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# Three Phase Induction Motor Monitoring & Controlling Using IOT

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**ABSTRACT:** This work provides the information regarding IOT handheld control and monitoring method of initiation motor fashionable miscellaneous industries for exercise, for shielded and economic environment. The limit like temperature, quivering, outside moisture, RPM, initiation person who acts automatically load current and voltage exist noticed by transducer modules and sensors are shipped to the (Arduino) subject to series of actions to achieve result unit. It will check and exhibit the limit. To send these information's for detached watch carefully, the processing part (Arduino) communicate with the entry to place piece to the cloud database. For conservative and financial data ideas fashionable industrial fields, an initiation engine is watch carefully and regulated using IOT.

**KEYWORDS:** Internet of Things, Induction Motor, Monitoring, Controlling, fault.

## I. INTRODUCTION

As electrical technology advanced, dc motors were widely employed in a variety of industrial applications. Due to the numerous advantages of induction motors, the outlook of industry altered after the advent of ac motors, particularly ac induction motors. A fixed portion and a rotating part are the two primary components of an induction motor. Mutual induction, which is a transformer concept, connects two pieces. Rotating transformer is another name for an induction. The primary benefits of 3-phase induction motors are self-starting, robust design, strong power factor, and inexpensive cost; nevertheless, speed control is not possible without compromising efficiency. The many induction motor defects include, Faults in the electrical system: The following variables, such as an unbalanced three-phase supply, an excessive voltage,

## II. LITERATURE SURVEY

Since many objects are effectively interrelated, conditional and controlled monitoring may be used to boost productivity. Constant equipment monitoring, alarms, and data accessibility for preventive maintenance. Utilizing online location, the motor is efficiently and continually checked. IoT-based traction motor drive condition monitoring in electric vehicles: Part 1. Kunthong, Jakkrit, et al. IEEE's 12th International Conference on Power Electronics and Drive Systems (PEDS) was held in 2017

The establishment of a wireless Internet of Things allowed for the supervision of the motor drive condition for traction in electric cars (IoT). The prototype's design and testing utilising an ESP8266 microcontroller module to determine the status of the motor are shown. Prakash, Chetna, and Sanjeev Thakur. Internet of Things Smart Shut-Down and Recovery Mechanism for Industrial Machines The 8th annual international conference on cloud computing, data science, and engineering was held in 2018. (Confluence). IEEE

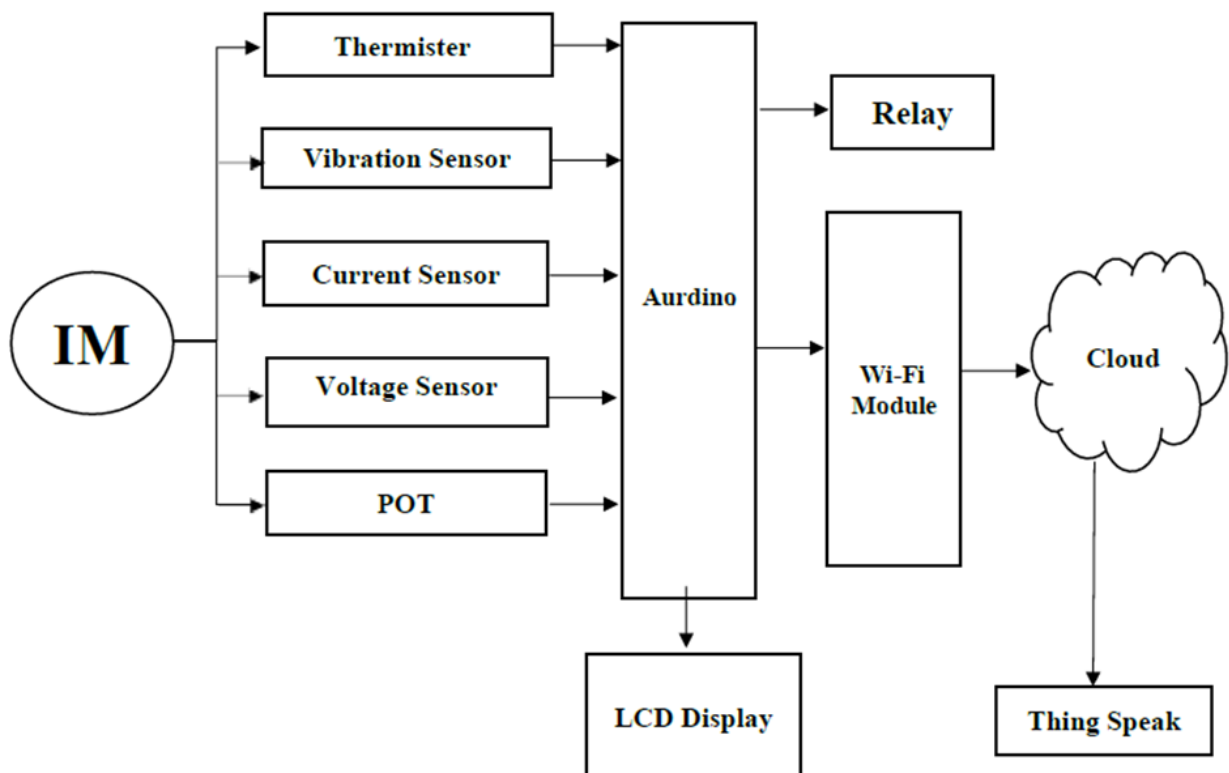
Continuous monitoring is required for predictive maintenance of motors in the industrial sector in order to identify any performance decline or motor failure. When the primary motor is turned off, a backup machine is offered via the recovery mechanism. This aids in reducing the loss that would result from the outage. This makes it more trustworthy.

