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IOT BASED ELECTRICAL MOTOR CONTROL AND MONITORING

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ABSTRACT: At present, industries are increasingly shifting towards automation. Today's industrial automations mostly based on programmable controllers and robots. In order to do the tedious work and to serve the mankind, automation is developed in industries. DC motor plays an important role in various industries. In this paper, we have present a system to provide protection, control and monitoring the condition of DC motor. Here Arduino uno and various sensors like current, voltage and temperature sensor are used so, continuously monitor the motor condition in an app. Real time values of various parameters like current, voltage, temperature and speed can be monitored in app. By continuous monitoring the motor can be protected against fault like short circuits overloading, overheating etc. hence machine performance is improved

1. INTRODUCTION

Now a day's there is advancement in technologies, in order to reduce the man power in industries, the industries are shifted towards automation. DC motors are used in various industries because of their small size and high energy output. The manual control motor of different areas of an industry the for switch ON or OFF the motor is time consuming and inconvenient here an effort is made to control automatically. for several applications. Protection or maintenance is also very important aspect for the smooth operation of motor in an industry. The monitoring of several parameters of motor like voltage, current, temperature and speed etc. by human is very time consuming process.this problems are studied and developed a remote a solution called project called IOT BASED DC MOTOR CONTROL AND MONITORING. In this paper, in this paper a cost effective protection and control system for DC motors which can be used in practice.

1.1 Motor Protection Scheme

In the motor protection scheme, the respective sensors accurate and precison intimation and protection to the motor under abnormal provided protection against overheating and over current. We have used sensor which gives accurate and precise protection to motor in abnormal or fault condition.

1.2 Motor Monitoring Scheme

Real time values of several parameters like voltage, current, temperature and speed are sensed by sensors and uploaded to the application which gives us feature of real time monitoring of motor from one device. The values are compared with default values to determine the condition of the motor.

2. METHODOLOGY

In this paper, we have interfaced various sensors with the Arduino Uno, Node MCU and the DC motor to collect data of the various parameters like voltage, current, temperature and speed to know the condition of the motor and also give protection against over voltage, under voltage, over load and thermal overloading by providing program for that, so if the motor crosses the pre-determined value of current voltage temperature by some fault it will get automatically turn off and the alarm give signal on the application. Also we can turn on/ off motor by button placed in the application. Block diagram, and simulation results are discussed below.

