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REVIEW ARTICLE

Review Paper on Fault Detection for UPS System Using GSM

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Abstract— Now- a- day, UPS is essential for every industries While not limited to protecting any particular type of equipment, a UPS is typically used to protect computers, data centers, telecommunication equipment or other electrical equipment where an unexpected power disruption could cause injuries, fatalities, serious business disruption and/or data loss. UPS units range in size from units designed to protect a single computer without a video monitor (around 200 VA rating) to large units powering entire data centers, buildings, or even cities. This UPS is manufactured by a particular manufacturing company, which they will provide to customers in different states. So it is very difficult to check whether it will work or not and also it required large time to find the fault of UPS. That's why in this paper we are going to develop one system which will help us to reduce the time required for find the faults.

We are taking different signals from the UPS send to the server. By using GSM trans-receiver module can receive the information about UPS. And company will understand actually where problem is? And they will easily find the solution on that problem.

Keywords— UPS; GSM; processor; battery

I. INTRODUCTION

In the last many years researchers had researched improvement in the identification, and faults compensation, in the power electronics area.

Firstly [1] K. Debebe, V. Rajagopalan, T.S. Sankar proposes the use of rules based on intelligent systems to fault diagnosis in voltage-fed inverters. Through a database a mechanism makes the supposition of the system conditions, beyond the status of the protection circuit.In [2] D. Kastha, B. K. Bose the authors had made a methodical investigation of faults modes of voltage-fed Inverter system for induction motor drives. Through this study it is possible to determine components problems in the steady state and to contribute for the improvement of protection systems projects. Another work using a data-base model was considered by [3] R. Peuget, S. Courtine, J. Rognon. This study was based on the current vectors trajectories analysis and instantaneous frequencies during the PWM (Pulse Width Modulation) inverters faults.

The fault definition was established in [6], like "a defect in a point or region in a circuit or component". Considering this, is possible to propose for the work definition two fault categories. The first one where the fault leaves the equipment or device is not operate, and another one where the equipment continues operating, in inadequate form, supplying the loads. No plant stops in production systems can results of unnecessary costs, besides involving lives or important information. In hospitals or datacenters the use of UPS is essential. In this paper observe different types of fault without disturbing the UPS.

An uninterruptible power supply, also uninterruptible power source, UPS or battery/flywheel backup, is an electrical apparatus that provides emergency power to a load when the input power source, typically the utility mains, fails. A UPS

differs from an auxiliary or emergency power system or standby generator in that it will provide instantaneous or near-instantaneous protection from input power interruptions by means of one or more attached batteries and associated electronic circuitry for low power users, and or by means of diesel generators and flywheels for high power users. The on-battery runtime of most uninterruptible power sources is relatively short 5–15 minutes being typical for smaller units but sufficient to allow time to bring an auxiliary power source on line, or to properly shut down the protected equipment. The offline / standby UPS (SPS) offers only the most basic features, providing surge protection and battery backup. The protected equipment is normally connected directly to incoming utility power. When the incoming voltage falls below a predetermined level the SPS turns on its internal DC-AC inverter circuitry, which is powered from an internal storage battery. The SPS then mechanically switches the connected equipment on to its DC-AC inverter output. The switchover time can be as long as 25 milliseconds depending on the amount of time it takes the standby UPS to detect the lost utility voltage. However, most UPS units are also capable of correcting common utility power problems such as :

Power failure: defined as a total loss of input voltage.
Surge: defined as a momentary or sustained increase in the mains voltage.
Sag: defined as a momentary or sustained reduction in input voltage.
Spikes: defined as a brief high voltage excursion.
Noise: defined as a high frequency transient or oscillation, usually injected into the line by nearby equipment.
Frequency instability: defined as temporary changes in the mains frequency.
Harmonic distortion: defined as a departure from the ideal sinusoidal waveform expected on the line.

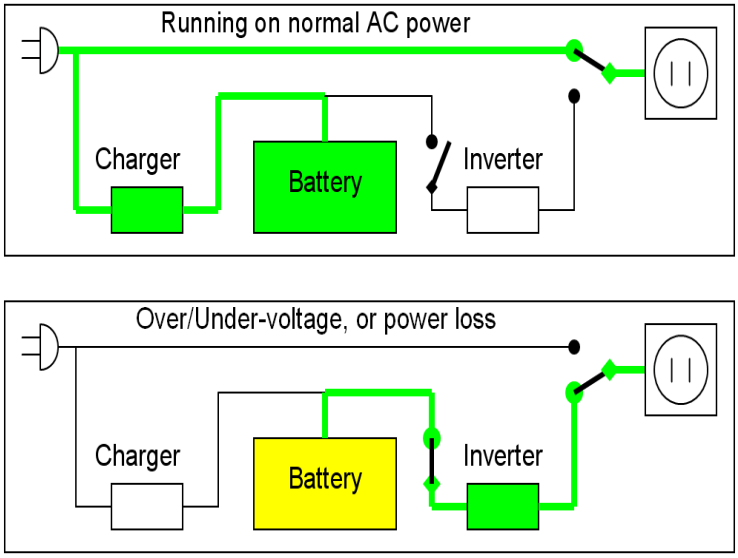


Fig-1 Offline / standby UPS

Uninterruptible power supplies (UPSS) are used to supply clean and uninterrupted power to critical loads, such as computers, communication systems, and medical support systems, etc. As such sensitive equipment is used worldwide, their interruption due to a power failure may lead to critical ac-accidents. The UPS system is indispensible for this reason as in [4].

