

Industrial Parameter Monitoring & Automization

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ABSTRACT : This paper mainly focuses on monitoring and controlling of Industrial Appliances remotely when the user is away from the place. Micro- controller is the core component of this project. Objective of this project is to avoid number of accidents, human errors, and for manual safety. As Human errors and manual safety systems lead to increase in industrial accidents, So here we are proposing a micro controller based industrial automation system that detects Smoke, Temperature, Fire, Alcohol, LPG Gas etc, to keep track of accidents, accordingly it on/off various load such as cooling fan, exhaust fan, water sprinkler and also it gives the information about detection to the supervisor through LCD Display. This paper includes the study of various electronic devices using sensors.

Keywords: Industrial Automation, Smoke detection, Alcohol detection, LPG detection, Temperature and fire detection, Micro-controller.

INTRODUCTION

In the list of most threatening causes that led to global warming are fire hazards. Hazards can be resolved by the adaption of new and growing technologies which also help in better living. Applications in monitoring and control are performed by the wireless multi-sensory network are characterized by small, low power and cheap devices which are integrated with limited computation, sensing, and remote communication. It impacts enormously on fire emergency. Temperature sensors are installed in fire endangered areas which allow a person to manually provide temperature information on fire extinguishing website email or landline number. The process of accessing information from the website may be time-consuming and it may cause some amount of delay in the response to the fire extinguisher.

Technology has advanced so much in the last decade or two that it has made life more efficient and comfortable. The comfort of being able to take control of devices from one particular location has become imperative as it saves a lot of time and effort. Also human errors may lead to accidents and hazards. It also helps in avoiding wastage of power. Therefore, it arises a need to do so in a systematic manner which we have tried to implement it with our system. The system we have proposed is an extended approach to automating a control system.

Industrial Parameter Monitoring Automation is a wireless technology. It is used in combination with fire fighting for hazard source monitoring, fire fighting rescue, fire early warning, preventing and early disposal. It is effectively used for the enhancement of fire brigade fire fighting and emergency rescue capabilities. Security is primary concern everywhere and for everyone. Every person wants his industry to be secured. This project describes a security system that can monitor an industry. This is a simple and useful security system. Here our application uses Micro controller as its controller. A Gas sensor is present to avoid leakage of gas intimated with buzzer alert. A Gas Leakage is very dangerous to human being present in the industry as it can cause fire. A fire sensor is also present for protection against fire hazard and is intimated with buzzer alert so the controller person will get informed as the buzzer starts making noise and he can turn on the water sprinklers. A temperature sensor is also present at this end to find out increase in temperature so that the controller person will manually switch on cooling fans to cool the room. In this way security is provided through all aspects. In this paper, we are developing a system which will automatically monitor the industrial applications.

Industrial automation system has given a powerful way to build industrial system by using wireless devices, and sensors. Industrial parameter monitoring automation system concept is to monitor and control the industry. In phase (1) the hard ware was designed successfully using micro-controller. The input from sensor and data output can be displayed in the LCD .micro-controller which is used to collect data from sensors and displayed in LCD. The displayed data can be seen on the server.

