IOT based DC Motor Controlling & Monitoring System

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Abstract:- DC motor plays a very important role in different industrial applications. This project deals with a system that protects the DC motor as well as helps in controlling and monitoring various parameters like temperature, speed, etc with the help Internet of Things (IoT). This project makes use of NodeMCU-ESP8266 Wi-Fi modules, a DC motor, temperature sensor (NTC thermistor), relay, etc. We are using the IoT for the process monitoring and control which allows us to control various operations from a very long distance and web server to store real time values. Here the whole system is going to be controlled by using a user interface (pc or smartphone). The signals can be transmitted and received by using the IoT cloud interface with the help of the Wi-Fi module ESP8266 (NodeMCU). This system is design to control DC motor without shuting off whole system i.e. without break in work. It helps to monitor the system and if temperature goes high, it will reduces its temperature by rotating a DC motor in anticlock wise direction and without causing any damage to the system.

Keywords- DC motor, IoT, Node MCU wi-fi, Sensors, etc

I. INTRODUCTION

IoT based embedded systems are used in various fields to grown up with the latest technology. So we have decided to implement this system for protecting, controling and monitoring of DC motors in the industry. In various industries numbers of DC motors are used for various applications so maintenance of those motors were a difficult task for the operators in the industry. But by the use of IoT based system any operator can check any motor's present status from the control room. He can record real time readings of various parameters like voltage, current and temperature by using IoT based system on a single computer screen. Also if he find any abnormal condition in any motor of the plant he can stop the motor from the control room by the use of IoT based system.

II. LITERATURE SURVEY

1] In their paper, Tan, Lee and Soh (2002) proposed the development of an Internet-based system to allow monitoring of important process variables from a distributed control system (DCS). This paper proposes hardware and software design considerations which enable the user to access the process variables on the DCS, remotely and effectively.

2] Potamitis, Georgila, Fakotakis, and Kokkinakis, G. (2003) suggested the use of speech to interact remotely with the home appliances to perform a particular action on behalf of the user. The approach is inclined for people with disability to perform real-life operations at home by directing appliances through speech. Voice separation strategy is selected to take appropriate decision by speech recognition.

3] Prof. Era Johri Dept. Of Information And Technology K.J.Somaiya College Of Engineering VIDYAVIHAR, MUMBAI "Remote Controlled Home Automation Using Android Application via WiFi Connectivity".

4] Prakash, Chetna, and Sanjeev Thakur. "Smart Shut-Down and Recovery Mechanism for Industrial Machines Using Internet of Things." 2018 8th International Conference on Cloud Computing, Data Science & Engineering (Confluence). IEEE, for predictive maintenance of motors in the industries, monitoring needs to be performed continuously so as to determine any degradation in performance or failure of the motors. The recovery mechanism provides a back-up machine which is started when the main motor is shut down. This helps in decreasing the loss that would occur during the downtime. This increases the reliability.

6] Şen, Mehmet, and Basri Kul. "IoT-based wireless induction motor monitoring." Scientific Conference Electronics (ET), 2017 XXVI International. IEEE, 2017. In this way, the production process is not impeded and the required maintenance or replacement

can be performed with the least possible disruption. This study has provided statistics not only for creating mathematical models but also for enabling the CMS operator to establish a motor maintenance schedule.

III. METHODLOGY

The main methodology of this entire project is depends on IoT based embedded system so interfacing of all hardware with wi-fi and internet is very important part in its functioning. The whole programming is done in IDE and then it is load in the Node MCU and with the help of wi-fi and various sensors we have achieved the required goals like providing protection to motor from the abnormal or faulty conditions. Also study and observing of various parameters of motor like temperature, current and voltage. Controlling of motor is another very important factor in this project. Total functioning of project in terms of block diagram is shown in the Fig 1.

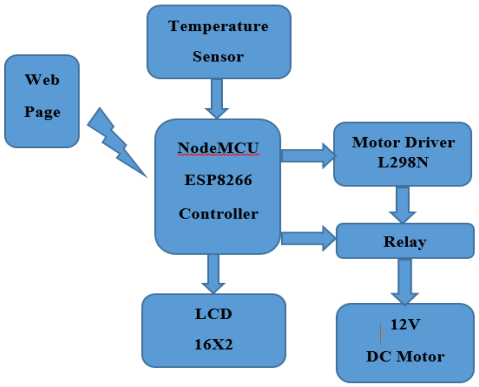

Fig 1. Block Diagram

IV. HARDWARE

This system is embedded system so hardware is very crucial part of this system. The most important hardware is Node MCU 8266 wi-fi. Through the Node MCU 8266 wi-fi all other hardwares like temperature sensor, DC motors are interfaced with the IoT system. We have used Voltage Sensor Module to measure voltage and its related abnormal conditions like over voltage or under voltage. For the same purpose we have used ACS712 Current Sensor and Temperature Sensor. Motor driving relay is also an important part of the system as it interfaces motor with the Node MCU 8266 wi-fi. When a supply and wifi are given to the system that system gets started. NodeMCU-ESP8266 start collecting real time readings of temperature and according to that the whole system works. When their is possibility of DC motor to get closed then motors start rotating in anticlock wise direction. All the real time readings get stores on web page which is designe to monitore and control whole system. With the help of that web page, we can also control the speed of DC motors.

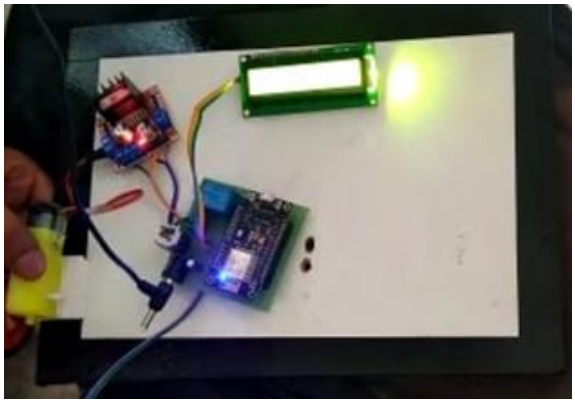

Fig 2. Testing of Hardware

V. RESULTS

In this project we have achieved results regarding humidity, temperature, load current etc as shown in Fig 2. The parameters are shown on the display to monitor, to control and to protect the motor. In harsh condition the motor will automatically gets off. In this way we protect whole system by damaging and breaking whole setup without manual efforts.

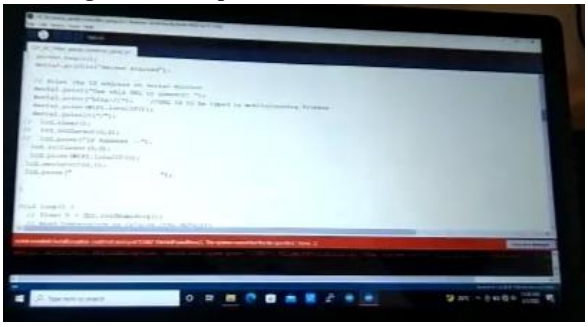

Fig 3. Software Testing

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