

# Monitoring and control of self-start generator using android app

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## Abstract

Human are busy to investigate easy ways to control different objects. Internet of things (IOTs) and home automation are the most emerging fields these days. Generators are used as backup power source of electricity. The traditional way of monitoring a generator was through regular checks on generator site several times in day. There should not be any extra load on generator because it causes to reduce its efficiency.

A generator could be controlled by wired system and it could be controlled by Bluetooth system. Some other ways to monitor a generator include radio frequency. By a selected frequency a generator could be controlled. A new way to control a generator wirelessly is through android app.

An efficient way to control a generator is through android app. The app has ability to turn a generator ON/OFF. It could measure fuel level, battery water level and could manage load. If any extra load is present of generator it would be automatically turned OFF. Furthermore, one could turn ON any of the loads within the specified limit. There is an option to update limit each time. It uses Wi-Fi module which has limitation as per a simple Wi-Fi device has limit.

This project is applicable in industries as well as in homes and markets. This could be used in such offices which have tall buildings where it is difficult to approach a generator which is placed on ground level. It could be used in stadiums, caravans & in hospitals.

**Index Term**-Generator, Android App, Load Management

## I. INTRODUCTION

Electric generators are used as backup power source and they play an essential role in this modern era. As the world is expanding day by day, it is being difficult to control and monitor all appliances. Almost every single appliance is dependent on electricity. Therefore, it is major issue to take much care of generator. Different industries and factories hire a team for monitoring and controlling of generator. So they have to do a lot of work and there are

chances of inaccurate data recording. They have to check it on daily or hourly bases.

Therefore, to resolve the entire problem an android app is developed which could turn generator ON/OFF, checks fuel level, checks battery electrolyte level and manages the load. Load limit is defined through android app and if load exceeds the limit than extra load is automatically turned OFF. This gives a live feedback on android screen.

It's a new method for monitoring and controlling of a self-start generator. It is a

new aim for advancement in different technologies.

## 2. LITERATURE REVIEW

Previously, generators were controlled and monitored through regular checks. There are different approaches that have been used for controlling the generator. Some techniques include Bluetooth, Zigbee, GSM based system and some wifi connected techniques are the techniques that have been used for controlling the generator.

These are days of android. In 2014 a generator was remotely controlled based on android app. It was controlling and monitoring generator's parameters like fuel level, temperature, current and voltages. In addition this application was able to turn generator ON/OFF.

In 2014 a set of generator was controlled by android app. It was consisted of four modules. It was continuously monitoring the running state and parameters information of generator set.

In 2017 a generator is controlled by globally system based on android. This technology is composed of five parameters. The parameters include data acquisition, data uploading to sensors on cloud, data visualization, alerts and notification and controlling of generator through app. This could measure the output voltage, fuel level and frequency.

Arduino mega 2560 is used as controller. For measuring fuel level and battery electrolyte level ultrasonic sensors are used. For turning the generator ON/OFF and turning load ON/OFF relay system is developed. All the relays are controlled by Arduino signal. The important parameter is controlling load on the generator. If there is

extra load on the generator, it reduces the efficiency of generator. There is an option of load limit in android app. Every time limit is defined according to load. If there is extra load on the generator, it is automatically turned OFF.

## 3. METHODOLOGY

A hardware based controlled system is designed and connected with generator. It includes the Arduino mega 2560 controller. The first task is writing of Arduino code. Its URLs are given on net and they are accessed in development of android app. For each new value it gives updated value.

Sensors are connected to control unit, battery, load and generator. Control unit takes analogue input from all the sensors and gives digital values to wifi router which emits signal. These signals are received by android app. So, whole control is displayed on mobile screen. Reverse process is done when signal travels from mobile to control box and loads.

The control box includes relay system for turning generator and load ON/OFF. It includes two sensors which are being used for measuring level of fuel and battery electrolyte. These are actually distance measuring sensors. They measure the empty part of tank and then it is estimated that how much fuel or battery electrolyte is present. There are three levels which are named as good, average and bad level. If fuel or battery electrolyte approaches to bad condition then it is alarming situation and it is necessary to put fuel in generator or to put water in battery.

Different loads are connected to the generator. If load exceeds the generator limit then extra load is automatically turned OFF.

There is an LCD for displaying values on screen. Moreover, it includes a protection system and a 12v supply for turning this system ON.

#### 4. RESULTS

After sorting out all the problems, the project functioned completely as it was expected. First of all application is installed and it is connected to system wifi.

