System Monitoring & Protection & Fault Alert using Global System

Ravi Raval
Assistant Professor
Department of Computer Application
C. U. Shah University, Wadhwan City, Gujarat, India

Abstract— The load monitoring and protection on electrical power lines are important factors in Electricity Field. This Project proposes a monitoring of Load and Power lines using SMS based GSM Technology. The Proposed methodology is designed and implemented using mobile embedded system to monitor and record load fluctuations with respect to current and voltage in electric power lines and it also controls the same when line breaks during high load. The proposed on-line monitoring system integrates a Global Service Mobile (GSM) Modem, withstand along single chip microcontroller and sensor packages. This mobile system will help the utilities to optimally utilize the protection of power line and identify problems before any catastrophic failure. This system provides flexible control of load parameters accurately and also provides effective means for rectification of faults if any abnormality occurs in power lines using SMS through GSM network.
Key words: System Monitoring, Protection, Fault Alert

I. INTRODUCTION

This Project is based On "System Monitoring & Protection And Fault Alert Using Global System". By This Project We Can Send the Message in Emergency Situation for failure Notice in Any City / home application / industry. To measure current and voltage of system and display on LCD. If any parameter is exceeding the limit than protect the load by tripping the relay. If any fuse failure is there then send SMS to other station through GSM modem for corrective action. When current flows are higher than fix current of MCB then MCB switch will trap. In this system we can know the problem by sending SMS of this fault using GSM modem. We can say that we can measure the voltage and current of our system and display on LCD. If any fuse failure is there then send SMS to other station through GSM modem for corrective action.

The prototype of the GSM based display toolkit was efficiently designed. This prototype has facilities to be integrated with a display board thus making it truly mobile. The toolkit accepts the SMS, stores it, validates it and then displays it in the LCD module. Using this solution we solve the problem in present MCB. There are so many important of this project compare to general MCB. As given here some solution of problems of the general MCB electrical system in this project. For the solution of this problem, we can make one circuit using microcontroller and GSM modem.

Wireless communication has announced its arrival on big stage and the world is going mobile. We want to control everything and without moving an inch. This remote control of appliances is possible through Embedded Systems. The use of "Embedded System in Communication" has given rise to many interesting applications that ensures comfort and safety to human life.

Such that I decide to make a small project on electrical system. Sometimes short circuit present in our home, industries and some organization. So I think to put some communication system to the project. I search about the communication with Miniature Circuit Breaker. So I make small project based on GSM. In this we can change current limit and also the voltage limit, we can also measure current, voltage and frequency. In this circuit we can set the alarm using microcontroller, then MCB switch is trapped by using relay. Than we can know the problem. In this system we can solve the problem by sending and receiving the SMS by using GSM modem.

We can get the problem immediately by SMS. Aim of the project is to measure the voltage and current of system and display on LCD. If any parameter is exceeding the limit than protect the load by tripping the relay.

We can make such an application like Fuse failure detection from MCB auxiliary Contact, Intended for railway systems (16 2/3, 50 or 60 Hz), Industry & Home application, etc.

II. LITERATURE SURVEY

Some of the closely related work has been discussed in this section.

With the growing population of India and its rising electric power needs, the demands on the power grid continue to rise. This demand necessitates additional grid reliability. Special protection systems (SPS) are an example of a class of protection schemes that can benefit from the use of communication to increase their accuracy and reliability [1]. The job of an SPS is to detect system faults and take corrective action. Faults can be broadly classified into two main areas which have been designated "Active" and "Passive".
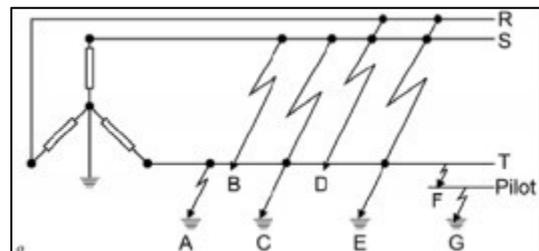

Fig. 1.1: Types of Fault in Three Phase System

a) Phase-to-earth fault.
b) Phase-to-phase fault.
c) Phase-to-phase-to-earth fault.
d) Three phase fault.
e) Three phase-to-earth fault.
f) Phase-to-pilot fault.
g) Pilot-to-earth fault.