2.1 Block Diagram

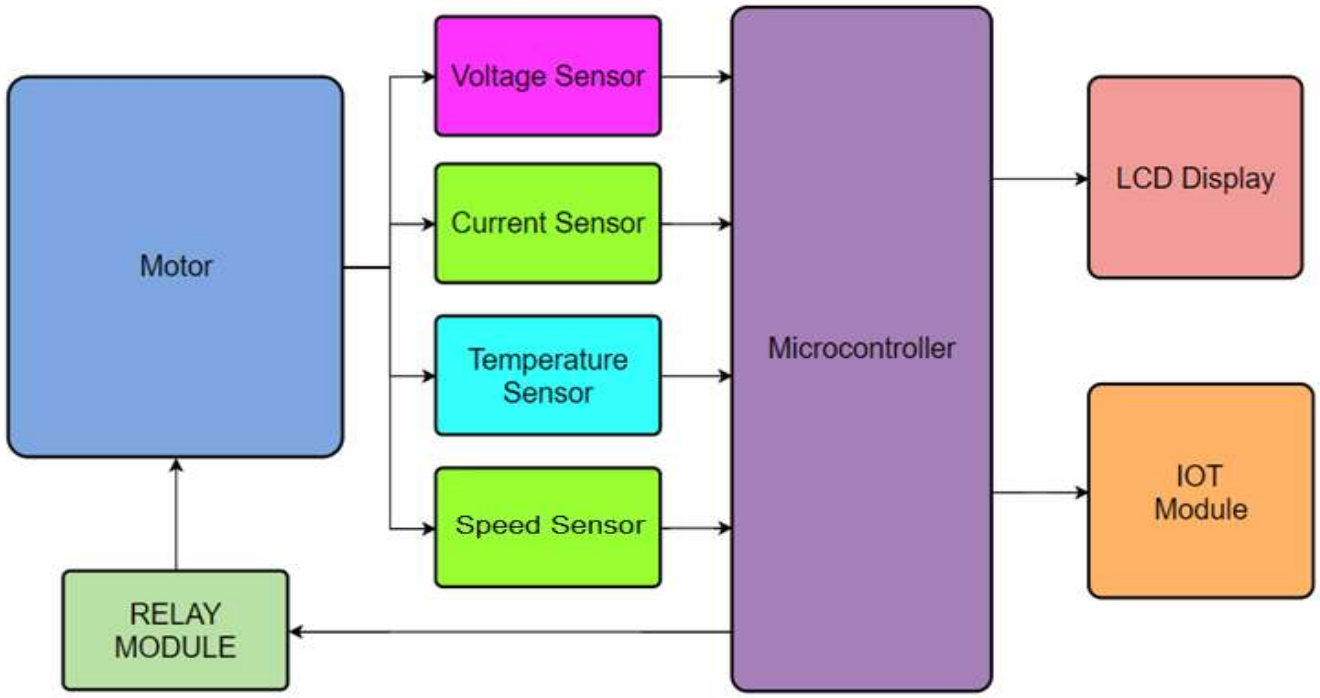

Fig 1: Block diagram

In this paper work, the voltage sensor is used to read the voltage value. The current sensor is used to read the current value, temperature sensor is used to measure the temperature of the DC motor. The speed sensor is used to monitor the speed of the motor. The signal from the above mentioned sensor is processed by the Arduino uno with the predefined values. The Node mcu is used to transmit the real time data to an application for remote monitoring. If the values of any parameters such as voltage, current and temperature of the DC motor is not within the predefined value then specific fault will be triggered and the motor will shut down automatically. LCD display is used to display the fault on the spot and using Node mcu the fault condition is

notified to the linked mobile devices. Proteus is used to display the simulation result in this phase of the project.

