

GLOBAL INDUSTRIAL PROCESS MONITORING

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Abstract—Nowadays sensors play a vital role to develop many applications. This project aims to introduce the general structure of wireless sensor networks as well as different wireless standards and network components. The main tasks of sensors are controlling a variety of industrial equipment, monitoring of some processes, giving feedback and collecting different data for specific purposes. The continuous monitoring of temperature, gas and pH level of liquids is done through sensors. In this project we are developing a system which will automatically monitor the industrial applications and generate alerts/alarms or take intelligent decisions using concept of IOT. IOT has given us a promising way to build powerful industrial systems and applications by using wireless devices, android and sensors. A main contribution of this paper is that it summarizes the uses of IOT in industries with artificial intelligence to monitor and control the industry.

Keywords: Sensors, Real time embedded system, Easy IoT Server, Wi-Fi, Industrial automation and monitoring.

I. INTRODUCTION

Society in the daily endeavors has become so dependent on automation. It is more difficult to imagine life without such automation engineering in current environment. In recent environmental protection engineering, traffic engineering, building engineering, and medical engineering are some of the areas where automation is playing a vital role as well as application. Some applications are built to collect and send data through a modem to a server. Wireless based industrial automation is a prime concern in our day-to-day life. The approach to Wireless Network for Industrial applications standardized nowadays. Intelligent and low-cost automation of industrial processes are crucial in order to improve process efficiencies, deliver quality products, and ensure timeliness and accuracy of systems. Wireless is predicted to be one of the fastest growing technologies in the area of process automation sector. Industrial automation systems comprise of various field devices and technologies working in synchronization. These

devices are responsible for a variety of functions related to Instrumentation, control, supervision and operational management system. Temperature, Gas, Humidity, viscosity pressure, motion, and speed are often measured parameters. Some electronic circuits, chemical reactions, biological processes perform best with in limited temperature and also necessary to measure gas in environment. These parameters are mostly used in power plants, chemical industry, hospital, medicine production company.

II. GOALS AND OBJECTIVES

To design and implement a secured wireless communication system. Various sensors are interfaced with the microcontroller and parameters like temperature, gas, smoke, humidity are measured. To co-operatively pass their data through the network to a main server location and hence real time sensed data is available on the remote PC as well as on the android smart phone.

III. EXISTING SYSTEM

In the existing system, we can measure the condition of the environment through sensors and send SMS via Bluetooth ,GSM. In this system problem may arise like consuming more power and limited network coverage. It does not have the capacity to communicate in a large network. The major drawbacks of the existing system are high cost, short range coverage delay and network coverage is required for GSM.

IV. PROPOSED WORK

The purpose of our project is to develop a method of communication between a core sensor and several sensors through the use of IOT technology. It is used to monitor the status and to alert the operator if the sensor detected a

problem. In order to receive the transmitted data, we use Wifi module which gives access to all the data. Previously, we can monitor the situation with the help of camera. Now, we have implemented Internet of Things (IOT) in industries to monitor as well as to inform the responsible person and to take appropriate measures. Thus we are developing a system for industrial automation using IoT to make system automated which will take intelligent decisions.

Advantages – The advantages of the current system is that they have good accuracy and high efficiency. Due to these factors they are widely used in industrial monitoring system and smart industrial system.

V. BLOCK DIAGRAM

TRANSMITTER SECTION

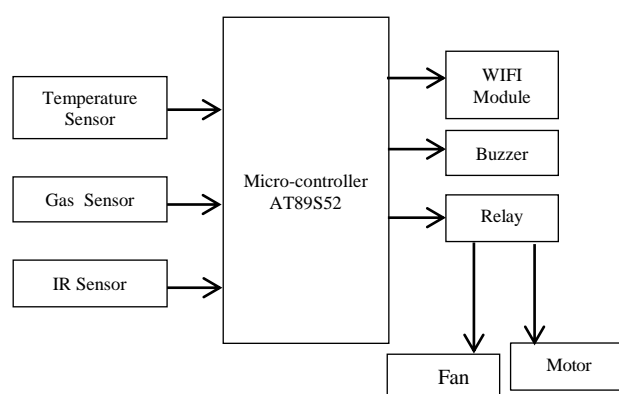


Figure-1.Block diagram of Transmitter section

The block diagram of transmitter section for the industrial monitoring is shown in the Figure-1. The microcontroller AT89S52 is interfaced with the temperature, gas and IR sensor. A buzzer is connected for giving alert to the labor. Cooling fan is interfaced in order to reduce the ambient temperature in case if the temperature exceeds the threshold value. DC motors are connected through the relay circuit. This whole module is sealed and it is allowed to monitor the working system. The wifi module is interfaced with the microcontroller in order to transmit the monitored information to the receiver.

