MACHINE MONITORING AND CONTROLLING USING WI-FI TECHNOLOGY

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Abstract

This project describes about the monitoring and controlling system of the DC motor with wireless technology. The maintenance of the DC motor is essential in industries for the better performance. The proposed system can monitor the parameters of DC motor such as temperature and speed of the motor and smoke factor. The system consists of Arduino Node MCU Controller Microcontroller which acquires the various parameters from the motor and then measured values are given to the Personal Computer (PC) through Wi-Fi Technology and also displayed in Android app Smart Factory Solution using Thing Speak cloud platform. Temperature and hall-effect sensors are used to measure the temp and rpm of the DC motor.

Turning appliances "ON" or "OFF" should be easily possible using a remote device. Also in many industries such as small-scale factories or offices controlling of various devices or machines is very difficult. In industries each motor or machine is switched "ON" or "OFF" manually. So that it increases number of labors and time is wasted. The app consists of on-off switching button which wirelessly controls motor. So, the proposed work presents the design and implementation of a wireless sensor network based industrial appliances system with a modular Android application.

Keywords: DC motor, Wi-Fi Technology, Arduino, Thing Speak, Fire Base, cloud sever, Android studio.

I. Introduction:

Home automation system has been developed for purpose of security, controlling and monitoring. The main concept is to form a wireless controlling system for houses and offices because it gives user a comfortable environment to use home appliances. This project describes about the monitoring and controlling system of the DC motor with wireless technology. The maintenance of the DC motor is essential in industries for the better performance. The proposed system can monitor the parameters of DC motor such as temperature and speed of the motor and smoke factor. The system consists of Arduino NodeMCU Controller Microcontroller which acquires the various parameters from the motor and then measured values are given to the Personal Computer (PC) through Wi-Fi Technology and also displayed in Android app Smart Factory Solution using Thing Speak cloud platform. Temperature and hall-effect sensors are used to measure the temp and rpm of the DC motor. Turning appliances "ON" or "OFF" should be easily possible using a remote device. Also in many industries such as small-scale factories or offices controlling of various devices or machines is very difficult. In industries each motor or machine is switched "ON" or "OFF" manually. So that it increases number of labors and time is wasted. The app consists of onoff switching button which wirelessly controls motor. So, the proposed work presents the design and implementation of a wireless sensor network based industrial appliances system with a modular Android application

In this project, we describe the system for monitoring and controlling of industrial dc motor. A low cost system is proposed to monitor the parameters of the dc motor such as temperature of the windings, speed of the motor and smoke factor. In addition with the monitoring, the temperature control of the motor is also performed. If an overload occurs i.e. temp exceeds the maximum limit the relay circuit will turn on the buzzer and the Light Emitting Diode (LED) will glow.
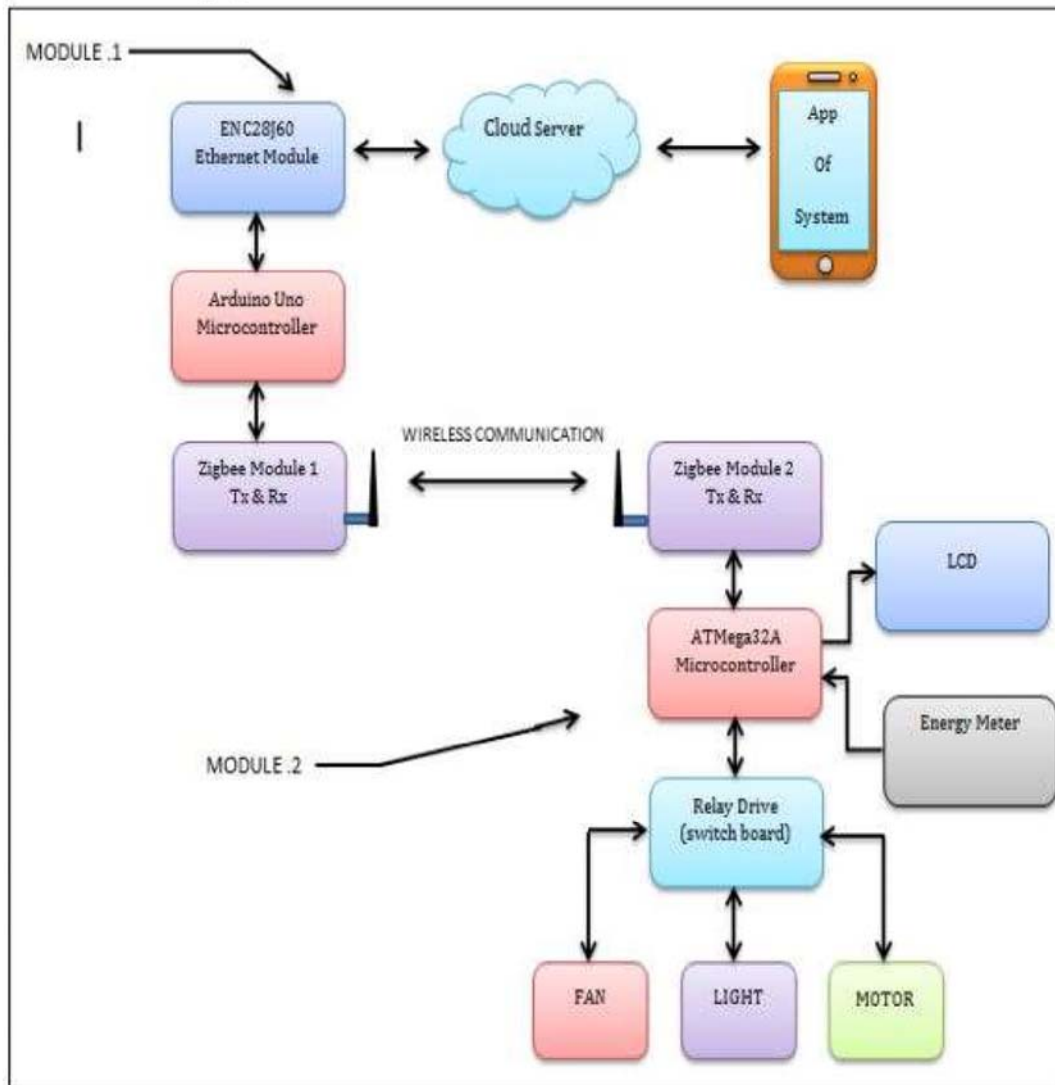
II.   Existing System

