# 4. BATTERY TESTING APPLICATION

## 4.1 REQUIREMENTS AND APPROACH

Batteries are essential in any transport system which use electricity as a propulsion mechanism. However, batteries need to be tested over a long period of time because of the degradation of their battery capacity. The assigned project was a result of this requirement. Another engineer, proficient in IoT hardware setup a system which charges and discharges battery continuously. The system also consists of sensors which measure various parameters and format them according to the requirement of the standard representation. This data is then communicated over the Internet to the server to process this data.

However, this apparatus measures the data every second, and since the microcontroller is of low power, processing capacity is limited. And to reduce the network traffic, the data can only be uploaded once per day. This, about 87,000 lines of data need to be uploaded each day by every battery. The microcontroller, having low processing capacity, requires that the network service does not occupy the CPU for more than 1-2 seconds. And this becomes an issue as SQL servers are generally slower to insert and handle large amounts of data. Hence, an asynchronous method was adopted and where the data uploaded was initially backed up to a highly redundant storage like AWS's S3 and this file was then asynchronously processed. The network is released right after the file is uploaded to the S3 server. This results in the ability to have complicated computation while not having a significant network overhead with such sensitive hardware.

## 4.2 DESCRIPTION

This project required that a tool is created which allows the user to have a long-term view as well as a deep, detailed per-second view of the performance of any battery in any stage. This required significant optimization in the technique used to interface with the data from the SQL server and still respond to the user in a reasonable amount of time as shown in Fig 7. Hence, the following steps were adopted.