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IOT based Industrial DC Motor Speed Control and Monitoring Parameter using Arduino

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***Abstract*—In this proposed system, we are monitoring and controlling the speed of DC motor and direction of the motor. For that purpose microcontroller, Temperature sensor, DC motor and WI-FI modules are used. A speed of motor is controlled by using webpage through WI-FI. Simultaneously, we can also control the direction of the motor whether to be rotated in clockwise or anticlockwise direction. Temperature sensor is used to measure a temperature of DC motor. In this paper we have to design a system which provides protection to the DC motor and it also helps in control and monitor various parameters. For that controlling and monitoring purpose we have to use WI-FI and web server using some transducers we can easily achieve our goal to protect and control the motor and to monitor various parameters. We have provided various controls through internet to avoid faults in DC motor.**

***Index Terms*— Microcontroller, DC motor, Transducers.**

I. INTRODUCTION

In different types of industries DC motors are very important. In this project, we design a system which is used to protect a DC motor and it also helps in control and monitor of various parameters. In this project WI-FI and web servers are use. By using some transducers we can easily achieve our goal to protect and control the motor and to monitor various parameters. Various parameters can be controls through internet to avoid faults in DC motor. DC motors are most important device in various industries like Steel Industries, Textile Industries, Robotics, Space, Automobile etc.DC Motors can be controlled at both directions. Pulse Width Modulation (PWM).IOT(internet of things) ,DC motor , wifi module are used to control Speed of DC Motor,

II. MOTIVATION AND PROBLEM FORMULATION

The speed control of DC motor is very crucial in applications where precision and accuracy are of essence. Purpose of a motor speed controller is to take a signal representing the required speed and to drive a motor at that speed. In this project we controlling the DC Motor and analyse the fault coming during operation by using IOT. In industrial applications dc motors are used because the speed-torque relationship can be varied to almost any useful form for both dc motor and regeneration applications in either direction of rotation. DC motors feature a speed, which can be controlled smoothly down to zero, immediately followed by acceleration in the opposite direction without power circuit switching. Having control operation of speed of motor which can increase productivity in broad range of industry**.**

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III. OBJECTIVE

This project is mainly focus on developing about a system which provides protectionto the DC motor as well as helps in control and monitor various parameters.DC motor widely used in speed control system which needs high control requirement such as rolling mill ,double hulled tanker and high precision digital tool.Manual control is not practical in technology era because it can waste time and cost.The user can monitor their system at certain place without need to going to plant especially in industrial implementation. By use of IOT based system any operator can check any motor's present status from the control room. The Objective Is To Implement Simple Control, High Reliability, Low Cost And Fast Response System For Existing DC Motor. Implementation Of Closed Loop System Increases The Steady State Response, Transient Performance And Stability Of System. To Achieve The Objective Of Project We Divide Our Work In Three Stages.

1. Modelling
2. Simulation
3. Implementation of Hardware for Controlling the Speed of DC Motor.

IV. WORK DONE

A. System Level Architecture

The fig 4.1a shows the block diagram of the IOT Based Industrial DC motor speed control and monitoring parameters using arduino.In this chapter design and implementation of hardware project were discussed. Design is done on the basis of rating of equipment. In order to Speed control & fault analysis of dc motor by using IOT.

