

# BATTERY MONITORING SYSTEM FOR ELECTRICAL VEHICLE

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**ABSTRACT:** The project is focused mainly on the applications of battery monitoring system in our day to day life. In this project we are going to monitor different aspects of battery and how they are affected by the condition of a battery. The several factor includes voltage, heat and abnormality of voltage. In electric vehicle industry battery is the key source and the life, condition, status, plays a vital role in the health of a car as well as the person driving it. So, we combined two technologies that is, one is to monitor a battery by monitoring its different aspects and another is to send and receive real time data with a user interfacing with our system

It is clear that an electrical automobile undoubtedly depends on the provision of strength from a battery. However, the number of energy provided to the EV is reducing bit by bit that ends up in the performance degradation. This can be a primary problem for battery performance. During this work, the idea of watching the performance of the battery with the usage of arduino strategies is planned. The planned bms system is developed and this machine consists of 2 major elements i) monitor and ii) interface. Supported experimental results, the device is capable to watch degraded battery overall performance and sends notification messages to the user for more action.

## INTRODUCTION

As the climatic condition on the earth is getting worst day by day and the major problem is raise the global temperature which is because of carbon emission. The CV vehicle plays a major role in the emission of carbon originated gases and to overcome this problem various manufacturers like TESLA designed an electric vehicle which is cost efficient as well as sustainably a good technology in future to rely on but the main problem with electric vehicle is the maintenance monitoring and charging.

So we made a technology which can monitor the condition of a battery the charging % of a battery and send the data to a user and in case if any miss happening happens then to notify a proper authority to help the person in need by this technology we simultaneously solve two problems

1. Environmental and another 2. The problem related to electric vehicle

It is clear that an electrical automobile undoubtedly depends on the provision of strength from A battery. However, the number of energy provided to the auto is reducing bit by bit that ends up in the performance degradation this can be a primary problem for battery manufacture during this work, the idea of watching the performance of the auto the usage of IoT strategies is planned, so the watching are often dead directly the planned IoT-based battery watching machine is consists of 2 major elements i) monitor and ii) interface supported experimental results, the device is capable to watch degraded battery overall performance and sends notification messages to the user for more action.

## PROBLEM STATEMENT

- The main challenge associated with that after successful completion of hardware work then we have to connect it with cloud based system because all feedback data of BMS will be feed by the system to the cloud.
- As user don't know the health condition of a battery and they has to go to proper place to get to know about battery condition which is not convenient and efficient as well.
- User can get stuck in any area because of battery failure and might not get proper authority to help them

## SOLUTION

The solution is to use the monitoring system in electric vehicle for measuring condition of battery and further operations. A battery tracking system for EV that can notify the person about battery situation is important to save you the said issues. Previous battery monitoring system handiest display and locate the condition of the battery and alarmed the

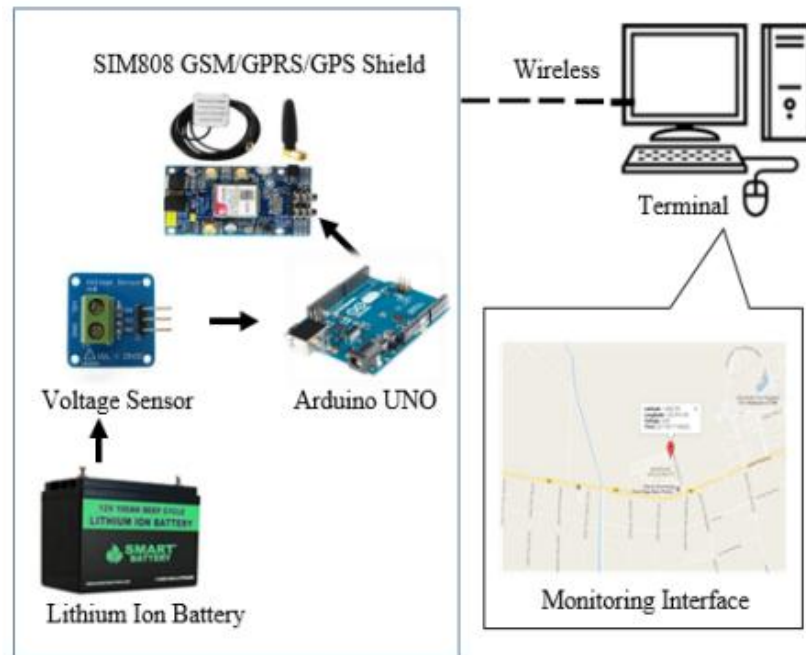
consumer through battery indicator interior the automobile. Due to the development of the layout of notification device, BMS generation may be used to inform the producer and users regarding the battery repute. This can be considered as one of the maintenance support system that can be achieved with the aid of the producer.