According to [5], maintainability is the quantity mean time to repair (MTTR) that is required in viability analysis. Viability is a concept used in the architecture and engineering of digital UPS measure of a system's capability performance and reliability.

In practice and in theory, a system that cannot fail is unachievable. So therefore, it is obvious that every UPS can and will eventual fail [1]. Hence, it remains to consider the manner and effect of those failures and the cost of minimizing them. In this paper, we identified the various manner failure occurred in UPS over five year period and the effects of those failures on MTTR.

II. SYSTEM DEVELOPMENT

- This System further be elaborated by integrating the GSM based system
- GSM system used to provide the Service Period of UPS

Moreover, the consumer can place an order through SMS

Block Diagram of proposed system:

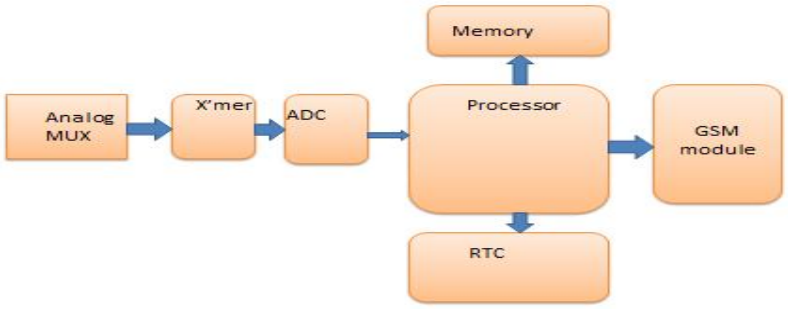
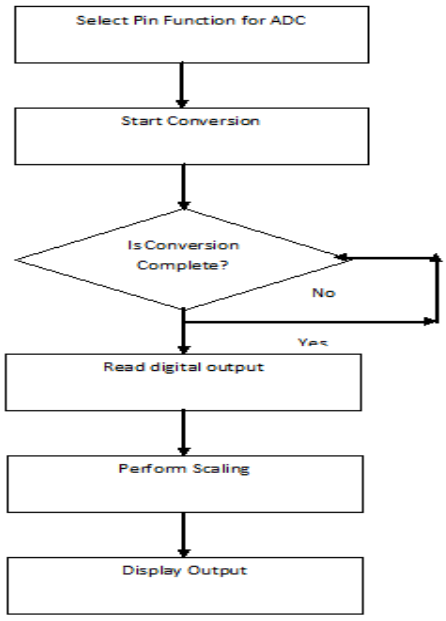


Fig. 2 Block diagram of proposed system

The different inputs from various sections of the UPS are given to the analog multiplexer .Intern the Analog Multiplexer provide this Inputs to the step down transformer which is one of the selected signal at a time. Then this input value which is Analog in nature is given to the ADC to convert this into digital form to made it compatible with the Processor. Then it is applied to the processor which will store this values of various sections on the memory IC and will send this updated values to the GSM module.

RTC, memory and GSM transmitter module is interfaced with processor .RTC is used to update the different values at Predetermined time. Memory is used to store the converted information. GSM transmitter section is connected to the GSM receiver section to send information. So the module can display the information. By observing this received values with the Ideal value, one can easily detect the differences in the values and intern can find the respective faulty block. So as to minimize the MTTR.

- Design & Implementation
  I. Flowchart for the ADC Block:



