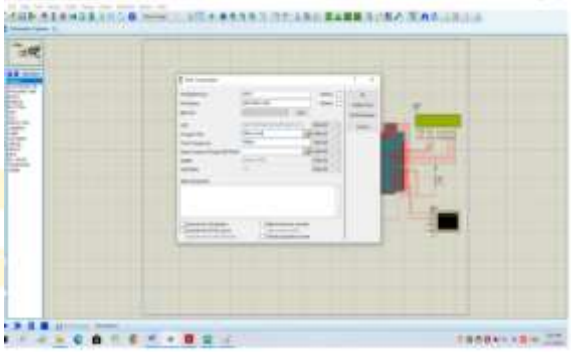


Figure 4

8. Here are need to select generated hex file in to arduino one and need to simulate this result.

9.The code is uploaded intel IC after click run option simulation will provide result.

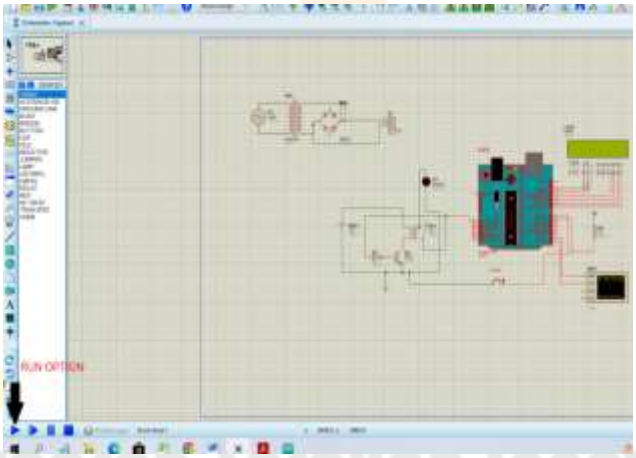


Figure 5

10. The LCD display shows message on LCD will demonstrate results of simulation.

VI.RESULTS

As per simulation result we can conclude that LCD displayed consumption of unit and Charging is full get automatically is sense for the charging circuit then cut off relay is will be directly get turned off the battery and will be disconnected for main supply and serial communicated GSM through message because of that extra charging it's not to be provided battery.

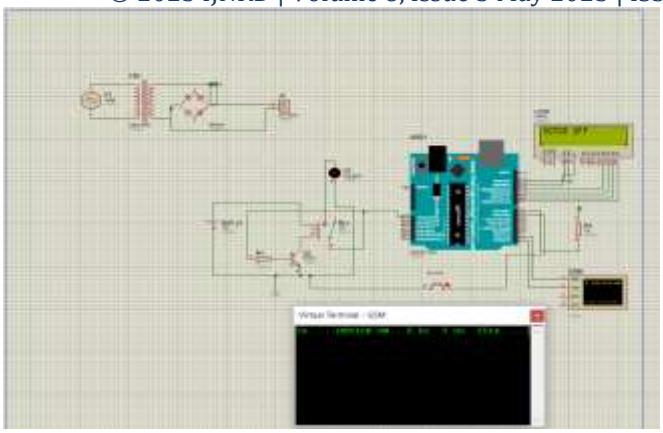
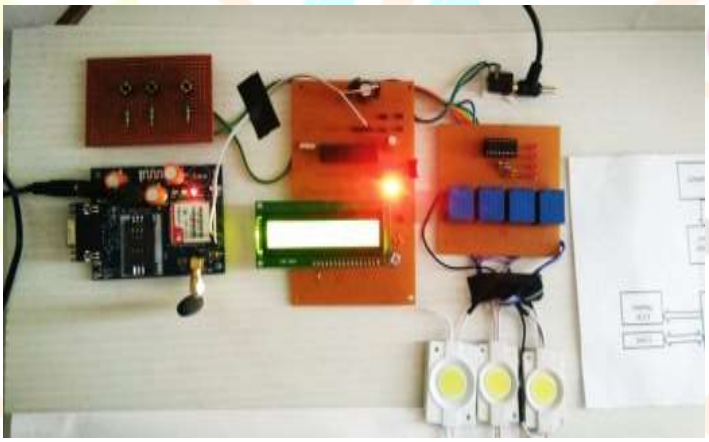


Figure 6

VII. Result Table 1

Sr.No.	Time	Rate	Unit
1	2 hr	15 rs	3
2	1 hr	10 rs	2

VIII. FINAL HARDWARE



XI. FUTURE SCOPE

1. The unit can be made small as possible.
2. Whole unit can be assemble using SMD component.

X. PROJECT APPLICATION

1. In residential purpose.
2. It is portable unit device.

XI. CONCLUSION

In this paper we have to create a small portable device which will show the charging unit required to charge the electrical vehical it will also help the owner and customers the exact time and amount and unit. Required by the vehicle it will give one stop solution for the amount to be charged for charging the electric vehicle in future same things can be reduce in size and able to fit in a single socket.

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