The Remote Intelligent Automatic Error Detection in Power Grid with Sms Alert System Using GSM

Venkatesh K[a], Jebasingh Inbamani D[b]

Department Of Information Technology and Engineering
[a] Manonmaniam Sundaranar University, Tirunelveli, Tamilnadu, India
Department Of Information Technology and Engineering
[b] Manonmaniam Sundaranar University, Tirunelveli, Tamilnadu, India

ABSTRACT

Recently the Power Grid companies are trying to adopt the electronic measurement of energy consumption data because of reduced manufacturing cost, improved measurement accuracy, increased timely information, and miniature size. In this paper with the help of a communication network, an improved error detection solution is developed, where automating the progression of measurement through digital wireless communication technique is adopted to get the above benefits along with smooth control. Our sensor system which calculates the errors presented in the power grid. This data is fed to a remote computer server through the wireless Gsm network that represents the concept of distant wireless metering, practically involving no manpower.

I. INTRODUCTION

Automatic Error Identification (AEI) is popular because of its remote nature of data collection. There are different technologies being used to capture and transfer data remotely, but the accuracy, speed, efficiency, reliability and cost effectiveness are the usual benefits that should be properly achieved using this system. AEI is defined in as the communication link, complete from the meter to the utility headquarters. The automatic Fault sniffing system employs distributed structure, consists of measuring meters, sensors, intelligent terminals, management centre and wireless communication network. The error detection and the other management processes are free from human errors. This system also gives many advantages over the traditional error identification system such as the eradication of manual fault identification costs, improves customer services by reducing the maltreatment of data and replaces the difficulties like involvement of distance and accessibility of measurement points. With the advancement of new modern computer technologies, chances for more well-organized management of electric power distribution are there. The increasing importance of more accurate energy measurement data and real-time access to that data is accelerating acceptance of the digital metering technology. The data communication is an important part of the AEI system. The communication system should be accurate, reliable and cost effective. To evaluate the type of communications network needed to carry fault detection data, it is necessary to review the type of customer infrastructures that could be interfaced to such a network. As for the automation of the power distribution system, its development and practical application have become an urgent task to achieve efficient operation of equipment and high reliability for increasingly complex and expanding distribution systems.

For successfully wireless data transmission, in system the GSM specification is utilized. There has been increased interest in the GSM standard recently. People prefer using this standard network among different wireless protocol for diversified applications. In An agent-based wireless local positioning system with GSM technology is proposed, mainly for factory level applications. A cost effective GSM-based wireless mine supervising system is used with early-warning intelligence on methane, temperature, and humidity in mining area. So GSM specifications are incorporated by many manufacturers in their device design. In the work presented here a GSM product is designed for the wireless transmission and reception of messages for the Power grid Operations

Objective of the Project.

According to this error the sensor has been placed in the windmill. If any error occurs means it automatically sense that accurate faults and send that particular error i.e. where it error occurs with plant id to the service engineer mobile through SMS using GSM.

Battery Low.

Sense the battery level, if it's low means its intimates the status of the battery to the service engineer through SMS.

Oil Leakage / Oil Low.

If oil leakage and also the Oil Level Low means its intimates the status to the service engineer through SMS

Speed monitoring.

The speed has been calculated. The speed ranges i.e. the Rotate per Minute (RPM) value 1200 /minute according to the formula value. According to our naked eye the rotation i.e. is RPM 20/minute. If speed should be varied it should sense and intimates to the service engineer through SMS.

Temperature Sensing.

The temperature has been sensed. If the temperature should apt for working condition, but the windmill does not work means it's should sense and intimates to the service engineer through Sms

II. DESCRIPTION OF THE SCHEME

The whole system developed can be divided into three sections. First is a hardware based chipset solution of energy meter that measures real-time active power from any power grid system [fig-1]. Second part is the data transmission, where a number of fault detection can be transferred through a wireless GSM based network to a remote server. The third part is the improved data management system based on user friendly software with two separate access support.