Figure 1 Block Diagram

There are various methods that use wireless technology and sensor. Some are as follow Controlling machine via Bluetooth and Arduino ,Controlling light over internet with help of Arduino , Analyzing data using Think-speak cloud then Sending Sensor data over cloud using Wi-Fi and Arduino ,then Event trigger controlling using Arduino and finally Time trigger controlling using Arduino.

III.   Proposed System

In the proposed project there are different types of data that will be collected by microcontroller via motor. This data will be stored on Cloud server. With the connection via Wi-Fi user can access this data from cloud server. This data plays very important role in whole system, as working is dependent on the data readings. There will be some predefined data as well which will be compared with the new data in-order to maximize the efficiency of the whole system. The input data consist of power supply to the motor which will give actual input to microcontroller. This is broad level diagram of project showing project overview. In this project there are four objects as motor, microcontroller, mobile and router. Project uses relationship like generalization, association, specialization.
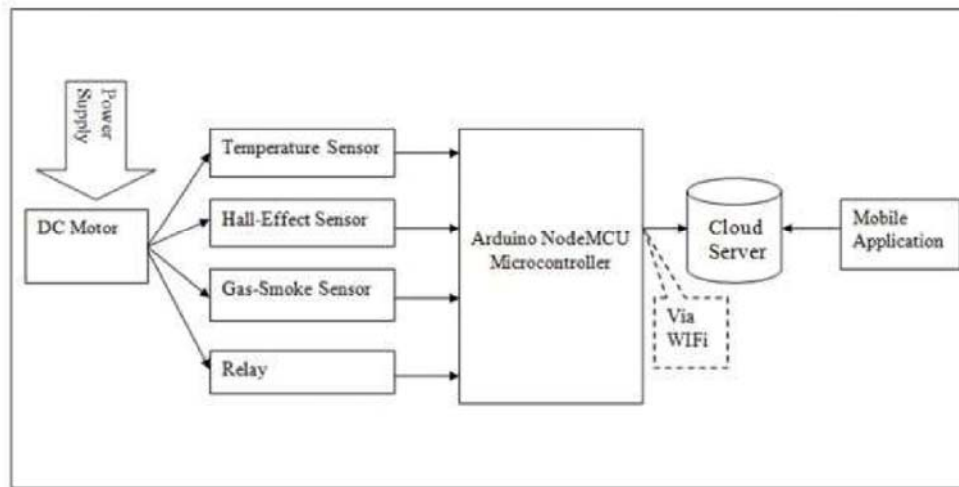
Figure 2 Proposed System Architecture

IV. Implementation

1. On receiving system design documents, the work is divided in modules/units and actual coding is started. Since, in this phase the code is produced so it is the main focus for the developer. This is the longest phase of the software development life cycle.

2. Firstly all connections are made of sensors, microcontroller and motor. Then the actual coding starts into two different software.

3. Using Android Studio, android application is created. It has 3 fragments about, monitor, control. Monitor fragment can monitor real time motor temperature and speed and display in chart view via Thing speak cloud. Control fragment can control motor like switching on and off via Firebase cloud.

4. Using Arduino, the microcontroller is coded. It is the heart of system.As soon as all code is compiled, project starts execution.

5. Sensors sense data and NodeMCU transfer it to Thing speak. App fetches data from there and represent it in chart view. On any smoke detection, motor and sensors are switched off. On clicking on-off button in application it sends 1- 0 on firebase server which is fetched by Arduino and accordingly action is performed.

6. Steps to create Thing Speak Cloud:

a) Sign In to Thing Speak™ using your MathWorks® Account, or create a new MathWorks account.
b) Click Channels > My Channels.
c) On the Channels page, click New Channel.
d) Check the boxes next to Fields 1–3. Enter these channel setting values
e) Click Save Channel at the bottom of the settings.
f) Your channel is available for future use by clicking Channels > My Channels.

V. Future Scope

➤ The monitoring and controlling system of the dc motor can be implemented in the industries and the monitoring values are updated in industrial application for providing the easy maintenance.
➤ Develop methodologies and best practices for using wireless in diagnostics, control and safety applications.
➤ Provide a standardized testing mechanism and test plan for making effective wireless reconfiguration of appliances.
➤ Report on technology trends in wireless systems for control.

VI.   Conclusion

➤ The developed system Wireless based parameter monitoring and controlling of machine is capable to perform following operations, read and display speed, temperature of dc motor, start and stop the motor at distant place.

➤ Two clouds can be integrated smoothly and works fine as a single cloud.

➤ If in any case the monitored value of any motor parameter is beyond safe value microcontroller takes appropriate action to protect the motor from damage.

➤ By this project it will be a great help indeed to researchers in wireless monitoring and controlling industrial appliances by android application. This is also user friendly, economical, fully automatic and efficient device by software programming interfacing for controls.

VII.   References

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