

Development of Smart Thread Monitoring Device for Spinning Mill Industry using Internet of Things

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Abstract—Smart application has become more and more popular in recent years. It aims at helping people manage the various devices freely and build an autonomous environment. This project introduces a wireless solution based on Internet protocol to manage the industrial units easily. Smart application system can connect the various units together and provide a unified interface for users to interact with the monitoring block. Some main features are listed such as temperature control of motor, security and safety. As with the development of the Internet, Internet based remote monitoring and control solutions for industry has been proposed.

Index Terms— Internet of things, Temperature sensor, Humidity sensor, Fire sensor.

I. INTRODUCTION

Automation has much more importance in industry because due to automation overall productivity is increases. Quality of the product is also increases due to automation. It also reduces manufacturing cost. There are another several reasons such as lack of availability of skilled person, lack of industrial training centers so that automation got importance. Most of the developed countries suffer from lack of human resources. Those persons who work for their industry from many years they are leaving the industry. If they want to hire new candidate to replace old candidate then first problem is that new candidate is non-experienced. So we have to arrange training session. Candidate may leave the industry if workload is more. In case of developing country skill become important factor. They have more manpower but these peoples are not technically strong. Hence automation is become need.

Technologies which are invented for the industrial automation deals with the monitoring and controlling of the various activities and different manufacturing process running in the industry. Machinery used in the industry has its own specification. In industry boilers are used for heating purpose. These boilers have own their operating temperature range. If the temperature of the boiler exceed beyond the threshold level then there is possibility of explosion of the boiler which become more dangerous. Hence controlling of temperature is important. All other parameters such as speed of the motor, torque of the motor, pressure, available light etc. must be monitor and control. In day today life people wants to have world in their fingerprints. That means use of internet is increased in great extent. Internet of things is a new emerging technology which connects all the living or nonliving things of the world using internet. Internet of things allows the communication between the people and thing anytime, anywhere using large internet network. To monitor and control such automation process we can use concept of internet of things. We can also control this parameter by providing appropriate feedback command. For this communication between devices and web page we use controlling device along with IOT.

II. EXISTING SYSTEM

In existing system the device can controlled manually with the man power.if there is wastage of energy in the form of running devices in the industry, it results in huge loss of power and thereby contributing to the economical fall.When the machines goes abnormal condition, it indicated to the user via buzzer. Mainly, the automatic detection of cautious environment in the industry is quite less in the existing system. Some of the disadvantages of existing systems are Power wastages are more, Man power is needed, Tendency for accidents to occur The main disadvantage in the existing system is the man power accidental conditions through which various load losses are evolved. The regular switching characteristics of the loads are further mishandled due to human error.

