

Online Monitoring of Industrial Parameters by using Scada System: Proposed Work

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Abstract— Online monitoring plays a very important role in industry. Monitoring industrial real time data and executing some control operations using web browser is one of new tools in the market. Using the internet as communication backbone or as application services provider will save time, effort and cost. We can control different parameters like pressure, temperature, moisture, humidity, etc. By using various sensors, controllers we can monitor and control process from remote areas. The task of supervision management of data processing and process control is made by LAN network. SCADA system is the “supervisory control and data acquisition”. SCADA is useful in industry for the supervisory control and data acquisition off the industrial process. SCADA system use for controlling and monitoring process from remote areas.

Key words: Scada, ATMEGA328, LCD, Arduino, Ethernet Shield, Sensors

I. INTRODUCTION

In conventional SCADA system the monitoring of SCADA system is done manually in continuous way but in our project we are using wireless network to access the SCADA so that any operator view the current scenario of the system from any remote area by secured log-in to the website designed for the particular companies SCADA system. SCADA system requires both hardware and software for their successful execution. SCADA acquires the real time data from field devices and performs supervisory control on it. Most important thing in our project is use for safety and security purpose in online monitoring web application. An efficient, fast and effective control system has become a vital need in industrial sector. An internet and SCADA system interconnection based on industry-accepted communication standards is offered as a solution. The interconnection permits links between SCADA system and company users within internet.[1]

As discussed about our project that is online monitoring of industrial parameters by using SCADA system over a SCADA infrastructure, we use such components as Microcontroller (28 pin) - ATmega328 (8 Bit MC), Ethernet Shield - Wiznet 5100, 16x2 LCD ,16 MHz Crystal- Full profile crystal ,Voltage Regulator(5V) - IC 7805, Voltage Regulator(3.3V) -LM1117T, Ethernet cable, 28 pin IC stand, Capacitors 10 Micro Farad, 10K Resistor, LED lights, Buzzer, On Off Switch, 5K Potentiometer etc. SCADA (supervisory control and data acquisition) is a system operating with coded signals over communication channels so as to provide control of remote equipment (using typically one communication channel per remote station). The control system may be combined with a data acquisition system by adding the use of coded signals over communication channels to acquire information about the status of the remote equipment for display or for recording functions. It is a type of

industrial control system (ICS). Industrial control systems are computer-based systems that monitor and control industrial processes that exist in the physical world. SCADA systems historically distinguish themselves from other ICS systems by being large-scale processes that can include multiple sites, and large distances.

SCADA information and command processing was distributed across multiple stations which were connected through a LAN. Information was shared in near real time. Each station was responsible for a particular task thus making the size and cost of each station less than the one used in First Generation. Similar to a distributed architecture, any complex SCADA can be reduced to simplest components and connected through communication protocols. In the case of a networked design, the system may be spread across more than one LAN network called a process control network (PCN) and separated geographically.[1]

II. LITERATURE SURVEY

The need to monitor the process and possibly control the operation of industrial system from virtually anywhere is becoming an important issue. In conventional SCADA system the monitoring of SCADA system is done manually in continuous way but in our project we are using wireless network to access the SCADA. So that any operator view the current scenario of the system from any remote area by secured log-in to the website designed for the particular companies SCADA system. It can be also possible for the operator to control the parameters of system from remote place. SCADA software usually exists in the computer which carries out task of supervision, management of data processing and process control.

The computer can record and store a very large amount of data. Thousands of sensors over a wide area can be connected to the system, but the system is more complicated than the sensor to panel type. The need to monitor the process and possibly control the operation of monitoring parameters system from virtually anywhere is becoming an important issue. It can be also possible for the operator to control the parameters of the system from remote place. SCADA software usually exist in the computer which carries out task of supervision and process controller.

