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 ijircce@gmail.com

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IOT Assisted Motor Monitoring System Using Node MCU

Dr. V V Teresa¹, Sujitha P², Sneha V³, Sankar Ram K⁴, Sreenivasan M⁵

Associate Professor, Department of ECE, Sri Eshwar College of Engineering, Coimbatore, India¹

UG Scholar, Department of ECE, Sri Eshwar College of Engineering, Coimbatore, India²

UG Scholar, Department of ECE, Sri Eshwar College of Engineering, Coimbatore, India³

UG Scholar, Department of ECE, Sri Eshwar College of Engineering, Coimbatore, India⁴

UG Scholar, Department of ECE, Sri Eshwar College of Engineering, Coimbatore, India⁵

ABSTRACT: In the current evaluation, automation has become a basic surviving feature for the industries. Induction Motors are the nerves of many industries. This project is an IOT Assisted motor monitoring system for industries to maintain the physical conditions of motors. Transducers and sensors monitors the parameters of motors like RPM of motor and transmit the data through Wi-Fi to the web-browser. In this project we calculate the rpm of motor by the Hall-effect and the required power consumption will be calculated. Along with the vibrations from the motor and noise produced. And also all the deviations in these parameters are noted.

KEYWORDS: Node MCU, IOT (Internet of Things), Temperature sensor, Vibration sensor and web browser.

I. INTRODUCTION

Growth of the industrial sector is crucial for the economic development and thus for the overall development of the nation. There are various sectors of industries like furniture, mining, automobile and many more industries but all the industries need to be monitored. Earlier it was done manually, but with the advancement of technology this now they are controlled and monitored with the help of internet. With the rapid increase of internet usage over the past few years, Internet of things is the latest emerging technology. Controlling and monitoring is very important in our day to day life now and with this technology it is possible to access various devices remotely through mobile phones. In IOT people and machines are connected to mutually collect, create, utilize and share services and information. Different types of sensors are used which record the required parameters and then respective actions are taken. This system mainly focuses on the protection of DC Motor using ESP32 WROOM Controller. In three phase supply many electrical problems rises under voltage, overvoltage, overload, open circuit, unbalanced voltage, single phasing and earth faults. Embedded controller is developed to protect the device from the faults at initial stage

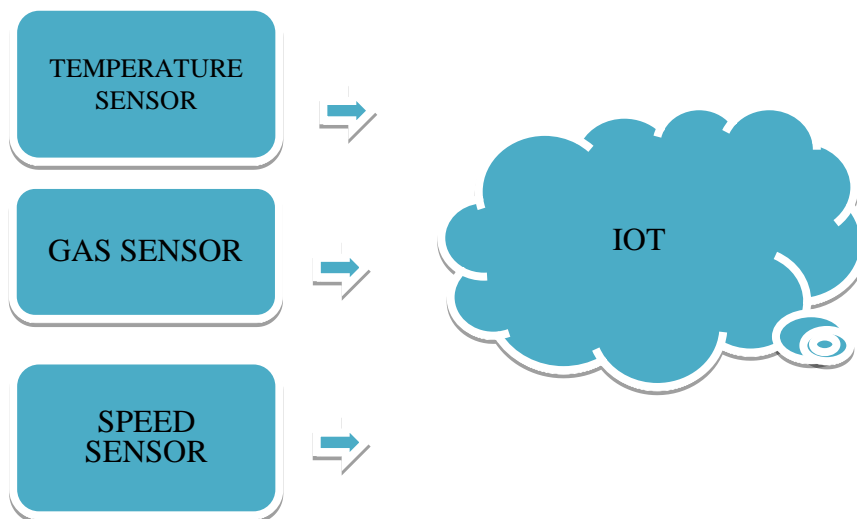
II. LITERATURE SURVEY

In [1] "Induction motor condition monitoring and controlling based on IOT" Sreenivasan V et al have focused on controlling the motor condition with the help on IoT. They have worked on Stop/Start of the Induction motor when any system failure occurs in the motor parameters like temperature and current.

In [2] "Smart Shut-Down and Recovery Mechanism for Industrial Machines Using Internet of Things" ChetnaPrakash et al have worked on continuous monitoring of the machine. They have added a backup unit of motor so when the actual motor is worn out the process can be completed with the other.

