

# GSM BASED MONITORING SYSTEM OF UPS BATTERY

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**Abstract :** Today every scale of the business has increased more and the UPS usage has also increased more than the before days. The purpose of this system is to monitor UPS system's battery remotely using various sensors, microcontroller and GSM module. UPS monitoring is very important in today's time in IT sector, finance sector, medical sector. The presented idea is very useful for Electronic equipment system that runs on batterybased power supply. By employing this system, the user can monitor and control the UPS system 24x7. Microcontroller continuously monitors the voltage and if the voltage drops below the set value, then this system alerts the user through GSM in the form of SMS. This system helps to increase the efficiency of ups with providing remote monitoring feature..

**Index Terms – GSM, UPS, Monitoring.**

## I.INTRODUCTION

A backup power system at a minimum in form of an Uninterruptable Power Supply (UPS) is a must to keep your systems operational in the event of an outage. In case of power failure UPS is the device that maintains power. UPS mainly consist of battery, battery charging circuitry and inverter circuit. In case of power failure the battery supplies power as long as it can last. UPS are good for backing up important system as well as their data in case of power failure. Loss of data can be prevented by using UPS. It provides a power source in case of main power failures blackouts. In many scenarios they also regulate incoming voltage to the system so that constant supply to the system is maintained and hardware of the system won't be damaged by power spikes.

When there is power failure. the efficiency of process organization is doing decreases and it affects the productivity of an organization. This power failures may cause by system switching, weather conditions, hardware faults, high power demands etc. To monitor UPS continuously and manually is difficult and not hustle free. To tackle this, we have proposed our system

You can take quick corrective actions based on insights gained from monitoring. In case any UPS fails or any of its parameters change, the technician can be alerted through SMS. This will not only help in detecting the faults, but also determining the condition of the UPS at that particular moment.

## II. RELATED WORK

TABLE I :COMPARISON OF TECHNOLOGY USED FOR MONITORING OF UPS

Year	Title of paper	Technology Used	Algorithm	Accuracy
2017	CH Satya Sai Krishna Gopal [1]	IOT, GSM	Protocols – T2C, UART Medium of communication-SMS	High accuracy
1991	Zbigniew Noworolski [2]	GSM	Protocol – UART Medium of communication-SMS	High accuracy
2017	Padlan Alqinsi [3]	MQTT	Protocol – MQTT Medium of communication- WEB	Moderately accurate
2014	Shiwei Li [4]	Cloud	Protocol – https Medium of Communication - WEB	Moderately accurate

[1] The paper mainly focuses on presenting an economical and elementary approach to design an intelligent UPS monitoring and controlling system, adopting the concept of mobile to machine and machine to mobile communication is one of the most effective wireless communication (GSM) is one of the parts must effective wireless communication that can be utilized easily. This paper describes about monitoring UPS with the help of IoT. The hardware is made in such a way that the information about the UPS (battery status) will be sent to the user via SMS using the WIFI module (ESP8266) in real-time.

[2] This paper presents a microcomputer-based system for the automatic monitoring of lead-acid cells in UPS battery installations by continuously measuring the voltage of each cell, it is able to store information during discharge which may be used to identify weak or defective cells. An algorithm for the prediction of the remaining usable support time for the battery is also introduced. By using both voltage and current data, it is able to predict remaining support time even if the battery is only partially charged when discharge begins.

[3] This paper describes monitoring of UPS using MQTT protocol. The system used MQTT as a communication protocol that was designed for a lightweight communication. the system was intended to display UPS monitoring data in real time on a webpage on raspberry pi which roles as a web server, MQTT broker, MQTT subscriber and database. The developed system allowed the

displaying of multiple UPS parameters in Real Time. The parameters were displayed in a webpage in order to make them possible to be accessed in various devices that a web browser.

[4] This paper describes building the new UPS battery remote monitoring system, using cloud computing technology, With the help of the cloud data storage to solve the problem of reliable access to huge amounts of data. Also analyzing cloud computing to solve the problem of highperformance computing, through cloud Business applications to solve the problem of stability and scalability of the application system. Through cloud terminal to achieve the diversification of application mode.

### III. METHODOLOGY

Considering requirement and research done, the system proposed mainly consist of 3 main parts. i.e., Collecting data from all sensors, sending that data and processing it with micro-controller, sending user feedback.

For monitoring input current and voltage, we are using ZMPT101B (Voltage sensor) and ACS712 (Current Sensor). These sensors will be monitoring incoming voltage and current to UPS battery and send that data to Micro-Controller i.e., Arduino UNO. Also, TI's IC BQ27441 (Fuel Gauge) will monitor battery parameters like remaining battery percentage(mAH), SOC (State of Charge), Battery voltage etc. this data will also be sent to Micro-controller.

After collecting all these data user will be alerted whenever any predefined parameter will change e.g., input voltage, current and battery percentage etc. by using GSM technology. SMS will be sent user on his/her phone with the help of GSM module i.e., SIM900A. For coding part of system, we have used Arduino IDE.