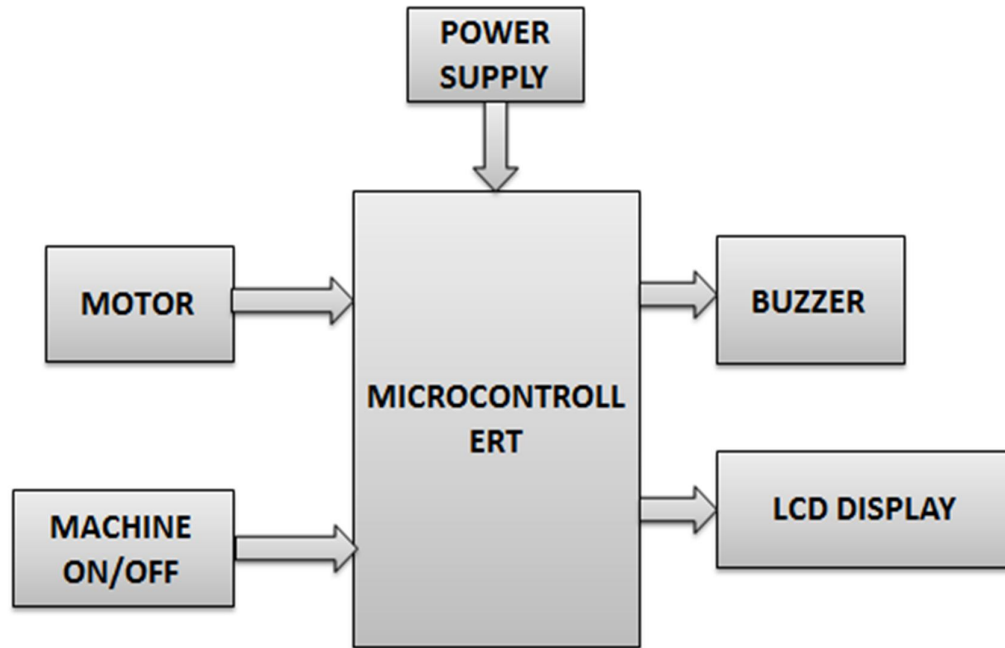


Figure 1. Existing system

III. PROPOSED SYSTEM FEATURES

Propose the automated monitoring of spinning industry using IOT. Temperature sensor is placed for monitoring the effect of surrounding temperature. Based on the measured temperature values motor will on. In this ultrasonic sensor is used for monitoring obstacles. Fire sensor is used to detect the flame at industry if it detect, buzzer will on for indication purpose. The present project is focused on Industrial applications that will be continuously monitored through a set of sensors that constitutes a sensor module.

The sensor module collects the relevant data to determine whether the applications to be monitored are working well under certain threshold values. Then measure parameters are display using LCD. Then measured parameters will also update to the IOT website.

The Arduino Mega2560 can be powered via the USB connection or with an external power supply. The power source is selected automatically. External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging a 2.1mm center-positive plug into the board's power jack. Leads from a battery can be inserted in the Gnd and Vin pin headers of the POWER connector. The board can operate on an external supply of 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may be unstable. If using more than 12V, the voltage regulator may overheat and damage the board. The recommended range is 7 to 12 volts. The Mega2560 differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter.