III. SYSTEM DESIGN

3.1 BLOCK DIAGRAM



IV. COMPONENTS DISCRPTION

4.1 HARDWARE TOOLS:

- **NODE MCU**
- **DC MOTOR**
- **TEMPRARURE SENSOR**
- **RPM/SPEED SENSOR**
- **VIBRATION SENSOR**

4.1.1 Node MCU ESP8266:

The ESP8266 is a low cost and user friendly device to establish internet connectivity. This module can work as both a Station (Wi fi) and an Access Point (Hotspot); hence it can easily fetch the data and upload the data to the internet which makes Internet of Things as easy as possible. Using API's, this module can be able to fetch the data from the internet hence our project would access any kind of information which is available over the internet, thus making it smarter. This module has another exciting feature; it can be programmed using Arduino IDE, which will make this module as more user friendly. This should be used along with another microcontroller such as Arduino, because this version of module has only 2 GPIO pins, else we can look for standalone versions such as ESP 32 and ESP 12.

Even though there are many IDE's and methods accessible to use with ESP modules, Arduino IDE is most commonly used. The ESP8266 works low power with 3.3V only. One common problem is that ESP 01 uses huge of power. While programming this module uses more power and hence you can give 3.3V pin on Arduino or can use a potential divider. So, it is very important to make a small voltage regulator for 3.31v which supplies minimum of 500mA. LM317 is a recommended regulator.



4.1.2 DC Motor

It is an electrical machine which converts electrical source of energy into mechanical source of energy. In a DC motor, the input electrical energy is the direct current which is converted into the mechanical rotation. A DC motor is defined as an electrical motor which converts direct source of current electrical energy into mechanical energy.

4.1.3 Temperature sensor

The temperature sensor measures the temperature of the motor and keeps on updating in app/web browser. If there is a raise in temperature beyond the threshold limit it will be notified to the user.

4.1.4 RPM/SPEED SENSOR

Checking the speed of a motor is an important criterion in industries. The speed sensor determines the shaft speed and also the direction of the motor. We will be able to predict the malfunction in the motors based on the number of rotations. Thus the RPM of the motor can be viewed from remote area through the web.

4.1.5 VIBRATION SENSOR

Faults in motor such as loose bearings, misalignment and corrosion related issues may cause the motor to have an internal vibrations. These vibrations can be detected through the vibration sensor and send to the controller.

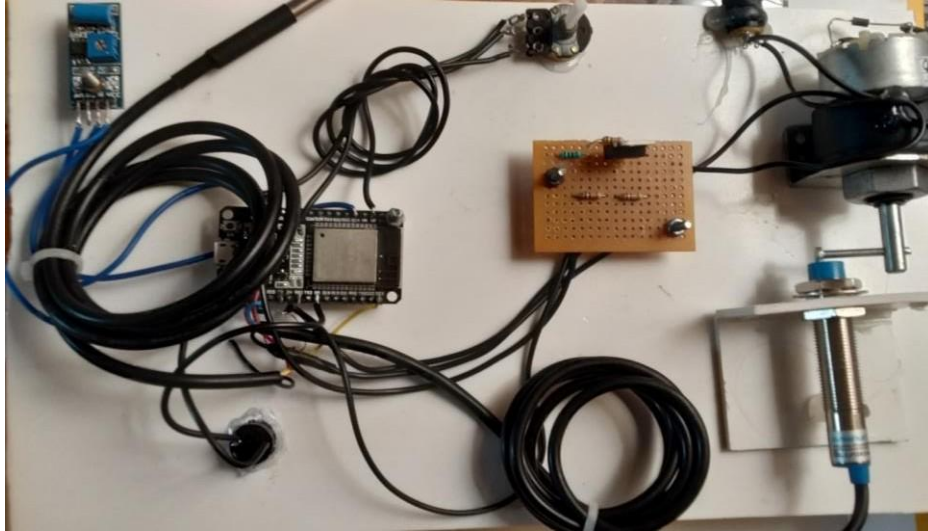
4.2 SOFTWARE TOOL

- Arduino IDE
- Language: Embedded C

4.2.1 ARDUINO IDE

In Arduino IDE where IDE stands for “Integrated Development Environment” and it is software officially introduced which is used for editing purpose, compiling purpose and uploading purpose which is in the form of code in this Device. Its modules are flexible with its software. It is easily available and an open source to install and start and also compiling the code on the go.

V. HARDWARE SETUP



Hardware Setup

VI. CONCLUSION

Motors are the backbone of many industries. So, shielding them from various faults is very critical. This method of parameter monitoring offers the ideal solution to secure the engines. The total device gives the measurement of the motor parameters such as speed, temperature and RPM factor. The system has high accuracy at compact size and at cheaper cost.

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