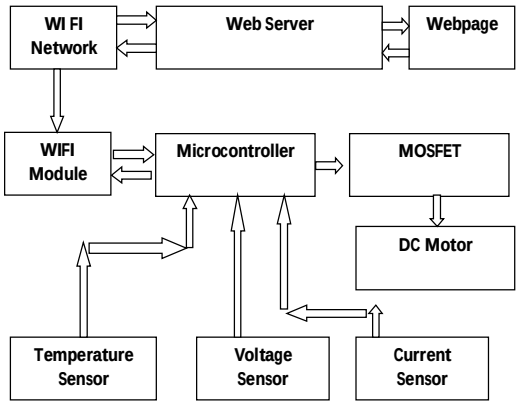

Fig 4.1.a: Block diagram of hardware

B. Hardware

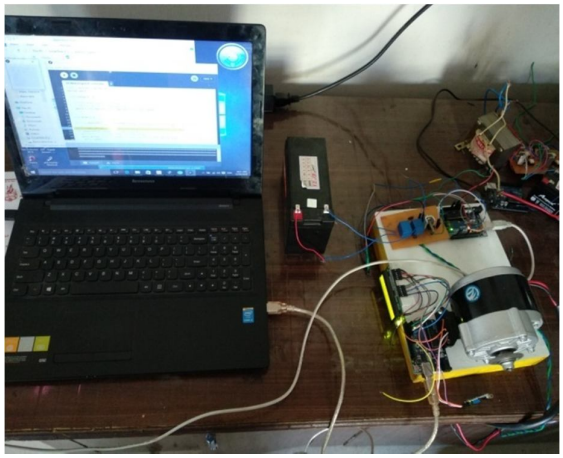

Fig 4.2.a: Hardware implementation

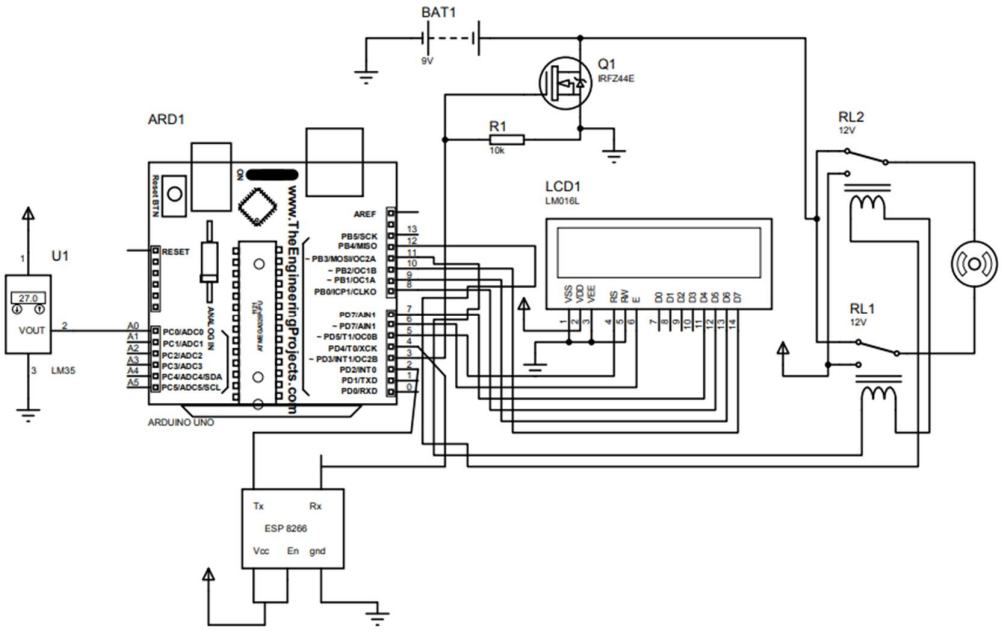

Fig 4.2.b: circuit diagram of hardware

C. Operation

In the above circuit Arduino Uno board is used to control the DC motor in their direction and speed. The IRFZ 44 MOSFET is used to control the speed of the DC Motor by using Pulse Width Modulation technique. The Power supply is designed of 12volt and 24 volt . The 12 volt supply is applied to the relay. The Relays are used to control the direction of the motor. The WI-FI module ESP 8266 is connected to the hyperterminal of the board. WI-FI module is a very powerful device and is used to connect the internet through WI-FI router. n this project we **control direction and speed of a 24v high currentmotorusing Arduino and two relays**. No power switches are needed for this circuit,two ULN 2003 pins and Messages Coming from website will **control the direction and speed of DC Motor**. One Message clockwise will rotate motor clockwise and other message anti clockwise will rotate it counter clockwise.

D. Working Methodology

In this project ,dc motor is controlled through website.DC motor is connected with mosfet at the trigger pins of the mosfet ,the drain of the mosfet is connected with 12v through relay . The poles of the relay has been connected to the dc motor .The relays are used to control the direction of the Dc motor .The wifi module ESP8266 is connected with the Arduino uno board at the pin 2 &4 .The third pin of arduino is connected with the mosfet gate pin .ESP8266 is IOT device through which the router get connected .Website is connected through this router by IP address of the router and control the dc motor .The IP address of the wifi is connected with router and the status of the connection is displayed on the serial monitor of the arduino ide .The website has the links such as start ,stop,speed decrement ,increment ,clockwise, anticlockwise direction . All these links have been assingned the characters such as ‘s’ for start , ‘p’ for stop , ‘c’ for clockwise direction,’w’ for anticlockwise direction ,’n’ for speed increment and ‘d’ for speed decrement .The ssid is given to the router to the wifi module then accept this Id passes that values to arduino .Arduino at pin 3 starts the motor at the minimum speed .Character P coming from the website is to stop the motor character is used for clockwise direction and when c read by arduino it moves the motor into the clockwise direction by changing the pin inputs to arduino ,these pins are connected to relay through relay driver IC ULM2003. This IC is used to change the direction of the dc motor.

V. Conclusion & Future Scope

In this paper, we have design a new architecture for control the BLDC motor, that can be use in a flexible industrial based Android Smartphone at a low price and implemented by Ethernet shield and Arduino UNO also using web domain for system control configuration.

This paper has presented the design and implementation of Internet of things for monitoring and controlling of various application and parameters in industries using wireless communication technique. The key idea of the proposed work is to provide flexible and long distance connectivity between industrial environment and user. 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. Future work will focus on improvement of above proposed work and adding features to make a reliable smart Industrial monitoring and controlling system.

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