III. GSM INTERFACING BOARD

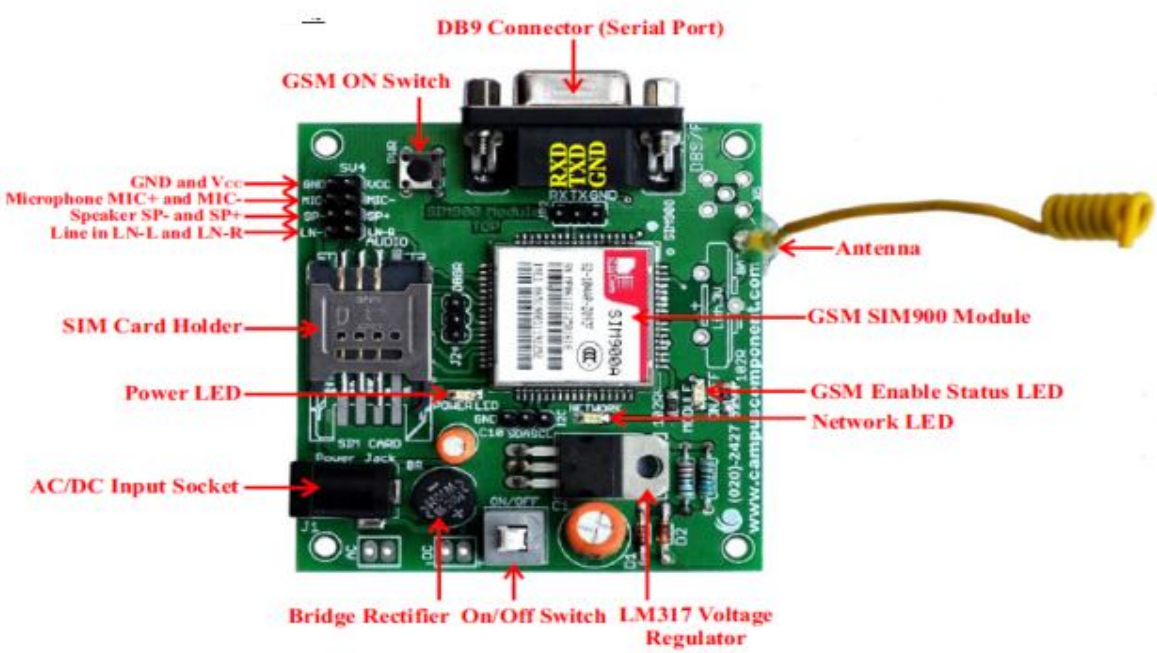


Fig.4 Hardware module of GSM interfacing board

SIMCom SIM900A GSM Module:

This is actual SIM900 GSM module which is manufactured by SIMCom. Designed for global market, SIM900 is a quad-band GSM/GPRS engine that works on frequencies GSM 850MHz, EGSM 900MHz, DCS 1800MHz and PCS 1900MHz. SIM900 features GPRS multislot class 10/ class 8 (optional) and supports the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. With a tiny configuration of 24mm x 24mm x 3mm, SIM900 can meet almost all the space requirements in User's applications, such as M2M, smart phone, PDA and other mobile devices. We use GSM module over here for the purpose of receiving and transmitting the SMS.

Fig.5 SIMCom SIM900A GSM Module

3.1 Service and maintenance

a) UPS systems by nature are designed to be inherently reliable but it is advisable to carry out maintenance checks on the UPS module as a minimum on a yearly basis. Such checks should include a visual inspection, mechanical check, control system check, battery check and functional check. Adjustments can be made at this time to take into consideration any changes in the operating parameters of the application and recommendations made to safeguard the integrity of the system.

b) The users operator should be trained to the level whereby he is familiar with the general operation of the system and is capable of replacing consumable spares which should be ordered with the system. However a call out service should be available from the supplier to attend to any major problems. This service is normally provided on a priority basis as part of a maintenance contract.

Some consumer-grade UPSes, and all UPSes designed for serious data-center use, can be bought with vendor service contracts. These don't make sense for low-end units that can be replaced cheaply from a local electronics store. If you're an IT shop with a bunch of UPSes scattered over a campus, a service contract might make sense, depending on circumstances. If you have a larger UPS in the 5-10 KVA range, a service contract may be a valuable hedge against extended downtime.

3.2 ADVANTAGES

- It is possible to check quality of the ups regularly
- Breakdowns can be controlled
- Within a predetermined time, the status of the UPS sections are updated on the main server.
- Since the faulty sections are detected at the manufacturer side only, the respective part can be replaced at ease.
- This results in reduced transportation cost with
- Reduced labour.

3.3 DISADVANTAGES

- Initial implementation is costly.
- This project is depend on server, if server is down then we can't debug the problem.
- It is very difficult to store the analog value.

3.4 APPLICATIONS

- Smart Grid
- Positive Train control
- Structural Health Monitoring
- Pipeline sensors
- Patient monitoring
- Desktop/Server monitoring

III. CONCLUSION

In this Project has the facility for Remote access to the UPS, hence sophisticated for access from main control room Since, remotely access it is quick and easy for fault finding. Within a predetermined time, the status of the UPS sections is updated on the main server. Since the faulty sections are detected at the manufacturer side only, the respective part can be replaced at ease. This results in reduced transportation cost with reduced labor. Initial implementation is costly. This system can be implemented on worldwide basis through internet. We can create a visual interface by adding the feature of net conferencing this system can again be implemented for variety of other industrial applications like PLC's, bending machine, press machine, etc.

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