### Literature Survey

With the improvement of cell arranges in the 1970's for expanding the absence of frequencies in the radiotelephone administrations which in go lead to presentation of AMPS (Advanced Mobile Phone System) where the transmission was simple based. This was known to be the first era in quite a while. The subsequent age depended on computerized transmission and was called with different condensing as GSM (Global System for Mobile interchanges), ERMES (European Radio Messaging System). Different Cordless phone guidelines were likewise presented during this time as it were. The third era has ascended with the unification of various advances; some of them which are prevalently known are FPLMTS (Future Public Land Mobile Telecommunications System), UMTS (Universal Mobile Telecommunication System), and IMT-2000. The word GSM Refers to Global System for Mobile Correspondences. These days numerous individuals are demonstrating parcel important to find out about GSM related ideas. Along these lines, here we have reviewed a rundown of different GSM based ventures thoughts which are having more request and exceptionally fascinating to learn. The accompanying ventures dependent on GSM innovation we reviewed would give better thought regarding the GSM innovation for all intents and purposes. By and by, the remote correspondence has reported its appearance on enormous stage and the world is going versatile. We need to control everything and without moving an inch. This remote of apparatuses is conceivable through Embedded Systems. The primary point of this undertaking will be to structure a SMS driven programmed show toolbox which can supplant the as of now utilized programmable electronic showcase. It is proposed to structure get cum show toolbox which can be modified from an approved cell phone. The message to be shown is sent through a SMS from an approved transmitter. The toolbox gets the SMS, Validates the sending Mobile Identification Number (MIN) and shows the ideal data after fundamental code transformations. GSM based information obtaining is a procedure control framework that empowers a site administrator to screen and control forms that are circulated among different remote destinations.

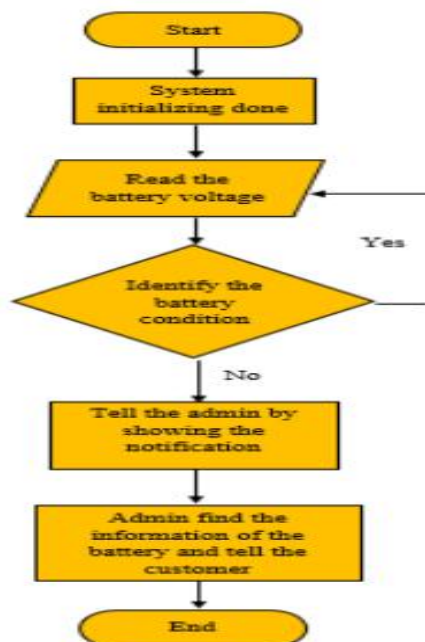
### COMPONENTS

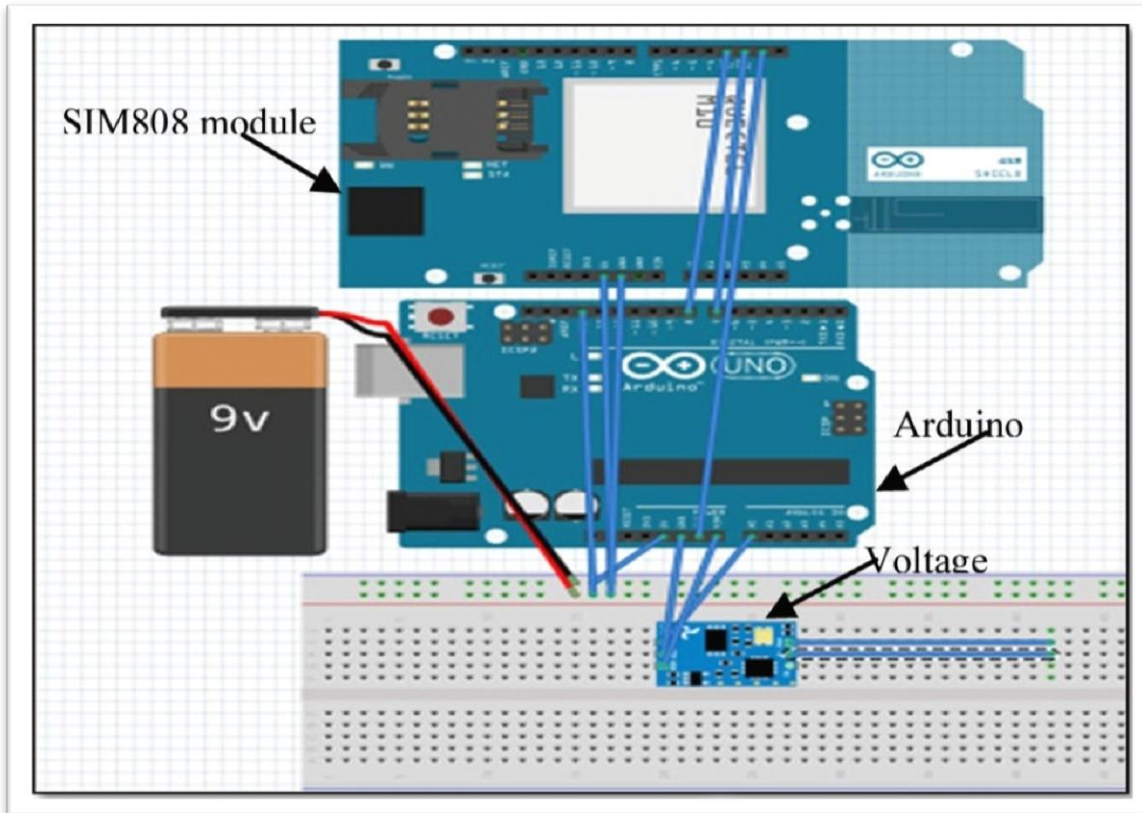
- i. Arduino UNO
- ii. SIM808 GSM Shield
- iii. Voltage Sensor
- iv. Lithium ions batteries
- v. Antennas
- vi. GSM sim



