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Design of Iot Based Industrial Safety Parameters Monitoring System

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1. ABSTRACT

Monitoring and Control is the main entity of the any field which can ensure for effective performance, hence its importance is rising exponentially in this modern era. There are millions of industries in all over the world, where different parameters and measures are to be placed within the limit. Variations on these values may lead to ceasing of performance or even the destruction of the equipments. Hence, those are to be monitor in real time and control whenever it is needed. In some industries proper maintenance of the controlling system or industrial devices is crucial to deliver an uninterrupted output. So to reduce the maintenance costs and to optimize critical monitoring system GSM Based Industrial Automation Technology is used. Process Control and Monitoring system is developed to monitor the process value and control the values on needed without human interface. Thus, it can be defined as a mechanism removing as much human interaction as technically possible and desirable in various domestic processes and replacing them with programmed electronic systems. This Embedded systems are electronic devices that incorporate microcontroller .

2. INTRODUCTION

Here we propose a smart Sensor reporting system over the internet. Our proposed system allows for Sensor parameter reporting over the internet. It allows the people to directly check the Sensor stats online without the need of a Sensor forecasting agency. System uses temperature, smoke, Fire as well as water leakage sensor to monitor water leak in industrials and provide live reporting of the Condition monitoring applications where data would be very expensive to acquire using traditional wired communication systems, could benefit from the use of wireless sensors. In this case, wireless sensors would help avoid effects of ground potential rise and reduce the difficulty and cost of installing wiring across substation yards. Wireless sensor systems can play a role in substation condition monitoring, but this role must take into account the realities of wireless vulnerabilities to EMI, path obstacles, scattering, congestion of the limited frequency spectrum, and other factors such as the number of access points (AP) required. A feasibility study on deploying wireless technologies in high voltage substations has shown that WIFI technology performs satisfactorily in terms of substation coverage, signal propagation, Sensor statistics. The system constantly monitors temperature using temperature sensor, humidity using humidity sensor and also for rain. The system constantly transmits this data to the microcontroller, which now processes this data and keeps on transmitting it to the online web server over a wifi connection. This data is live updated to be viewed on the online server system. Also system allows user to set alerts for particular instances, the system provides alerts to user if the Sensor parameters cross those values. Thus the IOT based Sensor

reporting system provides an efficient internet based Sensor reporting system for users. Temperature, fire, smoke and water leakage all sensors give the status of the sensor and inform in internet of things in alerting cases.

3. LITERATURE SURVEY

Electric power transmission and distribution systems are increasingly required to operate efficiently and reliably to guarantee both continuity and quality of supply. With many installations around the world using equipment that was installed decades ago and nearing the end of its service life, there is a need to monitor the condition of such equipment and possibly extend its service life without major system disruptions. This has prompted utilities to install plant and system monitoring devices in high-voltage substations, as well as in buried electric cables and on overhead power lines. Usually, such devices are used in conjunction with fiber optic links or hard-wired metallic cables to transmit information to a central monitoring point or SCADA system .For upcoming smart grid applications, the number of such retrospectively-installed devices is expected to increase, and this poses the problem of large-scale deployment requiring considerable cost and installation effort. Among the practical challenges, for example, would be to ensure that such systems are immune from the effect of electric and magnetic fields generated in a high voltage installation, by providing appropriate insulation to withstand failure and breakdown. Wireless monitoring sensors, however, offer an attractive alternative to wired or fiberoptic systems for high-voltage equipment in substations, and have prospective application in wide-area monitoring of large power system security and data rate. High voltage substations present special challenges in this respect due to the presence of many metallic structures causing multiple reflections, diffractions and scattering. It has been argued that WLAN, IEEE 802.11b/g and WPAN can be successfully applied for monitoring high-voltage substations, electric power lines and plant. Some authors proposed wireless data acquisition systems for measuring high-frequency signals such as transient EMI signals and partial discharge signals . In a wireless surge arrester leakage current sensor, based on the ZigBee protocol, capable of transmitting over a distance of 400 m was developed and tested in a 230kV substation. The authors of propose a wireless capacitive sensor for monitoring voltage variations of MV/HV plant using ZigBee technology. Other monitoring solutions have also been proposed for use with electrical plant .In addition to noise and external interference, wireless DAQ systems need to be immune to information loss errors and unauthorized access to data. This can be resolved with the selection of a wireless technology that provides robust security,