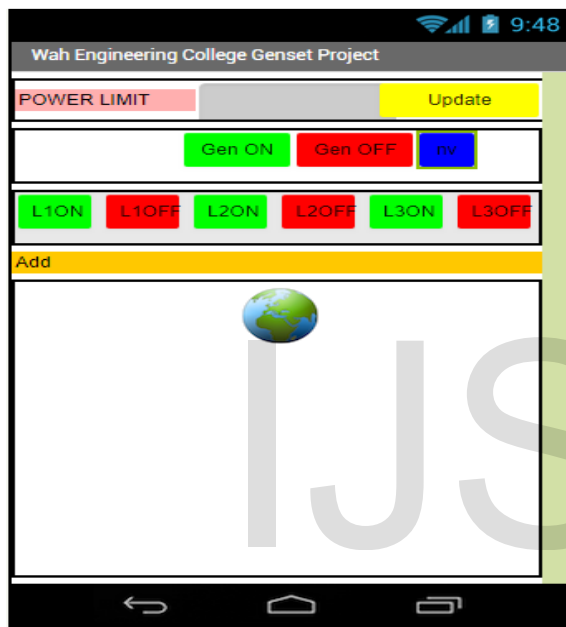


Fig1: Background of android app

Power limit is updated first and then generator ON button is pressed. It took 3 sec to start the generator. It was possible to see all the values on the screen. If level of fuel or battery electrolyte is on bad condition then fuel is put in generator or electrolyte in battery. All loads are turned ON and if there was extra load it were automatically turned OFF.

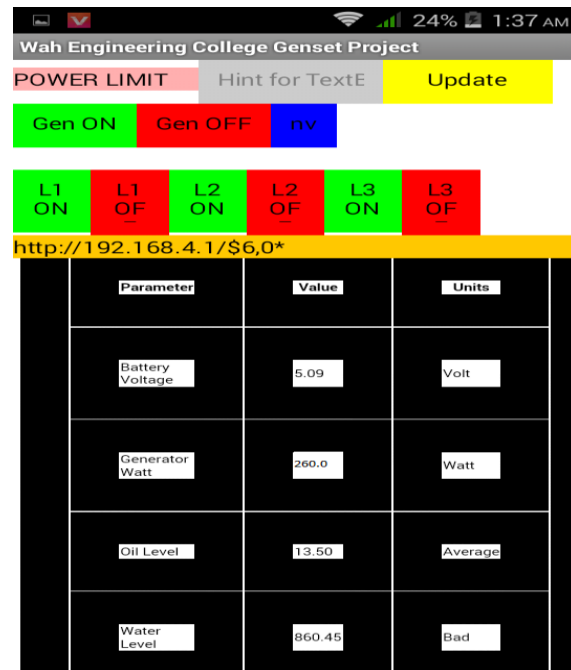


Fig2: All parameters on android screen

#### 5. LIMITATIONS

It was locally controlled and not globally. So it is controlled within specified range as a simple Wi-Fi is accessed in a range. The circuit is made for resistive load only and does not show accurate load values for inductive loads.

#### 6. CONCLUSION

The purpose of the project is to facilitate human and reduces its efforts regarding monitoring and control of standby generator. Generator was successfully turned ON/OFF from the android app. Fuel level and battery water level was continuously monitored and output voltages and wattages were also continuously monitored. The load connected to the generator was also turned ON/OFF from the mobile when there was extra load on the generator it was automatically switched OFF and after that load is set according to the user requirement.

## 7. FUTURE WORK

This project is IOT based project and it is most emerging field these days. Our project is locally controlled but it is possible to control the generator globally through android app. It has different parameters that could be monitored from anywhere but here two parameters are monitored which are level of fuel and battery water.

It is possible to measure engine oil level or its viscosity. It could measure the frequency of generator and load effect could be monitored on the generator. Its temperature could be monitored. Generator connected along house wiring has a change over this has to change manually but this change over could also controlled through android app.

Our project shows current status on the android screen but it is possible that current status is observed through SMS on the mobile. This is not limited to a single generator but it could perform same type of operation for more than one generator at the same time.

In home automation it is not bound to the generator control but it could control all appliances at the home. Medical equipment could also be controlled or monitored through the same principle.

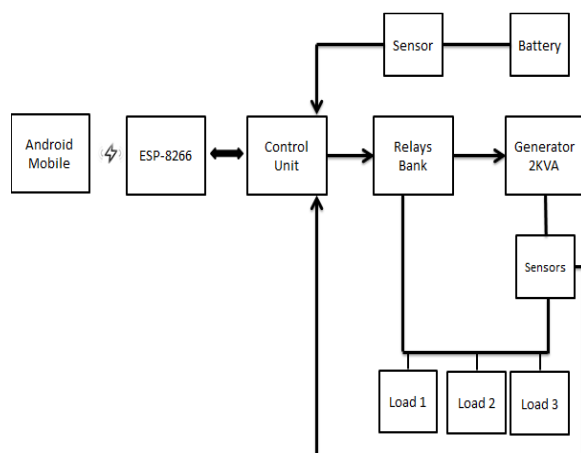


Fig 3: Block diagram for android control of generator

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