ISSN (Online): 2456-0448
International Journal of Innovative Research in Management, Engineering and Technology
Vol. 6, Issue 4, April 2021

Iot Based Generator Fuel Monitoring And Power Flow Control System

[1] Mr. S. Bharath,[2] R. Arthi,[3] V. Vijayalakshmi

[1][2][3] Department of Electronics and Communication Engineering, Surya Group of Institutions, vikravandi, India.

Abstract: ***This paper presents IOT based generator fuel monitoring and power flow control system in Base Station Cell Sites with SMS Alert. In Telecommunication Network cell sites, generators are manually monitored by the site operators and the process of monitoring the fuel and the temperature level of a generator installed in every cell site is not efficient. Cases had been reported where sites shutdown for hours because of careless and unprofessional practice of the site operators, thereby imparting huge loss to the Telecommunication company. This problem has lingered and calls for serious concern. Therefore, this work introduced GSM based monitoring process to address the unprofessional practice used by the cell site operator to monitor various generators. The proposed system comprises of both hardware and software. The hardware part consists of ultrasonic sensor, temperature sensor, Microcontroller, GSM module, power supply, Invertor, DC generator, motor, relay, load etc. while the receiver section is the mobile phone of the site operator. The software part includes the algorithm and program code written in C++ programming language. The system transmitter was carefully designed and tested. The result shows that the developed system perfectly monitored the level of the fuel and temperature, power condition of the generators in the targeted cell site and transmits the status (parameters) via wireless to the site operator's mobile phone. With this, cell sites can be sustained by monitoring the generators powering the Base Stations and alerting the site operator accordingly.***

Keywords- Base station (BS), GSM, Web Technology, Microcontroller, Critical Alert.

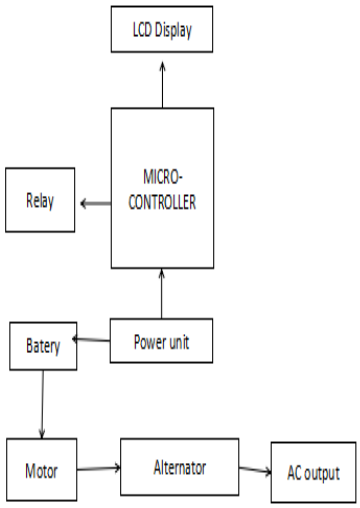
INTRODUCTION

The IOT based Generator fuel monitoring and Power flow control system is used to prevent system's fault and reduce the fuel consumption. We are Implement, this project in the generator, which is using in Telecommunication Industries to prevent network problem when the power is off and then the power flow is controlled by using Motor, DC generator and invertor etc.
Diesel Generators are commonly being used as a temporary source of power in domestic as well as industrial applications. So, the another aim of this project is to propose a system that would monitor the fuel level and temperature level of the generator continuously by using Ultrasonic sensor and Temperature sensor.
If the fuel level is lower than the base value of the tank and the generator is over heated then it Send an alert message to the user's mobile or laptop through the GSM. It can be used to reduce the generator accident and predict the system fault. And all the information stored in cloud storage for future reference.
Generator gives the output in AC form so relay is used to sense an AC line and battery is used to store a power and then the Invertor gives AC load to the relay. Here, we use two relays and two Load for to show an output. In Existing system, the load is given to all devices (I. e. all relay) but in our project the AC load is given to selected relay only, this is the main advantage of this project, we can save the fuel. And if the power is cut, we can get message through mobile phone using GSM module, and the fuel level is minimum or the generator is overheated, the generator is automatically OFF and also the message is sent to mobile.

By using GSM and IOT technology we get information from anywhere at any time through mobile phone. Here, we use two load and two Relay used to store the output. If the generator goes to critical state. we ON or OFF the generator from an

ISSN (Online): 2456-0448
International Journal of Innovative Research in Management, Engineering, and Technology
Vol. 6, Issue 4, April 2021

BLOCK DIAGRAM FOR EXSISTING SYSTEM

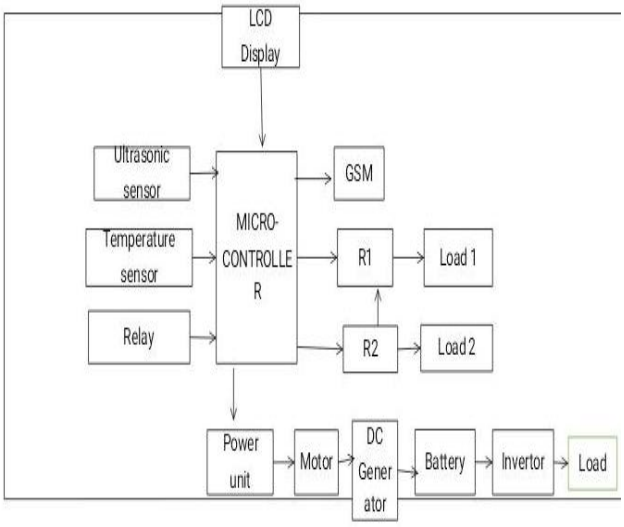


In existing system temperature level is not measured and the power condition is not monitored. IOT is not used and the load is given to all devices so fuel cannot be saved.

DRAWBACKS

* Can't adjust the load.
* Temperature and power condition are not monitored.
* Difficult to prevent the fuel theft.
* External data is required.

PROPOSED SYSTEM BLOCK DIAGRAM:



TRANSMITTER SECTION

The transmitter section would be installed in the Mobile cell sites to monitor the fuel level and the temperature level, power condition and control the power flow then send the levels to the controller which decodes and finally send to the user (site operator) via GSM modem for update. Each module is explained below including how they interact to achieve the desired system objectives for more under- standing.