FUNCTIONAL ANALYSES

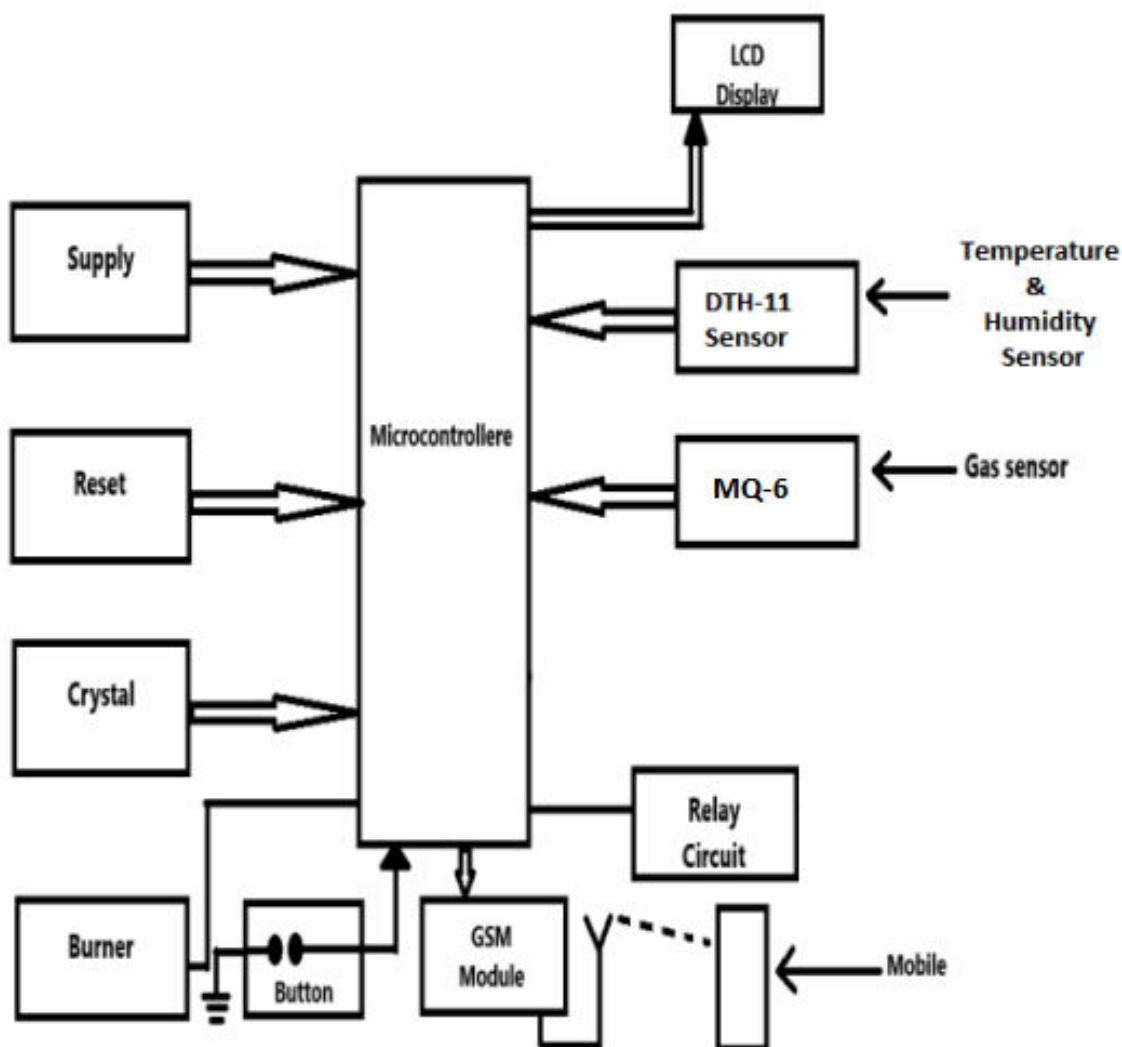


Fig. 1: Block Diagram

As we can see that we have used a Micro-controller to design our system i.e. Industrial Parameter Monitoring & Automization. The Micro-controller here operates as a major component operating with 11.0592 MHz crystal Oscillator. In Industrial Automation there are many concepts such as Monitoring of Temperature & Humidity, Gas Leakage Detection, Monitoring of Machine Status, Fire Detection, Smoke Detection. We have designed our system to monitor all these parameters.

For the detection of all these parameters we have used two sensors. 1)DHT-11 (Temperature & Humidity Sensor) - The DHT11 sensor consists of two main components – one is Humidity sensing component and other is NTC temperature sensor (or Thermistor). The Thermistor is actually a variable resistor that changes its resistance with change in temperature. They both sense the temperature and humidity of area and give the serial data as output to the IC (which is placed on back side of sensor) .From there the data is further transmitted to the Micro-controller which then monitors this data. The sensor can measure temperature from 0°C to 50°C and humidity from 20% to 90% with an accuracy of $\pm 1^\circ\text{C}$ and $\pm 1\%$. (2) MQ-6 (Gas Leakage Detecting sensor) - The MQ6 (LPG Gas Sensor) is a simple-to-use liquefied petroleum gas (LPG) sensor. It can be used in gas leakage detecting equipment in consumer and industry applications, this sensor is suitable for detecting LPG, iso-butane, propane, LNG. The sensitivity can be adjusted by the potentiometer. It has a small sensitivity to Alcohol and Smoke also. If any gas leakage is detected it sends the signal to the micro-controller.

A 16*2 LCD display is Connected to the port 1 of micro-controller which is used to show various informative messages to the user like sending SMS. It has 32 character in total 16 in 1st line and 16 in 2nd line. In each character there are 50 pixels. So to display one character all 50 pixels must work together. The standard open source library for interfacing LCD with Arduino board is used in the project. The library works as expected and needs no changes or modifications. With the help of a GSM Module we further send the recorded data to the supervisor/controller. The circuit is designed with 12Volt 1Amp Power supply which is further converted to 5 Volts using a 7805 Voltage Regulator.

A Reset Circuit is also connected to the Micro-controller. When The power supply is turned on and supply voltages settle out. Meanwhile, the RC circuit holds the MCU's (active-low) reset pin in a low state, which keeps the MCU from starting, until the RC circuit reaches a charged state. The delay to letting the MCU start is based on the RC time constant. A relay driver circuit is used to drive, or operate, a relay using a BS547 so that it can function appropriately in a circuit. The driven relay can then operate as a switch in the circuit which can open or close, according to the needs of the circuit and its operation. The relays used here are SPDT Relays i.e. (Single Pole Double Throw).

The MQ-6 sensor (Gas Detection sensor) which is a digital sensor and DHT-11 sensor (Temperature and Humidity sensor) are connected to the Micro-controller. The parameters sensed by these sensors are shown on the LCD. All the switches are connected to the Micro-controller. When we turn the

switches On it will turn the machine on and the data will get updated on the LCD and the status of all the devices will be sent to the Mobile of the user with the help of the GSM Module. This data sent to the user shows the On and OFF time of the devices that are in use in the company.

HARDWARE AND SOFTWARE TOOLS

Hardware

- 1) Power Supply
- 2) Microcontroller
- 3) DHT-11 sensor
- 4) LCD Display
- 5) GSM Module

Software

- 1) Proteus for PCB design
- 2) Keil compiler microcontroller embedded c programming

OBTAINED RESULTS:



Fig4.

CONCLUSION AND PERSPECTIVES

The project we have undertaken has helped us to gain a better perspective on various aspects related to our course of study as well as practical knowledge of electronic equipment and communication.

The extensive capabilities of this system are what make it so interesting. From the convenience of a Micro-controller and GSM Module a user is able to control industrial accidents, human errors and provide manual as well as industrial safety. This makes it possible for the user that there are less accidents taking place in industry and people's life or company growth is not in risk anymore. The end product will have a simplistic design making it easy for users so that they can interact. This will be essential because of the wide range of technical knowledge that industries have.

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