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4. OBJECTIVE

This project aims to develop a smart reporting system which would monitor the security parameters of an automated industry. This project proposes a smart Sensor reporting system over the internet. The proposed system allows for Sensor parameter reporting over the internet. It allows the people to directly check the Sensor status online without the need of a Sensor forecasting agency. System facilitates temperature, smoke, Fire and water leakage sensor to monitor water leak in industries and provide live reporting of the Sensor statistics. The system constantly monitors temperature using temperature sensor, humidity using

5. IMPLEMENTATION

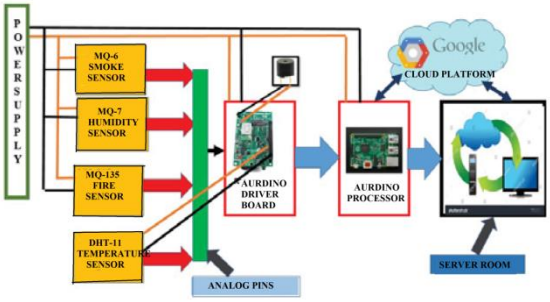
HARDWARE COMPONENTS

- Temperature Sensor
- FIRE Sensor
- SMOKE Sensor
- WATER LEAKAGE
- Atmega 328 Microcontroller
- Rps
- LCD

SOFTWARE SPECIFICATIONS

- Arduino Compiler
- MC Programming Language: C

BLOCK DAIGRAM



TEMPERATURE SENSOR

The Temperature Sensor LM35 sensor series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature.

FIRE SENSOR

This module is sensitive to the flame and radiation. It also can detect ordinary light source in the range of a wavelength 760nm-1100 nm. The detection distance is up to 100 cm. The Flame sensor can output digital or analog signal. It can be used as a flame alarm or in fire fighting robots.

SMOKE SENSOR

The voltage that the sensor outputs changes accordingly to the smoke or gas level that exists in the atmosphere. The sensor outputs a voltage that is proportional to the concentration of smoke/gas. In other words, the relationship between voltage and gas concentration is the following:

- The greater the gas concentration ,the greater the output voltage

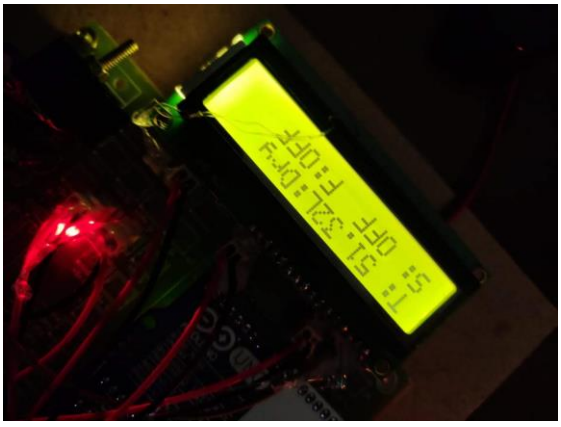
- The lower the gas concentration ,the lower the output voltage

ATMEGA 328

Arduino Board ATMEGA328P Board is a powerful development platform based on ATMEGA328 microcontroller which is one of the most feature rich AVR microcontroller from Atmel, featuring 128K Flash, 4K RAM, 53 I/O lines arranged in seven 8 bit ports, 8 ADCs, 2

LCD

We have also provided Liquid Crystal Display (LCD display) to this system. We have used 16*2 alphanumeric displays. LCD display shows actual weight of the gas and at the same time it shows various status messages like “Sending SMS”, “SMS sent” and “Gas has reached to 20% value” or “Gas has reached to 5% value”. All these kinds of messages are shown on the LCD so that person operating this project can read these messages. LCD display is useful in testing purposes as well.



