Design of Remote Data Acquisition System Based On 3G

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Abstract: **In this review paper, logging of data such as temperature, pressure, vibration, camera image etc. which may be applicable to any industry where all these parameters has to logged on a certain interval. This paper is based on a demonstration model which shows how data logging operation can be performed from a distance using GSM 3G Technologies. This data logger is implemented using suitable Microcontroller. These data loggers can be interfaced with various sensors based on the requirement and can be connected to the various plants in the industries which require data logging. Since these data loggers use GSM 3G interface they are the best solution for logging data from furnaces, Chemical plants, petroleum wells etc. where it is highly hazardous to log the data manually.**

Keywords: Microcontroller, sensors, GSM 3G Module, GSM 3G Dongle, PC, GUI

I. INTRODUCTION

Data acquisition plays an important role in the field of modern industry control. In many cases, remote data should be transferred to monitor center which is far away from the manufacturingfield. Traditional data acquisition system by means of wires could not satisfy the requirements. With the rapid development of embedded system, wireless communication technology and 3G technology, the remote data acquisition system which is based on embedded systems platforms and depend on 3G as wireless data transmit terminals, will be used widely on industry.

Data acquisition technology, which mainly researches the acquisition, memory, processing and control of data, is an important part of modern science and plays an important role in modern industry control. The problems of measurement and control parameters always exist in the field of the intelligent instruments, signal processing,industrial production and automatic control.Normally, the process that the analogs such as existing temperature, pressure, vibration.and angle of external world are transformed into digital signal first, and then transferred to the computer to display, is called "data acquisition",and the corresponding system is called data acquisition system.

Two popular technologies have been applied to the design ofthis system: embedded technology and 3G technology. Embedded system is characteristic of low power consumption and small size. The GSM 3G communication system with sufficient capacity has powerful multi-user management capabilities, high security performance, high-quality services and high efficiency of spectrum. Its transmission speed can achieve 2Mbit \ s in the indoor environment which can assure the transmission of large amount of data, and further strengthen the real time characteristics of the system. The system takes the embedded ATMEGA 128microcontroller as the master controller. Whereas Web cam also used to measure the real images at particular place at which we have to measure temperature, pressure, Vibration.

In most places data acquisition and analysis are still conducted by manual. Since the monitoring places of resources are widely distributed geographically, some of the existing data transferring methods such as the use of telephone lines and power line carrier have many problems for such as small coverage area, heavy line maintenance and the unreliable communication caused by the amount of noise pollution of power line carrier etc. With the development of the digital wireless communication network, current data acquisition is mostly realized by means of wireless communication, which is basically based on GSM and GPRS wireless communication network, but the speed of GPRS transmission can only reach to 20kb / s, which is merely applied to intermittent, sudden , frequent and small amount of data transmission. Nowadays, with the development of industry, large data which contain images, audios or videos have to be transferred, so it is increasingly difficult for GPRS to meet the requirements. The transmission speed of the 3G technology, nevertheless,reaches to 2Mbit / s indoors, so the system based on 3G can transmit large volumes of videos, images, sounds and other data.

II. PROPOSED EXPERIMENTAL WORK

In this review paper work it is proposed to carry out response analysis of Design of Remote Data Acquisition System Based On 3G.

The proposed work is planned in following steps:

1. Selection of sensors for industrial process Parameters i.e. Vibration Sensor, Temperature Sensor, Pressure Sensor etc.
2. Selection of suitable high definition web camera.
3. Selection of suitable controller.
4. To interface circuit for sensors.
5. Computation of algorithm for data acquisition.
6. Interfacing 3G modem to controller.
7. Algorithm for monitoring in case of following cases:
   a. Particular event,

　　　b.　depending upon client request,
　　　c.　Emergency condition
　8.　Software Design For

　　　a.　Remote terminal
　　　b.　Data acquisition and transmission terminal
　　　c.　Supervisor computer software

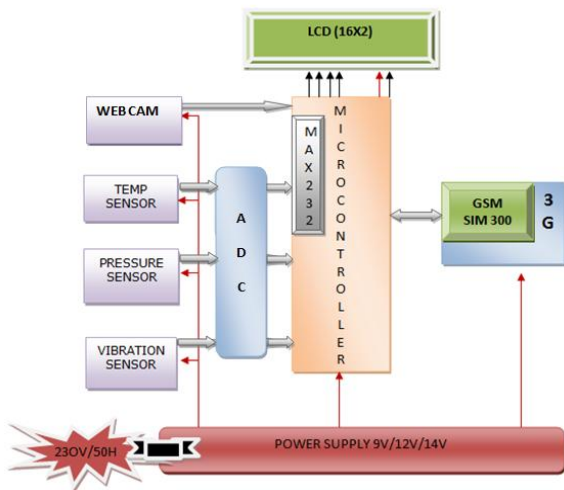　9.　Testing the performance of overall system.

A. Proposed Block Diagram
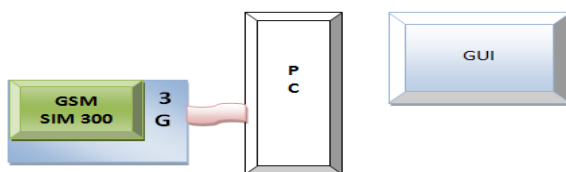

Fig.1 Transmitter Section

Fig.2.Receiver Section

III.THE ORETICAL ANALYSIS

Remote Data Acquisition System Based on 3G consists of spatially distributed autonomous sensors to monitor physical or environmental conditions, such as temperature, sound, vibration, pressure, motion or pollutants and to cooperatively pass their data through the network to a main location.

We also added a web camera for transferring a images or videos at particular place at particular time.
Embedded web server refers to import Web Server at the scene the monitor and control equipment, in the support of appropriate hardware platforms and software systems, transfer traditional monitor and control equipment into a internet-based , possessed with TCP/IP protocol as the underlying communication protocol and Web server technology as its core.
In our project we have 4 units. Data acquisition, data transfer module, data receive module and PC. The data acquisition system acquires the data from sensors and passes it to 3G module to transfer it further.

The PC unit can starts the ADC conversion and other sensing commands.

IV.CONCLUSION

We use 3G communication module with GSM 300 standards to design a remote monitoring system. It not only solves the problem of low-rate, short-distance transmission and scene cumbersome wiring, but also reduces high installation cost and power consumption. In addition, it has the advantages of high Speed high sensitivity, high accuracy, and strong compatibility and efficient operation. Users who have a PC connected to the Internet can get monitoring variety real-time information easily. This system can also be widely used in the fields of industrial and agricultural production, environmental monitoring, traffic monitoring, measurement and control.

ACKNOWLEDGEMENT

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