# Electric Vehicles Charging Station to Swap the Battery Using Mobile App

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***Abstract:*** *This Project proposes Continuous Battery Monitoring System to identify the battery condition. The Continuous Battery Monitoring System is able to detect the battery failure during the early stage of the event. The Continuous Battery Monitoring System will monitor the battery's voltage continuously. Measuring the voltage of the battery is the specialty of the proposed Continuous Battery Monitoring System for early battery failure detection. With that, the system will be able to measure the battery's capacity and will be able to measure the left-over capacity. The Monitoring System to allow the system to operate at real time basis and as well as monitor the battery's voltage continuously. In addition to this we are developing android app for battery slots availability and payment mode option, the payment amount will be send to the station, if payment is successfully paid means GCM Google could message will send the SMS to user.*

**Keywords:** Electric Vehicle, Battery Management Systems, Impacts and Challenging Issues, Battery Efficiency.

## I. INTRODUCTION

Battery is known for its capacity to store electrical energy in the form of usable energy which energy can be used when it is required. With that, battery is an essential device to store the energy for devices ranging from small electronics to large system such as renewable energy systems. Small electronic devices such as video/audio player, medical equipment, power tools, meters and data loggers, and remote sensors are installed with batteries. Installed batteries in these devices freed the users from the power cord connection and allow the users to portable application. Periodically the stored energy in the batteries installed in this application will reduce and these batteries require a charging process to restore the capacity.

## II. PROBLEM STATEMENT

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. 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. 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 accident such as fire. Therefore, a battery monitoring system for EV that can notify the user about battery condition is necessary to prevent the stated problems.

## III. METHODOLOGY

In order for the system to work, initially, the voltage sensor measures the lithium-ion battery's voltage level. At the same time, a GSM/GPS/GPRS shield reads the location of the station by using the GPS function.

The battery's voltage level readings and location of the vehicle are conveyed to a microcontroller for processing. As shown in the figure, the processed data are sent to a battery monitoring user interface in a computer wirelessly using the GPS shield.

Once data transfer is successful, the battery monitoring interface on the computer will show the updated data of battery status. When the battery produced low voltage level, a notification email is sent to notify the user. The online battery

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system not only can measure the voltage of the batteries but also communicate with the battery monitoring system to get the parameter of batteries

## A)Block Diagram:
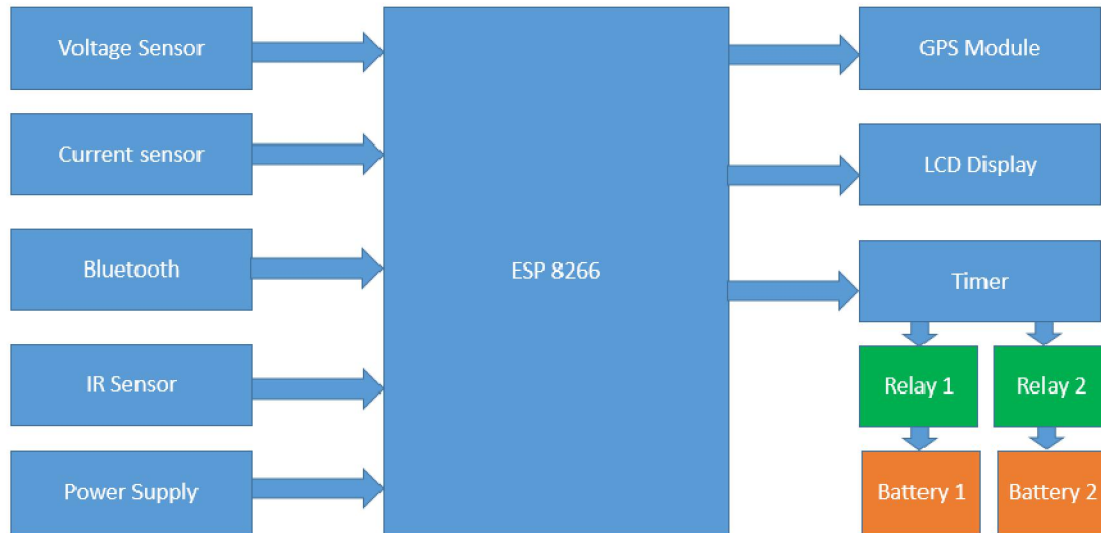


## B)Hardware Requirement:

### 1. Microcontroller:
The ESP8266 is a low-cost Wi-Fi microchip, with built-in TCP/IP networking software, and microcontroller capability, produced by Espressif Systems in Shanghai, China. The chip was popularized in the English-speaking maker community in August 2014 via the ESP-01 module, made by a third-party manufacturer Ai-Thinker.

### 2. LCD Display:
LCD stands for Liquid Crystal Display. LCD is finding wide spread use replacing LEDs (seven segment LEDs or other multi segment LEDs) because of the following reasons, The capability to display numbers, characters and graphics. This is in contrast to LEDs, which limited to numbers and a few characters. These components arespecialized for being used with the microcontrollers, which means that they cannot be activated by standard IC circuits. They are used for writing different messages on a miniature LCD.

### 3. Relay:
Relay comprises of an electromagnet and a contact unit. The definition is: Activating the contact unit using electromagnetic attraction, which is produced when electric current exceeding the specified value flows to the electromagnet; the voltage and current (input signal) applied to the coil opens or shuts the contact.

### 4. Voltage &Current Sensor:
Implementation of voltage sensor and current sensor techniques has become an excellent choice to the conventional current and voltage measurement methods.

### 5. IR Sensor:
Infrared technology addresses a wide variety of wireless applications. The main areas are sensing and remote controls. In the electromagnetic spectrum, the infrared portion is divided into three regions: near infrared region, mid infrared region and far infrared region red region 700 nm to 1400 nm IR sensors

**6. Bluetooth Module:**

HC-05 is a Bluetooth module which is designed for wireless communication. This module can be used in a master or slave configuration.

## C) Software Used:
## Arduino IDE:

IDE stands for "Integrated Development Environment": it is an official software introduced by Arduino.cc, that is mainly used for editing, compiling and uploading the code in the Arduino Device. Almost all Arduino modules are compatible with this software that is an open source and is readily available to install and start compiling the code on the go. In this article, we will introduce the Software, how we can install it, and make it ready for developing applications using Arduino modules.

## IV. CONCLUSION

This project battery monitoring system using microcontroller to control the core management to build battery information collecting subsystem, and the lead-acid battery 6V for the design of hardware and software realization of battery information collection, which is characterized by powerful function and low cost, stable operation, reliable and in practical, our experimental study shows a good performance. We are willing to cooperate with the manufacture the technology is applied to the industrialization.

## ACKNOWLEDGMENT

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