REGULATED POWER SUPPLY

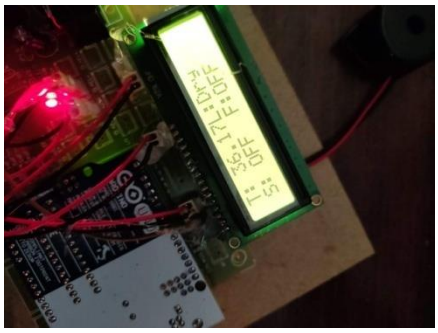
Power supply is a supply of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU

6. RESULTS

The proposed system develops a sensor interface device essential for sensor data acquisition of industrial Wireless Sensor Networks (WSN) in Internet of Things (IoT) environment. It is planned to style a re-configurable sensible device interface for industrial WSN in IoT atmosphere, during which ARDUINO UNO is adopted as the core controller. Thus, it will scan information in parallel and in real time with high speed on multiple completely different device information. Intelligent device interface specification is adopted for this style. The device is combined with the most recent ARM programmable technology and intelligent device specification. By detecting the values of sensors it can easily find out the Temperature, humidity, and gas present in the industrial area. And also it controls the power with abnormalities. So that critical situation can be avoided and preventive measures are successfully implemented. It is the most effective and most economical means of equipment safety monitoring. So it has very good social prospects.