In the Fig.1, the proposed system of or project is shown, First step towards the progress is to measure the voltage level of a battery available in the car then the SIM module we are using SIM808V 3.2 reads the current location of a vehicle then they are will be a heat sensor which will continuously working on detecting heat of a battery. As the voltage sensor program with the arduino will display the current battery charged percentage and we will set a certain limit beyond that if a battery charge percentage go then it will notify a user and we will also a threshold heat unit beyond that if battery temperature goes then both sensor which are connected to arduino will send a signal to module which will eventually send your the current location to a proper authority.

**SYSTEM FLOW CHART**





This flow chart shows the algorithm of a system step

1. To Measure the Battery voltage and send data to Arduino
2. By interpreting a data system will decide condition of a battery if condition is ok then it will revert back to step 1 otherwise next step will follow
3. To send a notification to an administrator
4. To tell the admin by showing the notification

**Voltage Sensor Experiment**

This is the phase 1 of our product it includes the change of a voltage by voltage sensor programmed with Arduino UNO and to get a data which will be the base of added interpretation we are going to do in future.

In Fig 5, The voltage is sensed by a multimeter to get the real actual value of voltage in the given battery. In Fig 6, the voltage is sensed using voltage sensor

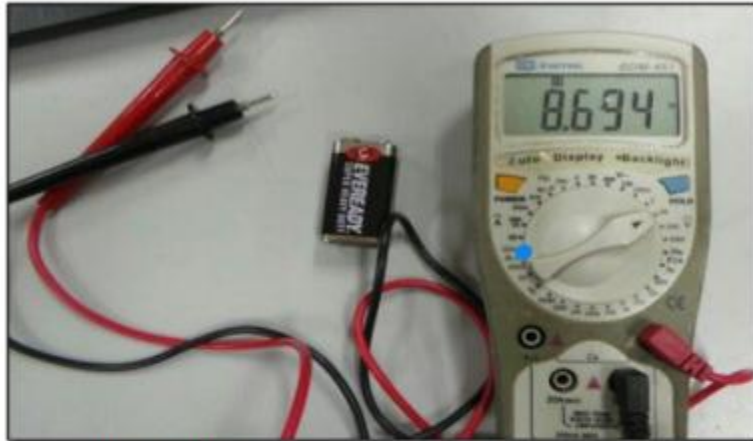


Fig. 5: Battery voltage measurement using multimeter

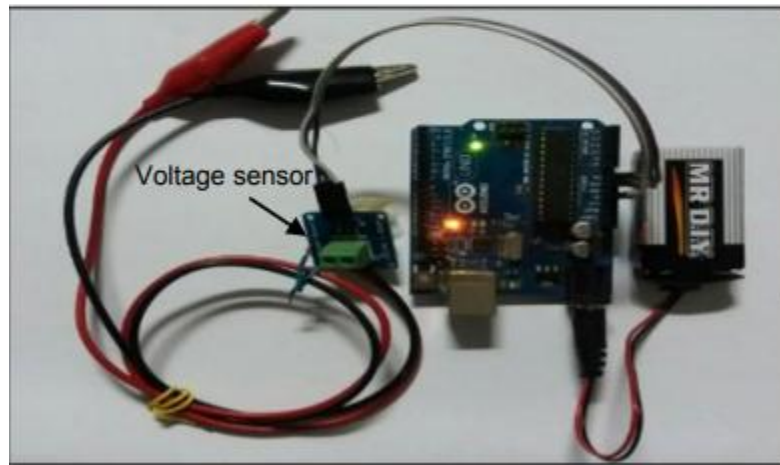


Fig. 6: Battery voltage measurement using voltage sensor circuit

### Market Analysis

1. A China based company which launch their first electric bike in the Indian market on 2019 i.e. REVOLT 300, REVOLT 400
2. A Bangalore based startup made a electric scooter named Ather in some years ago.

As The two example given above These brands didn't survived in the INDIAN market and the problem with both of the brands is they didn't have that much security as well as the top notch service with their product and as the electric vehicle required good care so a quality service should be provided.

### Market Analysis Conclusion

So from the data given above we can conclude that the Indian market needs a quality service when it comes to EV and with our product company can provide a service where a user can be helped no matter where the location is without even any damage to a self and a vehicle by this we can analyze that their a need of our product in the market. In Fig 7 the sales data is given by which we can analyses that the salesis increasing exponantionally. So, need of BMS will also increase.



### Electric Vehicle Sales Figures in India



Source:  
Society of Manufacturers of Electric Vehicles

#### ADVANTAGE

- The system of will be more reliable and user friendly user can experience monitoring of the battery condition from his smart devices through our GSM module
- The hardware for the battery tracking tool and a internet-primarily based battery monitoring user interface. The system is capable to show statistics together with vicinity, battery situation and time via internet via incorporating GPS device to stumble on the coordinate and display it on the Google Maps application Further change can be finished to improve the gadget by using including extra features into the system. The gadget can be used in smart phones by means of developing Smartphone software that can assist consumer to screen battery and as a battery degradation reminder. In order to enhance the net connection, Ethernet can be used to get a better internet connection as compared to GPRS.