Transducers

The function of a transducer is to convert signal from one form to another usually from non-electrical form into the electrical form. In our thesis we have to convert speed and temperature into electrical signals

Instrumentation on amplifier

The different amplifier turns out to be rather limited in its performance because of the low input impedance of (r2+ r1) to improve this two bootstrapped buffer amplifiers are commonly added, which in the simple instrumentation amplifier.

Analog to Digital Converter

Physical parameters captured from transducers are first translated into corresponding DC voltages varying from 0 to 5volts. If temper changes from 0 to 100 degree Celsius then the universe of

discourse of the temperature is converted into 0 to 5 volts. Therefore it is necessary that the analog data be converted suitably into the digital form being fed into the computer. The function of ADC is to convert the analog voltage that varies from 0 to 5 volts into a digital data varying from 00 to FF.
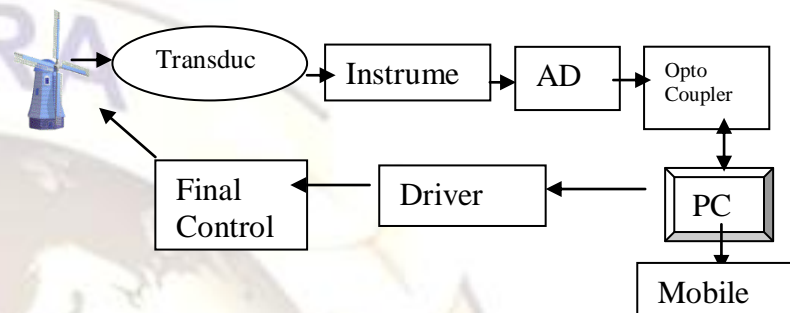

Fig 1: System Architecture

Optocoupler

A led and photo transistor are mounted in a single light excluding package. It is known as Optocoupler circuit. In an electronic device designed to transfer electrical signals by utilizing light waves to provide coupling with electrical isolation between its input and output". The main purpose of an Opto-isolator is "to prevent high voltages or rapidly changing voltages on one side of the circuit from damaging components or distorting transmissions on the other side

Isolator

It is a mechanical switching device capable of making carrying and breaking electric current under normal circuit conditions including operating overload conditions.

III.   WIRELESS   TRANSMISSION THROUGH GSM NETWORK

The Global System for Mobile communication (GSM) is a huge, rapidly expanding and successful technology. Less than five years ago, there were a small number of companies working on GSM. Each of these companies had a few GSM experts who brought knowledge back from the European Telecommunications Standards Institute committees designing the GSM specification. Currently, there are hundreds of companies working on GSM and thousands of GSM experts.

The GSM network can be divided into three broad parts. The Mobile Station is carried by the subscriber; the Base Station Subsystem controls the radio link with the Mobile Station. The Network Subsystem, the main part of which is the Mobile services Switching Center, performs the switching of calls between the mobile and other fixed or mobile network users, as well as management of mobile services, such as authentication. Not shown is the Operations and Maintenance center, which oversees the proper operation and setup of the network. The Mobile Station and the Base Station Subsystem communicate across the Um interface, also known as the air interface or radio link. The Base Station Subsystem communicates with the Mobile service Switching Center across the A interface.

Mobile Station.

The mobile station (MS) consists of the physical equipment, such as the radio transceiver, display and digital signal processors, and a smart card called the Subscriber Identity Module (SIM). The SIM provides personal mobility, so that the user can have access to all subscribed services irrespective of both the location of the terminal and the use of a specific terminal. By inserting the SIM card into another GSM cellular phone, the user is able to receive calls at that phone, make calls from that phone, or receive other subscribed services.

Base Station Subsystem.

The Base Station Subsystem is composed of two parts, the Base Transceiver Station (BTS) and the Base Station Controller (BSC). These communicate across the specified Aï¿½bis interface, allowing (as in the rest of the system) operation between components made by different suppliers.

The Base Transceiver Station houses the radio transceivers that define a cell and handles the radioï¿½link protocols with the Mobile Station. In a large urban area, there will potentially be a large number of BTSs deployed. The requirements for a BTS are ruggedness, reliability, portability, and minimum cost.