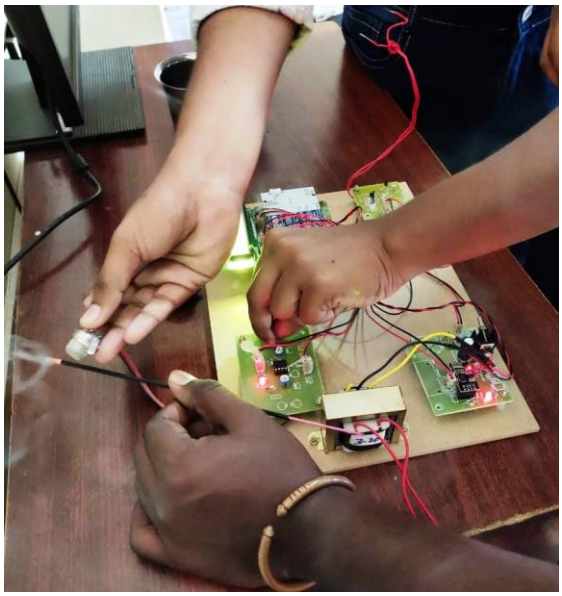
<u>FIRE:</u> CASE 1 : FIRE OFF

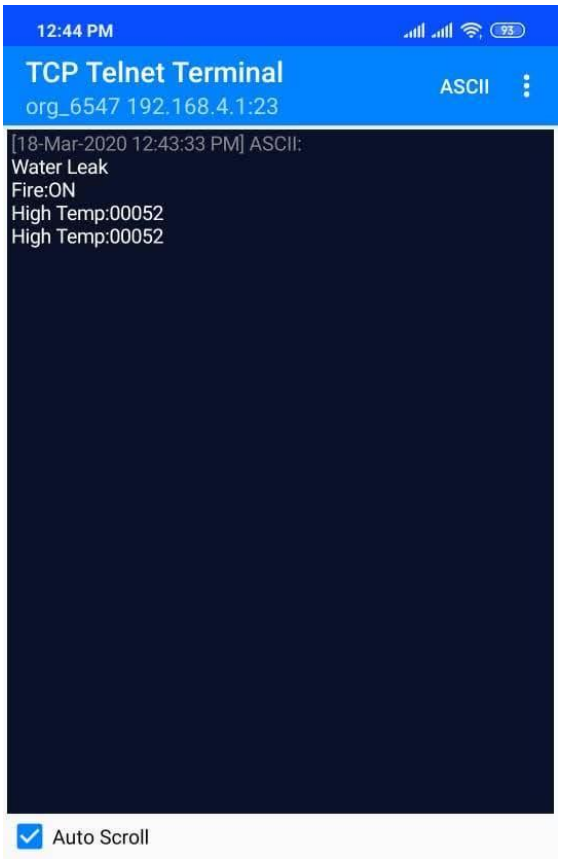
TEMPRATURE: 36.17



CASE 2: FIRE ON

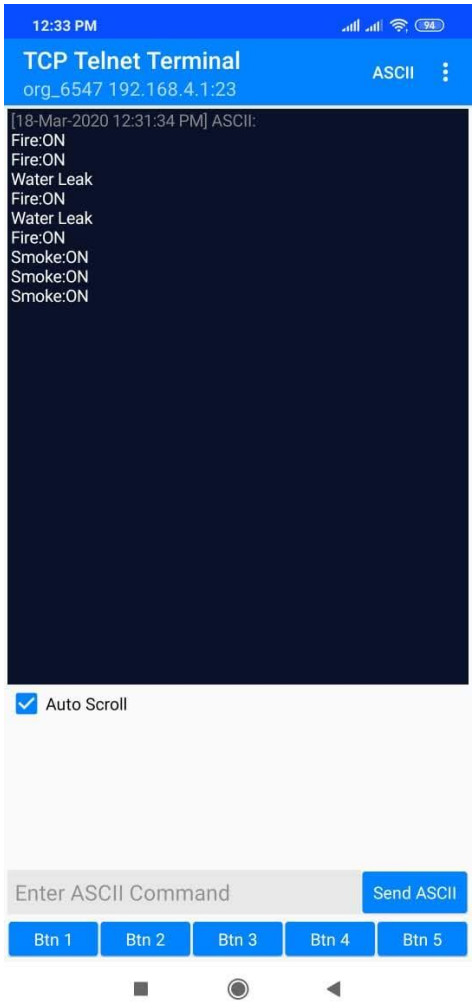
TEMPRATURE: 52



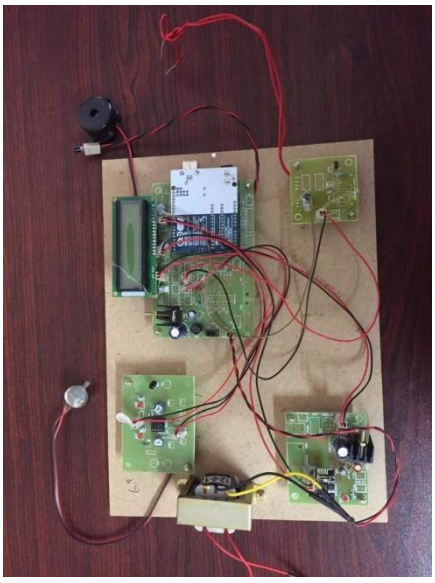


Alerts received from proposed system through IoT in Smart phone

SMOKE:ON



6. PROTOTYPE



7. CONCLUSION

This project describes a IOT Based Reconfigurable smart wireless system for industrial safety parameters monitoring. The system can collect sensor data intelligently. It was designed based on application of wireless communication. It is very suitable for real-time and effective requirements of the high-speed data acquisition system in IoT environment. The application of ARDUINO UNO greatly simplifies the design of peripheral circuit, and makes the whole system more flexible and extensible. Different types of sensors can be used as long as they are connected to the system. Finally, by taking industrial safety parameters monitoring in IoT environment as an example, we verified that the system achieved good effects in practical application

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