

INDUSTRIAL AUTOMATION USING MOBILE SCADA

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Abstract— SCADA is the abbreviation of “Supervisory Control and Data Acquisition.” SCADA system basically used in industry for process automation. Process automation is in the sense of data acquisition as well as controlling. Conventional SCADA system working with PC, and some older operating system based mobile phones as client. This paper representing an Android phone as supervisory controller and PC used as a base station to store the data as well as for further processing. The wireless communication between the mobile phone and the base station is performed by using Bluetooth application protocol. The test result have indicated that the mobile phone based SCADA integration using Bluetooth data transfer scheme could enhance the performance of Plant and Machinery in a day without causing an increase in the response time of SCADA function. The supervisor of the plant can see the status of parameter without visiting the site . Therefore this system reduces the maintenance cost and necessity of continuous monitoring. Therefore this system increases the productivity and performance of the Plant.

General Terms

Industrial Automation, SCADA.

Index terms- Android Smart phone, Bluetooth, Sensors, Remote monitoring system, Microcontroller.,

I. INTRODUCTION

Supervisory Control and Data Acquisition (SCADA) is a process control system used in industrial automation. It allows to site operator to monitor and control processes which placed at remote locations. A well designed SCADA system eliminates the complexity of monitoring and controlling of plants. It is time saving and cost reducing system thereby eliminating the need for personal attention to visit each site for inspection, data acquisition or make adjustments. SCADA systems having computers, controllers, actuators, networks, and interfaces that allows automatic process controlling and also allows data analysis through data acquisition. They are widely used in all types of industries. SCADA system performed both the operations such as data acquisition and supervisory control. Mobile Supervisory Control and Data Acquisition (referred to as Mobile SCADA) is the use of SCADA with the mobile phone for supervisory control. Bluetooth, Wi-Fi, RF are the wireless communication technologies used for reliable data communications. Bluetooth is chosen for short distance communication protocol without any time based charge.

The term SCADA was first referred in the 1960s at Bonneville Power administration and first published in Power Industry Computer Application. The SCADA system introduced to solve the issues regarding the data monitoring and controlling in the process automation. However it can be used in different types of platform to solve the problems regarding cost, security, accessibility system integration and data integrity. The SCADA system having real time data accessibility with different types of data communication protocols. Now a days SCADA system provided with rich Graphical User Interface (GUI) which makes easy access and controlling of system. SCADA system requires both hardware and software for successful operation. This paper discusses the use of android mobile phone as a supervisory controller and pc as a base station client. Test result have indicated that the android phone based SCADA system using Bluetooth data transfer scheme could increase the integrity of whole system.

A. OVERVIEW OF SMART PHONE BASED SCADA SYSTEM

With the vast growth in technology and advanced development in software the supervisory control and data acquisition system widely used in industrial process automation. It provides reliable and efficient way to monitor and control the manufacturing processes. The SCADA system having wide applications in industrial automation such as signal sensing, control, human machine interface, management and networking. It is emphasized that with some basic knowledge of design considerations, it is easier to take the right automation approach and choose the right equipment for the task considered.

II. SYSTEM OUTLINE

A. HARDWARE PLATFORM:

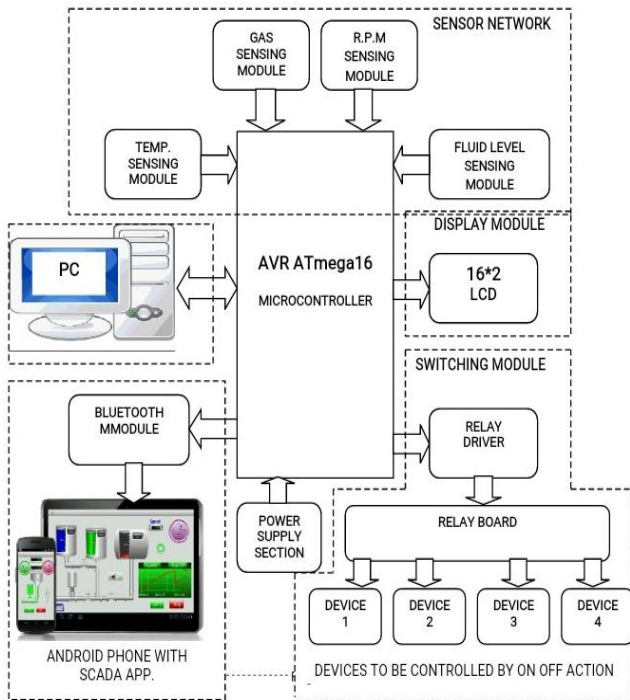


Fig 1: Block diagram of mobile SCADA.

The block diagram of proposed system has shown above. The proposed system has four main components.

1. Master Unit: Master Unit consists of PC and Microcontroller. It is the main part of the system and located at the centre of system. It is installed at site of plant where actual process is running.

2. Remote Unit: This unit is installed at the remote location from where we can monitor and control actual process. Remote unit collect the required data about the process and send it to the master unit.