A. **Power Supply Module:** The +5v DC power supply for the system was designed based on the voltage required to power each component as specified in the manufacturer's data book. Transformer was used to step down the 230V AC mains voltage to about 12V AC. The rectifying diodes were used to converts the AC Voltage to DC voltage. Electrolytic capacitor of 1000µF/35V was used to filter ripples and regulator of 7805 used to capture exactly +5V DC needed (figure 2).

B. Sensor Module:

Ultrasonic Fuel Level Sensor (HC-SR04): This sensor is based on "Ultrasonic measurement technology" that utilizes the sound to measure fuel level in the tank within a distance of 2cm-400cm. The UFLS includes a feature that gives an alert when the generator tank fuel level drops quickly, as well as provides protection from fuel leaks, theft and over-

D GSM Modem Module (SIM900): This SIM900 delivers GSM/GPRS 850/900/1800/1900MHz performance for voice, SMS, Data, and Fax in a small form factor and with low power consumption. It is deployed for wireless transmission of sensor data to the site operator. The modem communicates with the microcontroller through 'AT' commands (figure 2).

E System Display Module (16 X 2 LCD): A 16 X 2 LCD is used by the system to display temperature and power condition and fuel levels in percentage as it operates. Each character is displayed in 5 X 7pixel matrix as the data is sent from the microcontroller.

Receiver Section (Mobile Phone)

The Cell site operator would receive an alert via his/her mobile phone concerning the status of the generator's fuel level temperature level and power condition at an interval of time from all the sites he/she would be managing.

System Data Logger Alert Message

a. Non- Critical Message

The non-critical alert is the normal alert that is sent always when fuel and temperature and power condition (I e., when the power is ON or OFF). Figure 6a shows the non-critical set point logging data alert displayed during the test running period.

b. Critical Alert Message

The critical alert message is the warning message sent to the cell site operator`s phone and other logging devices only when the fuel and battery percentage usage is below or exactly at the set point of 15% (table 1).Figure 6b shows the data logger critical alert received during the test running period.

System Operation

The simulation of IoT System Based temperature and power condition and fuel levels monitoring system with SMS alert was done to showcase the performance of the system. The temperature and fuel levels were monitored by reading the voltage variations in the temperature and fuel level, mapped in analog form within the range (0-1023). This means that the sensors were able to convert fuel level and temperature level sensed into voltage levels mapped in analog form between 0-1023 The 10bit Analog to Digital Converter (ADC) converts sensor signals into its digital equivalent and sent to the microcontroller which processed and then send to the display unit (in percentage).The discrete (digital) value taken and signaled at the following percentage levels: 15 percent (critical value; attention needed), 20 percent, 40 percent, 60 percent, 80 percent. And the load is given to selected relay only through the invertor. Motor is used to convert the electrical energy into mechanical energy. DC generator is used to generate the DC power, that generated DC power is given to invertor. Invertor convert the DC power into AC power and it is given to selected relay only. GSM is used for SMS purpose.

ISSN (Online): 2456-0448
International Journal of Innovative Research in Management, Engineering, and Technology
Vol. 6, Issue 4, April 2021

ADVANTAGES:

* Fuel consumption is reduced.
* Temperature and fuel level is monitored to prevent the system from fault and fuel theft.
* External data is required.
* By using GSM module and IOT we can easily monitor the data through mobile phone from anywhere.
* If the fuel level is below or the generator is over-heated. we get alert message through GSM. And the generator is off **automatically.**
* Load is controllable.
* Power condition is monitored, when the power is ON or OFF.

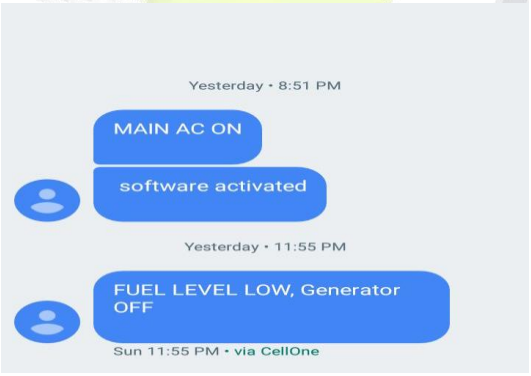
LIMITATIONS

1. Limited number of load connection
2. cost is high

FUTURESCOPE

- In future, SOLAR POWER is used to operate the generator to replace fuel use.

RESULTS



CONCLUSION

Telecommunication industries have become more competitive and the need to sustain power always to the base transceiver stations has call for serious concern. The customers and the network operators are at risk whenever network goes bad. In the same vein, full control of the mobile sites for reliable operations cannot be compromised. Therefore, remote monitoring of base stations via GSM technology would greatly improve the system by providing reliable process of maintaining and managing cell sites. The designed and tested system has proven to be more reliable in managing mobile site generator's fuel, temperature, power condition (I e.., when the power is ON or OFF) and control the power flow.

REFERENCE:

*REFERENCE 1 - AUTHOR NAME : Donald E and Chukwunazo E

TITLE : IoT Based Monitoring Of Generator's Fuel & Battery Levels In Base Station Cell Sites With SMS Alert Global Scientific Journal 36-44.(2019)

*REFERENCE 2 - AUTHOR NAME : Obikoya G D

TITLE : Design, construction, and implementation of a remote fuel-level monitoring system EURASIP Journal on Wireless Communications and Networking 76.](2018)

*REFERENCE 3 - AUTHOR NAME : Abel Avitesh Chandraetal

TITLE: "Cloud Based Real-time Monitoring and Control of Diesel Generator using the IoT Technology"