- You can use it on any device which conation lithium ion battery which make it more feasible than any other monitoring because now we don't have to make different monitoring system for different system.

#### DISADVANTAGE

- It will only work on a places where he network is available on remote location it will not work.
- User has to assign particular new SIM for this purpose
- User has to pay bill in order to use SMS and GPS function of a SIM
- When using on still system sending GPS location will be waste.

## APPLICATIONS

The developed battery monitoring system also consists of a web-based user interface. The user interface is capable of monitoring multiple battery monitoring devices' locations, and the conditions of batteries. Therefore, the idea of the user interface has taken into consideration the situation where there is a need to monitor multiple batteries conditions.

With the growing recognition of worldwide warming around the sector, the demand for smooth gas/energy is on the upward push and as a result there may be a continuous shift towards the electric motors (EVs) and hybrid electric powered vehicles (HEVs). Battery bureaucracy one of the maximum vital systems in any electric car. Battery performance is influenced by factors consisting of depth of discharge (DOD), temperature and charging set of rules. EVs and HEVs use battery control system (BMS) to address the implementation of tracking system parameters which includes contemporary, voltage and temperature.

The main application is plug and play feature with one time installation of the device it will make it maintained free and long working as it only need 5v amount of power to work it will not effect on the power consumption of a battery. The device will be more efficient.

We can also use it on other system rather than electric vehicles only the sending location feature will be useless otherwise all the system which uses battery needed a monitoring system and by this system one can easily get battery info anytime anywhere.

## PROGRESS REPORT

This project is divided into four phases

1. To monitor a voltage
2. To send a data on a phone
3. To monitor a temperature data
4. The Integral Interpretation of a data

Currently we did the first two phases in future we will proceed with another two phases.

## RESULT AND DISCUSSION

In the end we want to conclude that with lot and a different sensors we can monitor the performance of a battery as well as its condition the main idea behind this project is to develop a product which can work on iot and provide a safe environment for every one to drive a Electric Vehicle. We can also see that the potential of this product that it can be improve to a further research is done on it as we used SIM808 which will make this device more compatible cost efficient and reduced in size. So by this we conclude that battery monitoring system is a great futuristic technology.

We have implemented IOT and sensors together which is capable to measure battery temperature, Condition and no. of backup hours given by battery of hybrid vehicle and can record all these parameters with respect to time and display it on LCD as well as send it non mobile. We have tried our level best to make the project as good as possible. The system will help to ensure the efficient working of battery

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