3. SIMULATION

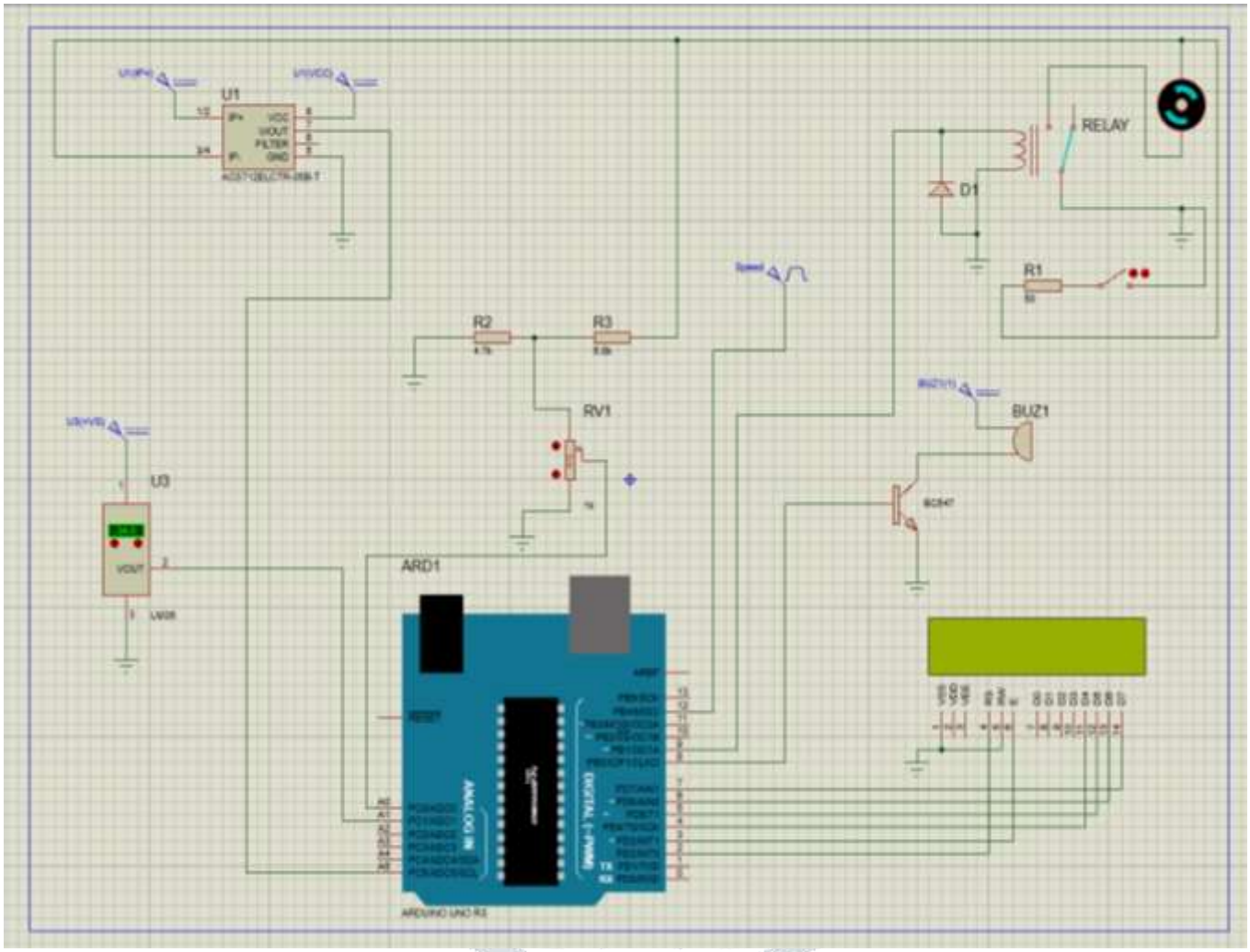

Fig 2: Simulation Setup in Proteus

This is the simulation setup we have done in the Proteus software. And we have set the predefined values to