Musaria K.Mahmood,Fawzi M.Al-Naima has proposed an efficient, fast and effective control system has become a vital need in industrial sector. An internet and SCADA system interconnection based on industry-accepted communication standards is offered as a solution. The interconnection permits links between SCADA system and company users within internet.

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operations using Web browser is one of new tool in the market.

Musaria K.Mahmood,Fawzi M.Al-Naima has proposed that internet based SCADA system offers solution by enabling any user to supervise and control all operations remotely from any part of the world with internet connection by any Web browser.

III. OBJECTIVE OF WORK

The objective of the project is to online monitoring of industrial parameters using SCADA system.

IV. METHODOLOGY

A. Proposed Block Diagram:

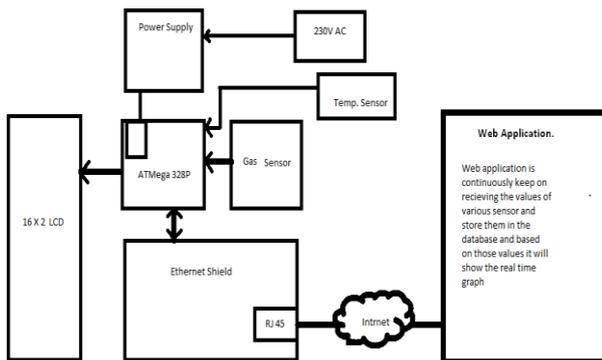


Fig. 1: Block diagram of online monitoring of industrial parameters by using SCADA system.

In this project we will implement the system which is cost effective solution to resolve problems. Data acquisition is done by SCADA system and monitoring of acquired data is done with help of Web application.

1) AT Mega 328p:

ATmega328 belongs to Atmel's AVR series micro controller family. ATMEL 8-bit microcontroller with 4/8/16/32KBytes. ATmega 328p has high performance low power Atmel AVR 8 bit microcontroller family. It has advanced RISC architecture. In ATmega328P, the Boot Loader Support provides a real Read-While-Write, Self-Programming mechanism for downloading and uploading program code by the MCU itself.[5]

2) Ethernet shield: (winzet5100)

The arduino Ethernet shield connects your arduino to the internet. Just plug this module onto your arduino board, connect it to your network with an RJ45 cable and follow a few simple instruction to start controlling your world through the internet. The arduino Ethernet shield allows an arduino board to connect to the internet. This all received data will get presented on LCD display.

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B. Sensors

1) Gas Sensor:

In this project we can use MQ-5 sensors, micro AL2O3 ceramic tube, Tin Dioxide (SnO2) sensitive layer, measuring electrode and heater are fixed into a crust made by plastic and stainless steel net. The heater provides necessary work conditions for work of sensitive components. The enveloped MQ-5 have 6 pin, 4 of them are used to fetch signals, and other 2 are used for providing heating current.

2) Humidity Sensor:

Relative Humidity is the most commonly used measurements of moisture content in the air. The key to understanding relative humidity is to understand that it is a measure of the 'actual humidity', relative to the maximum possible humidity at a given temperature. The relative humidity is expressed as a percentage, so the maximum is 100 %.The formula for relative humidity is:

$$\text{Relative humidity \%} = \frac{\text{Moisture in the air now}}{\text{Maximum possible moisture air can hold at the current temperature}} \times 100$$

3) Temperature Sensor:

The LM35 series are precision integrated circuit temperature sensors whose output voltage is linearly proportional to the Celsius (centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in Kelvin as the user is not required to subtract a large constant voltage from its output to obtain convenient centigrade scaling.

- Web Application: web application is continuously keep on receiving the values of various sensors and store them in the database and based on those values it will show the real time graph by using xampp.
- Power Supply: In this project use IC7805 voltage regulator for power supply purpose. It converts 9v into 5v regulated power.

V. CONCLUSION

Here we have proposed method to implement this system practically. We can use hardware as well as software work to implement this system to monitor the industrial parameters like temperature, humidity, gases. Also the future work of this work is to control the same parameters from remote place.

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