SIM.

A SIM card or Subscriber Identity Module is a portable memory chip used in some models of cellular telephones. The SIM card makes it easy to switch to a new phone by simply sliding the SIM out of the old phone and into the new one. The SIM holds personal identity information, cell phone number, phone book, text messages and other data. It can be thought of as a mini hard disk that automatically activates the phone into which it is inserted

GSM Modem.

A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection, or it may be a mobile phone that provides GSM modem capabilities

IV INTRODUCTION TO WIRELESS SENSOR NETWORKS

Typically, a wireless sensor node (or simply sensor node) consists of sensing, computing, communication, actuation, and power components. These components are integrated on a single or multiple boards, and packaged in a few cubic inches. With state-of-the-art, low-power circuit and networking technologies. We integrated the various types of the sensor with this proposed system. The Oil level sensor, battery Level Sensor, Counter, LM35, and PIC16F87X has been adopted in this system. It senses the error and intimate to the type of error with plant Id to the concern service engineer.

Advantages of Proposed System

In this work a wireless sensor communication system is developed**.** It helps to identify the fault occurrence in an accurate manner. With the help of the system the data communication can be executed in exact time. It senses the operations of the windmill, if any error occur means it will react for that particular error. If heavy storm occur means it will stop the working process of the windmill, Accurate Monitoring, Avoid Accidents, Continuous in process. Low cost. Secure Robustness.

V. CONCLUSION

The objective of developing a wireless energy fault identification system is not only to have high accuracy over a wide current dynamic range, better reliability and robustness. From this the system concluded as the Renewable energy are the most efficient, powerful and ethical source for the universe. The Proposed system which helps as to maintaining and developing the energy in the sufficient manner. We Pledge to make our **BRIGHTFUL** nation and universe with the support of **RENEWABLE ENERGY**

REFERENCES

[1] J. Holmes, D. Campbell, Communicating with domestic electricity
meters, Schlumberger Industries UK,129-133.

[2] L. Cao, J. Tian, D. Zhang, Networked Remote Meter-Reading System
Based on Wireless Communication Technology, Proceedings IEEE
International Conference on Information Acquisition, China, 2006, 172-176.

[3] T.Maity, S.Das, B.Datta, A PC based Intelligent Wireless Energy
Metering and Online Billing Solution for Domestic Consumers, The
Institution of Engineers (India) Journal (ET), 89, 2009, 8-12.

[4] J. Holmes, D. Campbell, Communicating with domestic electricity meters, Schlumberger Industries UK,129-133.

[5] L. Cao, J. Tian, D. Zhang, Networked Remote Error Identification System Based on Wireless Communication Technology, Proceedings IEEE International Conference on Information Acquisition, China, 2006, 172-176.

[6] J. Newbury, W. Miller, Multiprotocol Routing for Automatic Error Identificaton Using Power Line Carrier Systems, IEEE Power Delivery, 16(14), 2001,1-4.

[7] Cetin Mekik Murat Arslanoglu.Investigation on Accuracies of Real Time Kinematic GPS for GIS Applications. Remote Sensing .2009

[8] He Jie, Huang Xianlin, Wang Guofeng. Design and application of single-antenna GPS/accelerometers attitude determination system.

[9] Tang Kanghua, Wu Meipin, Hu Xiaopin. Design of MEMS IMU Aided High-performance GPS Receiver, ACTA GEODAETICA ET CARTOGRAPHICA SINICA.

[10] D. Koenig, M.S. Chiaramonte, A.Balbinot, Wireless Network for Measurement of Whole-Body Vibration, Sensors 8, 2008, 3067-81.

[11] S.C.Ergen, GSM/IEEE 802.15.4 Summary, 2004,www.citeseerx.ist.psu.edu/viewdoc/download.

[12] J. Lee, Y. Su, C. Shen, A Comparative Study of Wireless Protocols: Bluetooth, UWB, ZigBee, and Wi-Fi, Proceedings the 33rd Annual Conference of the IEEE Industrial Electronics Society, Taiwan, 2007, 46-51.