### IV. FLOW CHART

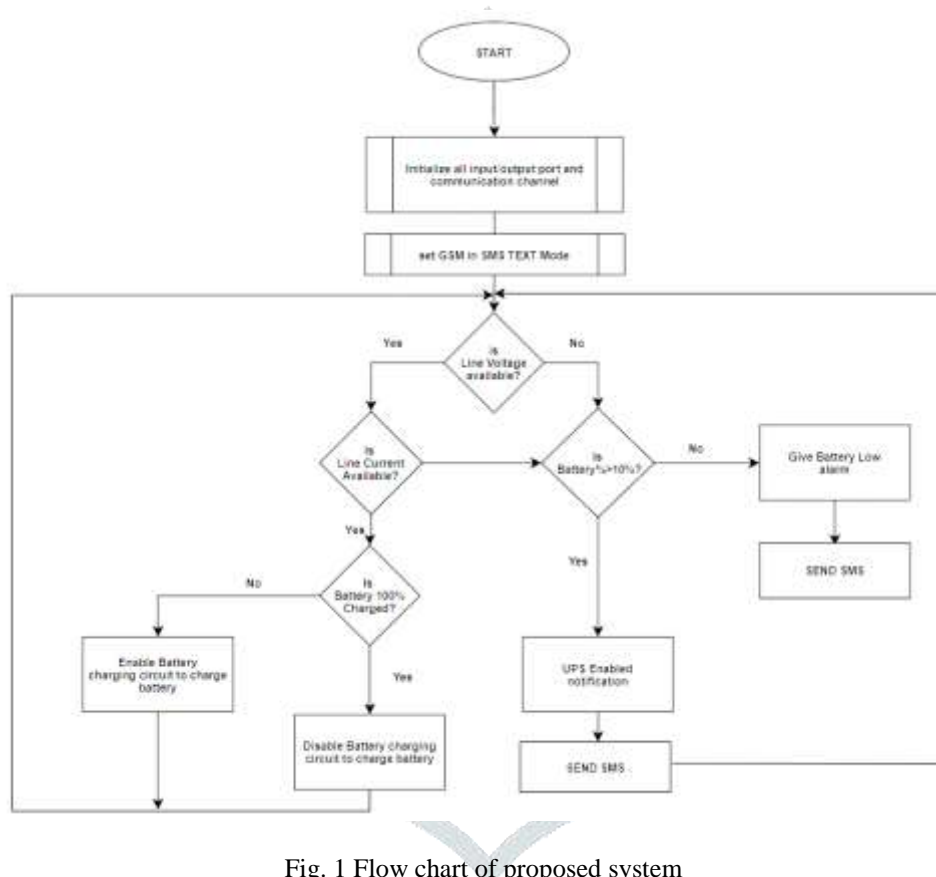


Fig. 1 Flow chart of proposed system

- A. First of all power on all components and check if input voltage and current are there and are in defined limits.
- B. Then check if battery is 100% charged or not and if it is not charged fully then it will enable battery charging circuit.
- C. Also when battery goes below 10% user will be notified.

## V. BLOCK DIAGRAM

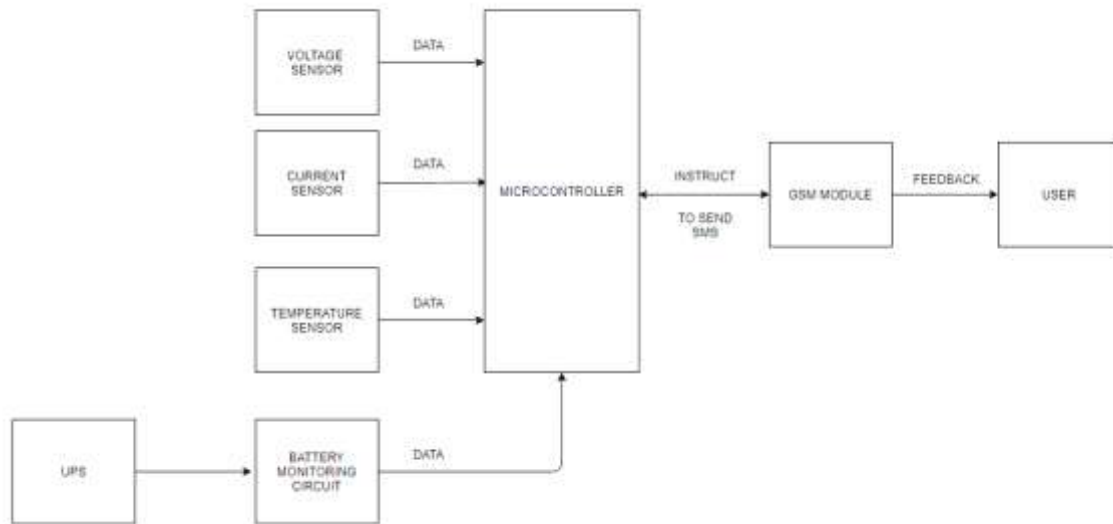


Fig. 2 Block Diagram Of GSM Monitoring System

All sensors will sense data and sent that data to microcontroller and microcontroller then take actions according to code provided and send SMS alert to using GSM module.

## VI. RESULT



User will receive alerts from the microcontroller (connected to GSM module). These alert messages contain “status of UPS”, “Battery SOC”, “Temperature”. Also, battery’s SOC, Volts, current, capacity, full capacity, power, health, is printed on serial monitor. The system proposed is monitoring UPS remotely and user is receiving alert messages predefined parameters are varying. This solves the inconvenience caused when monitoring UPS manually. This implemented system is low cost and can be affordable by all scales of industry.

## VII. ADVANTAGES, LIMITATIONS AND FUTURE SCOPE

### A. Advantages

Our model provides a novel way to keep track of UPS health and has following advantages

- Provides real time continuous data monitoring
- Provides real time continuous SMS warning system
- Beneficial for data security and total health of UPS Battery and related circuitry
- It is cost efficient system.

### B. Limitations

- Does not provide any control mechanism to control parameters within circuitry.
- It is a data monitoring and warning system in its current form, there is no provision for analysis of monitored data

### C. Future Scope

- Controlling of UPS can be added to our presented system so that if there is circuit failure or any other harm to UPS then not only user will be alerted also user can turn off the UPS.
- Also all the data gathered from all the sensors can be stored in database as a log for future references.

**VIII. ACKNOWLEDGMENT**

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