Fig-2 shows the wave shape of a typical unlimited fault current as well as the influence on this wave shape if FCL devices with and without fault current interruption capability are applied to the system. A distinction among the

different types of FCL is made between passive and active fault current limiting measures. Passive measures make use of already initially high source impedance both at normal and at fault conditions whereas active measures bring about a fast increase of the source impedance at fault conditions only. Fig-2. Typical fault current wave shape and characteristic data Traditional SPS or special devices works with preplanning on load shedding. Many technologies were used in different periods like carrier power line communication, Radio frequency based control system and supervisory control and data.7
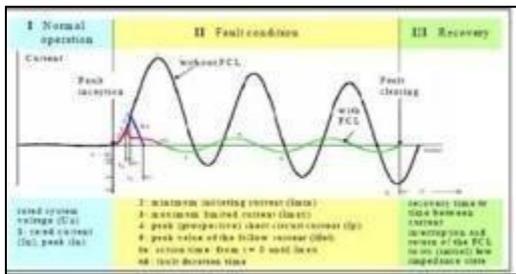

Fig. 2: Typical Fault Current Wave Shape & Characteristic Data

Robust GSM technology meets safety reliability and fastest in design. GSM is an open, digital cellular technology used for transmitting mobile voice and data services. It divides each 200 kHz into eight 25 kHz time-slots. GSM operates in the 900MHz and 1.8GHz bands. It has an ability to carry 64 kbps to 120 Mbps of data rates.

A. Review

Many special protection systems are available based on volume of power distributed and often the load changes without prediction required an advanced and special communication based systems to control the electrical parameters of the generation.

B. Conventional Methods

Fig.3 shows the example of a conventional remote operating and monitoring system (agent technology is not applied). In this system, the protection relay equipment serves as a server, the PC in an office serves as a client, and the PC and relay equipment communicate by 1 to 1.

We can perform and follows some personal computer in an office; download of the voltage and current data stored in the relay equipment when relay equipment is activated by some power failure; checking and changing the setting values of the protection relay; detecting an abnormal occurrence and the relay activation caused by power system faults. As an excellent information terminal which can acquire the real time data from a power system.
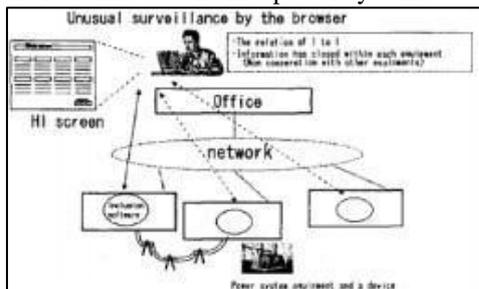

Fig. 3: The Conventional Remote Operating & Monitoring System

It is important that the information in a relay can bell unlimited fault current as well as the influence on this wave shape if FCL devices with and without fault current interruption capability are applied to the system. A distinction among the different types of FCL is made between passive and active fault current limiting measures. Passive measures make use of already initially high source impedance both at normal and at fault conditions whereas active measures bring about a fast increase of the source impedance at fault conditions only.

It is important that the information in a relay can be easily accessed from an office and of which mechanism for performing the function described above is simple. Because of the reason described above, the remote operating and monitoring system has expanded steadily. Thus, although the remote operating and monitoring system has outstanding features, the PC and protection relay equipment are connected with the relations of 1 to 1, and while operating this system, it is necessary that the operator looks at the PC browser continually all the time.

Moreover, in order to acquire information from a numbers of relay equipment, an operator must specify the address of each relay to access them in turn, which is complicated and time consuming. Furthermore, in this system, even when relays are connected within the same network, the relays cannot communicate and cooperate with each other. That is to say, relay equipment works only as a server providing data to PCs located in the remote office

III. DESIGN OF PROPOSED SYSTEM

Digital output is measured by microcontroller and measured values are displayed on LCD. & If the voltage or current parameter measured value exceeds the limit alarm is created load is tripped and SMS is send to other station.