RECEIVER SECTION

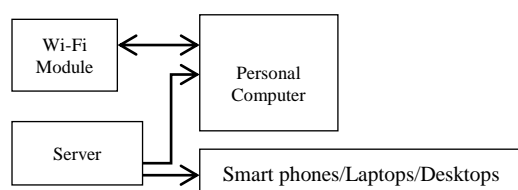


Figure-2.Block diagram of Receiver section

In the Figure-2, the block diagram of receiver section is given. In this section, a mobile phone or a PC can be used. The measured data are passed through the network to a main server location and hence real time sensed data is available on the remote PC as well as on the android smart phone.

VI. SOFTWARE DESCRIPTION

The following software tool is required for designing compiling, debugging and generating the results.

Microsoft Visual Basic: It is an event driven programming language, which is relatively easy to learn and use. It is a user friendly programming language designed for beginners and it enables rapid application development of graphical user interface (GUI) applications. It enables access to the databases using data access objects and remote data objects. Visual basic was designed to accommodate a steep learning curve. Programmers can create both simple and complex GUI applications. Programming in VB is a combination of visually arranging components, specifying attributes and actions for the components. Visual basic provides a convenient method for building user interfaces.

VII. HARDWARE DESCRIPTION

The following hardware components are required for this process monitoring system.

AT89S52 MICROCONTROLLER: The AT89S52 is a low power, high performance CMOS 8-bit microcontroller with 8k bytes of in-system programmable flash memory. This device is manufactured using Atmel's high density non-volatile memory technology and it is compatible with the industry standard 8051 instruction set. The AT89S52 provides the following standard features such as 8k bytes of flash, 256 bytes of RAM, 32 I/O lines, two data pointers, three 16-bit timers/counters, a 6-vector two level interrupt architecture, a full duplex serial port, on-chip oscillator and clock circuitry. Its operating range is 4.0V to 5.5V and it has three level program memory lock.

SENSORS: The Sensors that are interfaced in our proposed work model are explained below :

a. Temperature Sensor: There are many types of devices that can be employed as temperature sensors. LM35 is a sensor component used in this monitoring system. It is a precision IC temperature sensor with its output proportional to the temperature in Celsius. With LM35, temperature can be measured more accurately than with a thermistor. The features of LM35 are as follows:

They are calibrated directly in Celsius, suitable for remote applications, operates from 4 to 30 volts, low self heating, low cost and low output impedance.

b. Gas Sensor: Gas sensors measure the concentration of gas in its vicinity. It interacts with a gas to measure its concentration. Each gas has a unique breakdown voltage i.e. the electric field at which it is ionized. Sensor identifies gases by measuring these voltages. The concentration of the gases can be determined by measuring the current discharged in the device.

The various Gas sensing technologies are metal oxide based, capacitance based, acoustic wave based, calorimetric based, optical and electrochemical gas sensors. In this project we are interfacing MQ-6 gas sensor. It has high sensitivity to propane, butane and LPG. It also responds to natural gas. This sensor could be used to detect different combustible gas, especially methane. The characteristics of MQ-6 Gas sensors are long life and low cost. They are simple drive circuit and they have good sensitivity to combustible gases in wide range. They are suitable for various applications.

VIII. APPLICATIONS

Industry and office- we can implement sensors in a wide area over the machines and instruments, they are used to control and monitor circumstances by using the concept of IoT.

Hospital and Labs- we can plot sensors on patients body, in which a doctor can check current status on his/her android phone or pc and also take necessary actions and decisions.

Home – we can implement sensors to monitor and control the household appliances.

IX. RESULTS

The data from the sensor nodes is stored on the IoT server. This data can be accessed by any authorized user from any location. The obtained data can be stored in various formats and can be represented in graphical views. In this way, we can use automation in home, medical care as well as desired industrial sectors.

X. CONCLUSION

Nowadays we need everything computerized. Earlier we can only monitor the situations with the help of cameras. In industries to reduce manual overhead we have implemented Internet of Things in industry to monitor as well as to inform the responsible person to take appropriate measures. Thus an automated system is developed to take data from the different sensor nodes which can be used to control various actions. We can enhance the system using artificial intelligence to make system automated which will take intelligent decisions.

XI. REFERENCES

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