3. Communication Mode: It works as communication medium between Master Unit and Remote Unit. It transmitted required data between these two units. Proposed system uses Bluetooth as a communication medium.

4. Software: It required for interfacing between hardware and user. It drives the hardware and provides Graphical User Interface.

B. SOFTWARE PLATFORM:

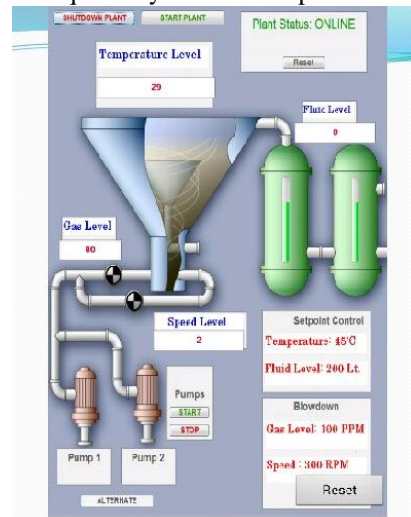
Androi Nowadays, most mobile devices have a Android operating system. Proposed system having smart phone with Android operating system through we can access production and process data using Bluetooth communication protocol. Smart phone have more features like Wi-Fi, Bluetooth connectivity 3G,4G which makes them really smart. Our idea is to do a smart visualization of industrial parameters such as temperature, speed; pressure etc. between smart phone and remotely located industrial devices. Android is one of the

world's most popular and fastest growing platforms. Android gives us freeware tools to create applications and also having a powerful development framework. The important features of Android Operating System are:

1. It is a very fast operating system having immediate connection to other peripheral.
2. It has the ability to supports events.
3. It also has the ability to supports trends.
4. Android gives you a facility to configure your project directly from your Android device.
5. It has the multiprocessing capabilities.

C. IMPLEMENTATION OF MOBILE SCADA SYSTEM FOR THE PROCESS AUTOMATION:

The advantages of SCADA software package is the flexibility to design any kind of process by which we can control and monitor the process using smart phone or tablet PC. It does not require any extra development environment. .



D. BLUETOOTH MODULE:

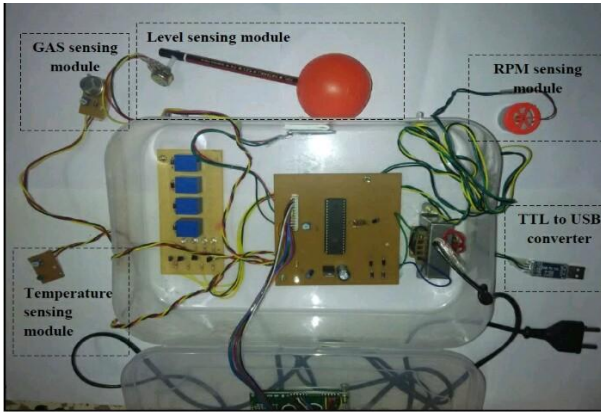


Communication. We can simply use it for the replacement of serial port to establish connection between MCU and PC for data communication.

The features of module are as follows:

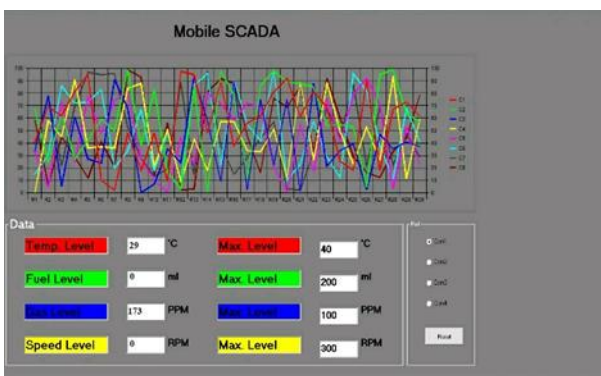
1. Required power for its operation- 3.3Vdc and 50 mA.
2. Feature of USART interface.
3. Range of operating area is 10 meter
4. Required minimum external components.
5. Easy to use with status Led's.

III. HARDWARE IMPLEMENTATION



IV. RESULT

PARAMETERS	SET VALUE	OBSERVED VALUE
TEMPERATURE	40	29
FLUID LEVEL	200	0
GAS LEVEL	100	173
SPEED	300	0



V. ADVANTAGES

1. Very Fast and immediate connection and display.
2. Easiness of implementation.
3. Configurable authorization.
4. Extended network lifetime.

VI. LIMITATIONS

1. Operating Range.
2. Battery problem can occurred.

3. Maintenance frequently required.

VII. CONCLUSION

This project effectively proposed, a Android enable mobile phone has been integrated into SCADA system as a supervisory controller. Therefore it is not necessary the SCADA work with a PC. Since the data monitoring and controlling process of a plant is performed by means of Bluetooth base station so there is no need of extra hardware for communication. In the industrial automation wireless communication is more efficient and practicable which reduces the process complexity of plant. Android SCADA based on Bluetooth or Wi-Fi protocol is the most widely used communication protocol in industrial automation.

VIII. ACKNOWLEDGMENT

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