A. Block Diagram
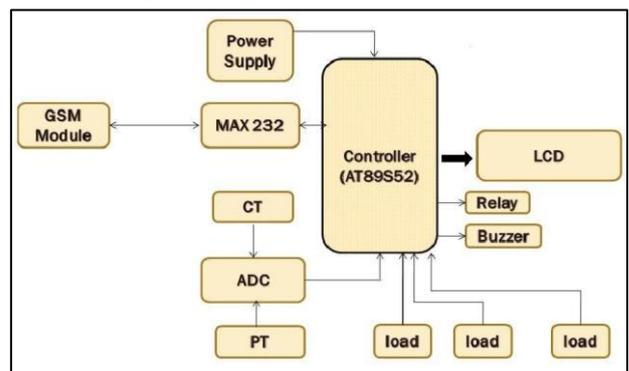
System is based on AT89S52 microcontroller. This has got built in 8k program memory 256 byte ram 32i/o pins. Voltage and current is sensed by potential transformer and current transformer respectively. Detector circuit gives dc voltage proportion to the ac parameters. ADC measures these dc voltages and gives digital output. This digital output is measured by microcontroller and measured values are displayed on LCD. We can set voltage and current limits using switchboard.
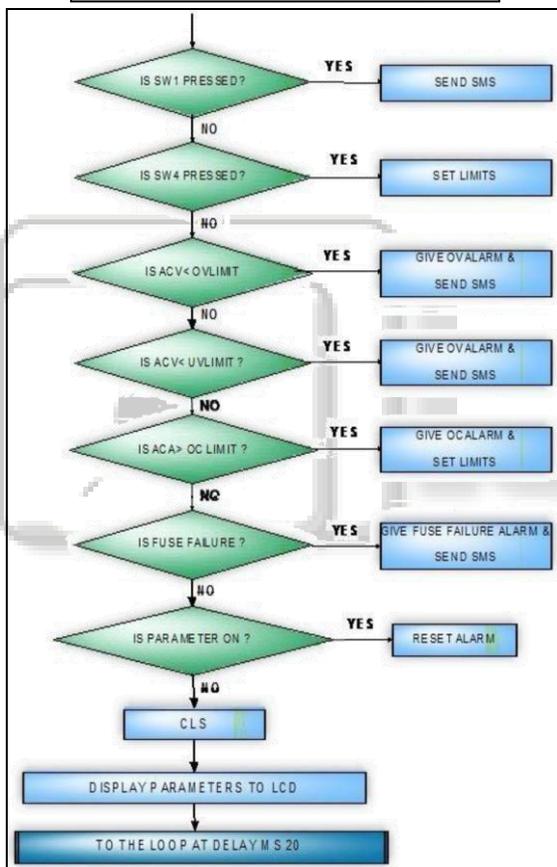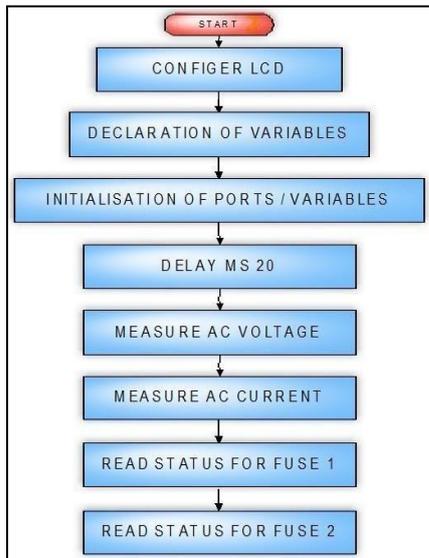
Flow Chart

B. *GSM Module*

Fig. 4: GSM Module

From taking serial input from microcontroller and sense SMS to the telephone number programmed at command for sending SMS is as follows.

AT+CMGS="9537142243" ENTER
TYPE MESSAGE CONTROL Z

C. *Description*

A GSM modem is a wireless modem that works with a GSM wireless network. A Wireless modem behaves like a dial-up modem.

The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate.

Matrix Simado GDT11 is a Fixed Cellular Terminal (FCT) for data applications. It is a compact and portable terminal that can satisfy various data communication needs over GSM. It can be connected to a computer with the help of a standard RS232C serial port. Simado GDT11 offers features like Short Message Services (SMS), Data Services (sending and receiving data files), Fax Services and Web Browsing. Remote login and data file transfer are also supported. It is the perfect equipment for factory plants, resorts, dams and construction sites where wired connectivity is not available or not practicable.

IV. CONCLUSION

We can conclude that we can measure the voltage and current of our system and display on LCD. If any fuse failure is there then send SMS to other station through GSM modem for corrective action. The prototype of the GSM based display toolkit was efficiently designed. This prototype has facilities to be integrated with a display board thus making it truly mobile. The toolkit accepts the SMS, stores it, validates it and then displays it in the LCD module. Using this solution we solve the problem in present MCB.

ACKNOWLEDGMENT

REFERENCES

[1] GSM and Personal Communications Handbook, Siegmund Redl, Matthias Weber, Malcolm W. Oliphant page no. 407-420
[2] 2. Principles and Applications of GSM, Vijay Garg page no. 125-130John catsoulis, "Designing Embedded Hardware", SHROFF PUB. & DISTR page no.652-663.

[3] Ali Mazidi "The 8051 Microcontroller and Embedded Systems Using Assembly and C" Dept. of Computer Science and Information Engineering National Cheng Kung University, Taiwan, 2nd Edition Page No: 536-555.

[4] Mazidi,"8051 Microcontroller Programming"; Pearson Education, 2009

[5] http://www.gsmworld.com/technology/applications/location.shtml