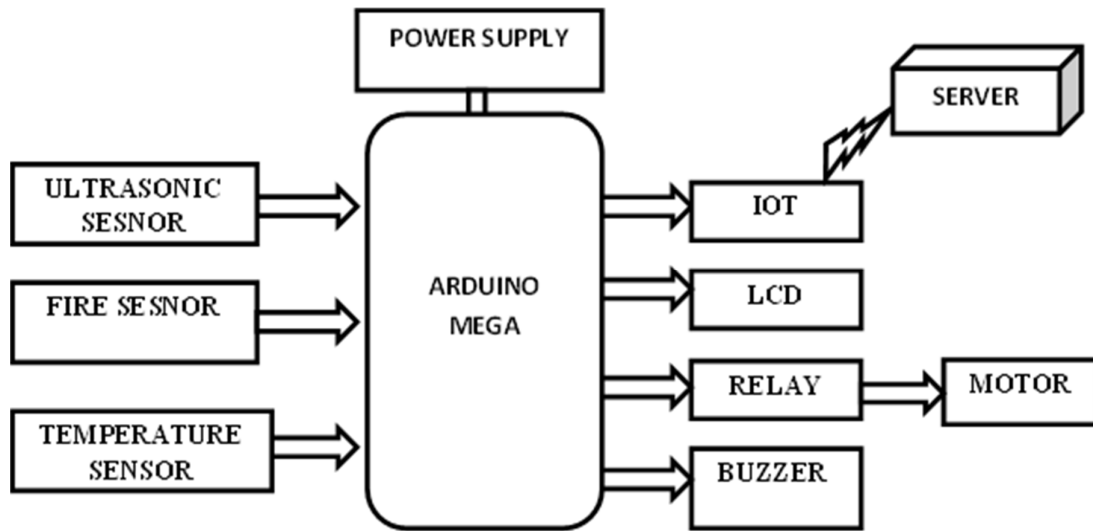


Figure 2. Block diagram of smart thread monitoring system

IV. WIRING DIAGRAM

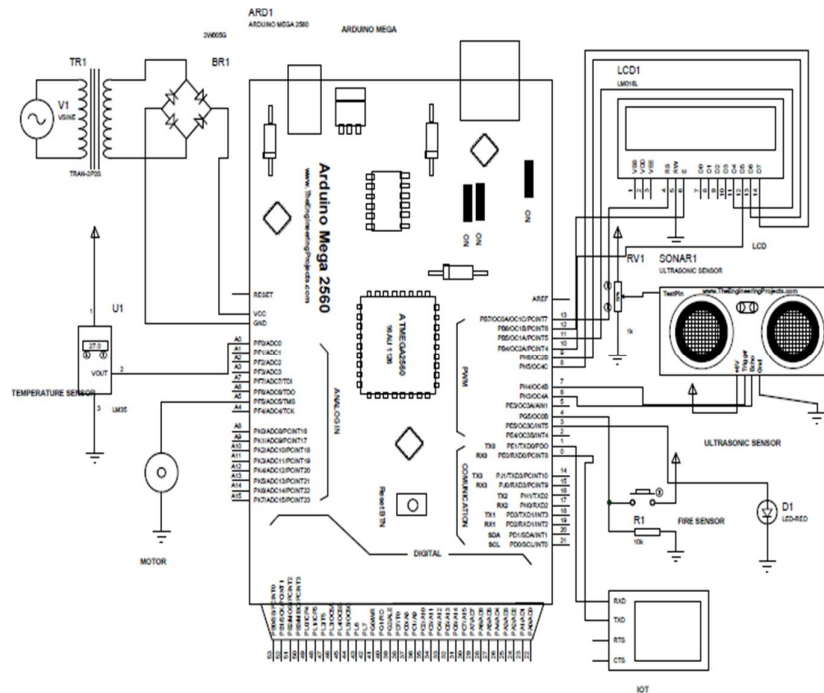


Figure 3. Wiring diagram proposed method

Each of the 54 digital pins on the Mega can be used as an input or output, using `pinMode()`, `digitalWrite()`, and `digitalRead()` functions. They operate at 5 volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull-up resistor (disconnected by default) of 20-50 kOhms. In addition, some pins have specialized functions:

The LM35 temperature sensor[6] is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in °C). The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified.

The ultrasonic sensor works on the principle of SONAR and RADAR system which is used to determine the distance to an object. An ultrasonic sensor generates the high-frequency sound (ultrasound) waves. When this ultrasound hits the object, it reflects as echo which is sensed by the receiver. HC-SR-04 has an ultrasonic transmitter, receiver and control circuit. In ultrasonic module HCSR04, we have to give trigger pulse, so that it will generate ultrasound of frequency 40 kHz. After generating ultrasound i.e. 8 pulses of 40 kHz, it makes echo pin high.

Flame sensor YG1006 which is a high speed and high sensitive NPN silicon phototransistor. It can detect infrared light with a wavelength ranging from 700nm to 1000nm and its detection angle is about 60°. Flame sensor module consists of a photodiode (IR receiver), resistor, capacitor, potentiometer, and LM393 comparator in an integrated circuit. The sensitivity can be adjusted by varying the on board potentiometer. Working voltage is between 3.3v and 5v DC, with a digital output.

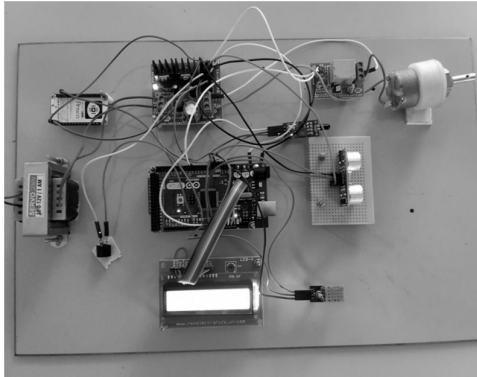


Figure 4. Schematic of the IoT control module



Figure 5. Snapshot of output of Fire and obstacle detected

V. CONCLUSION

Thus we built a system for monitoring and controlling of industrial environment by using new emerging technology of internet of things. This system gives efficient solution than other systems. In this system we collect the data from the sensor and made it available to the user from remote location anytime. Hence it will become low cost, high efficient embedded system. The advantages of the developed system are to have a continuous monitoring over industrial applications and also control them if going beyond their threshold conditions. As sometimes it will be late in this process and it will harm to property as well as life. For this purpose we are developing a system for Industrial Automation using IoT with the help of Artificial Intelligence to make system automated which will take intelligent decisions

As future work, we plan to further explore the proposed monitoring architecture by extending and refining the existing implementation, we aim at extending the architecture in order to provide support to more advanced instrumentation techniques.

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