1 Above 35 C thermal overload fault.

2 Above 12v overvoltage fault.

3 Below 9v under voltage fault.

4 Above 400mA overload fault.

4. SIMULATION RESULTS

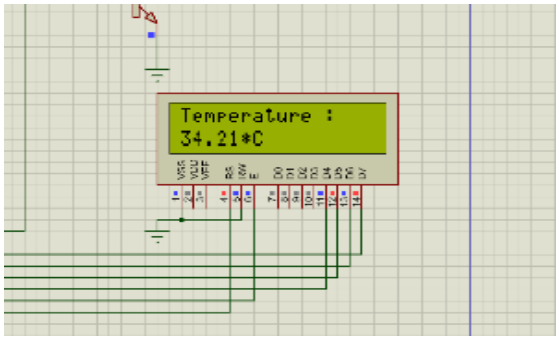

Fig 3: Temperature reading displayed

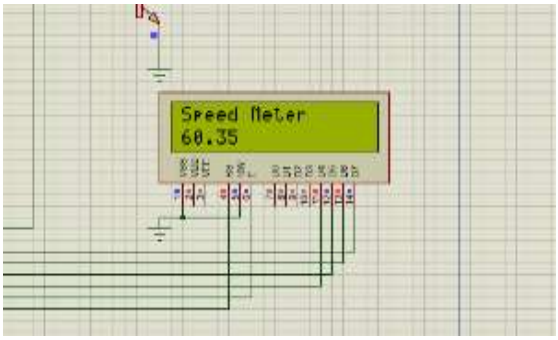

Fig 4: RPM reading displayed

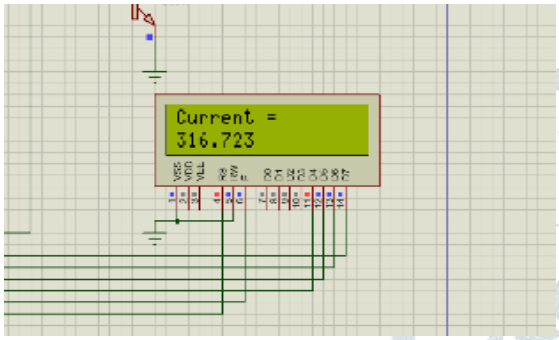

Fig 5: Current reading displayed

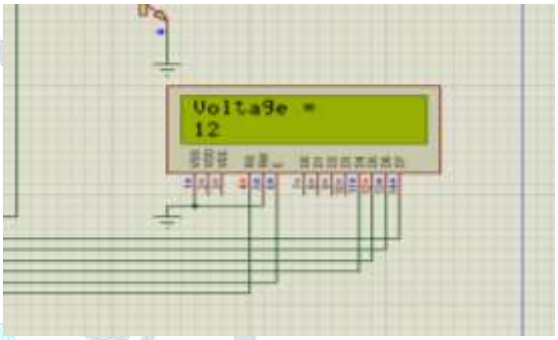

Fig 6: Voltage reading displayed

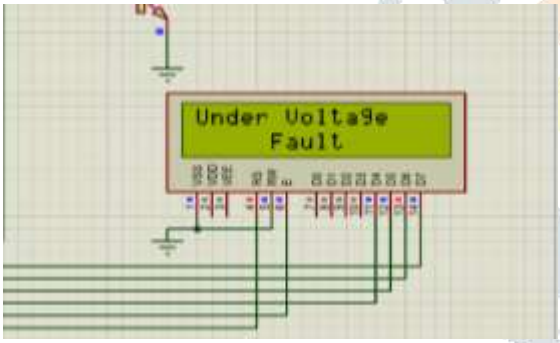

Fig 7: Under voltage fault displayed

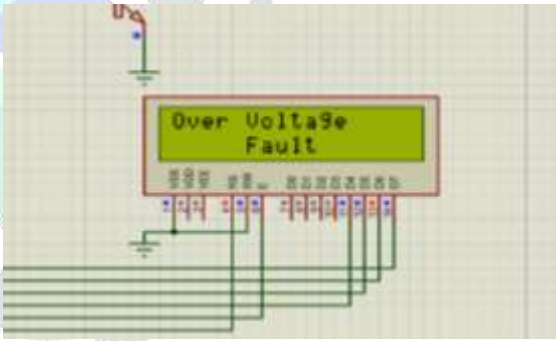

Fig 8: Over voltage fault displayed

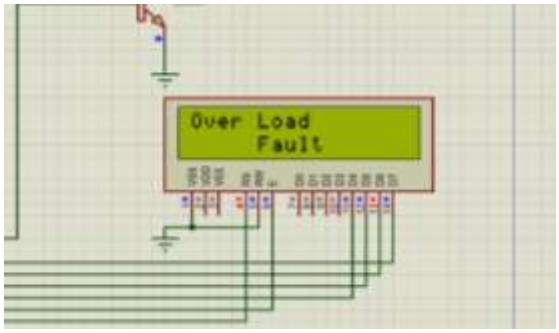

Fig 9: Over load fault displayed

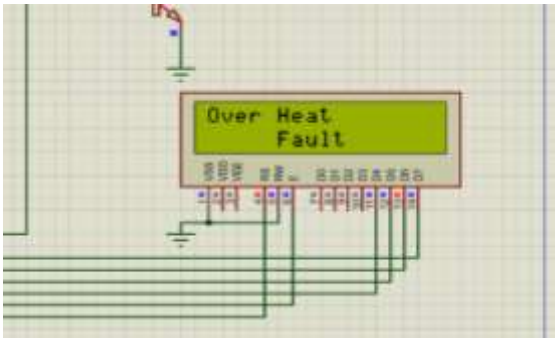

Fig 10: Over heat fault displayed

5. CONCLUSION

In this paper, we have introduced a system that can protect, control and monitor a DC motor through mobile application using Arduino Uno. Various parameters like current, voltage temperature and speed and their real-time values can

observed on the screen. Protection against the overload, overvoltage, under voltage and thermal overloading is done by current, voltage and temperature sensor. In this phase of the project we have successfully completed the simulation part.

7. REFERENCES

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