IoT-based wireless induction motor monitoring, Mehmet Sen and BasriKul. 2017 International Scientific Conference on Electronics (ET). IEEE, 2017. [4], The manufacturing process is not hampered in this way, and the necessary maintenance or replacement may be carried out with the least amount of inconvenience. This study's statistics have

been used to develop mathematical models as well as to help the CMS operator set out a timetable for motor maintenance.

Xue, Xin, Wallace P. Brithinee, and V. Sundararajan. "The use of wireless sensor networks for three-phase induction motor status monitoring." Electrical Manufacturing Expo and Electrical Insulation Conference, 2007.IEEE, 2007. [5], Measuring the supply current delivered into a big three-phase induction motor is the method most frequently employed for problem detection.

### III. PROPOSED WORK



**Block diagram of IOT based condition monitoring of 3-phase Induction Motor**

Above figure demonstrates the whole image of the work, the goal of condition monitoring of induction motor is accomplished by ceaselessly recording the considered parameters utilizing different sensors Accelerometer is utilized to record vibrations, thermistor is utilized to record winding and bearing temperatures, ACS712 current sensor for current, and a voltage detecting circuit to quantify voltage. Each of the sensor is associated with Arduino small scale controller board which is to be introduced at the motor site. The sensors will detect the parameters and are broke down by the miniaturized scale controller board as per the coded guidance. The information detected by various sensors can be seen on the sequential output screen of Arduino IDE and also on LCD board which is interfaced to the MCU.

The gathered information can be put away on the IoT stage utilizing ESP8266 Wi-Fi module. Utilizing sequential correspondence between the controller and the hub board, the informations firstly CURRENT IM SENSOR transferred to MCU board whose output can be seen on thesequential screen. At that point utilizing Wi-Fi usefulness the information accessible at hub MCU is transferred to Thing Speak Cloud stage. So as to transfer the information to ThingSpeak stage, a record is to be made in it and afterward another channel is to be made. Whilemaking a channel numbers of fields are to be chosen relying upon the quantity of parameters under checking Each field is doled out with one parameter which is spoken to in the graphicalstructure. A web application is created for ceaseless observing of parameters. Moment ready will be gotten on the page forany irregular task ofmotor.

The processed data and real time readings are then uploaded on to the server by ESP8266 Wi-Fi module every after some delay. This delay window is provided for ensuring every value uploaded by the controlling system on the ThingSpeak server. The parameters data is uploaded on Thing Speak channel in the form of graphs which can be easily access from anywhere via the internet.

**1. Power Supply :**

Power supply is the circuit from which we get a desired de voltage to run the other circuits. The voltage we get from the main line is 230V AC but the other components of our circuit require 5V DC. Hence step-down transformer is used to get 12V AC which is later converted to 12V DC using a rectifier. The output of rectifier still contains some ripples even though it is a DC signal due to which it is called as Pulsating DC. To remove ripple in output voltage the filter circuit is required. Here a capacitor is used. The 12V DC is rated down to 5V using a positive voltage regulator chip 705. Thus, a fixed DC voltage of 5V is obtained.

**2. Arduino UNO Microcontroller Board :**

The advantage of Arduino over other type of microcontroller is, it's open source and cost is less compare to other type of microcontrollers. The simple in programming it is used many more professionals. Arduino is a type of ATmega328. Arduino has analog and digital input/output pins. Arduino board need 5v dc supply to operate. Arduino UNO is the heart of this work for data acquisition and controlling of motor. The condition monitoring sensors, LCD display are interfaced with input/output pins of Arduino. The control circuit are added are also interfaced with output pins of Arduino. Arduino board has the reset button, pins for connecting external source (i.e., Battery) and USB cable. It's also has transmitter and receiver pin for serial monitoring. Arduino produce a output of 3.3V and 5V.

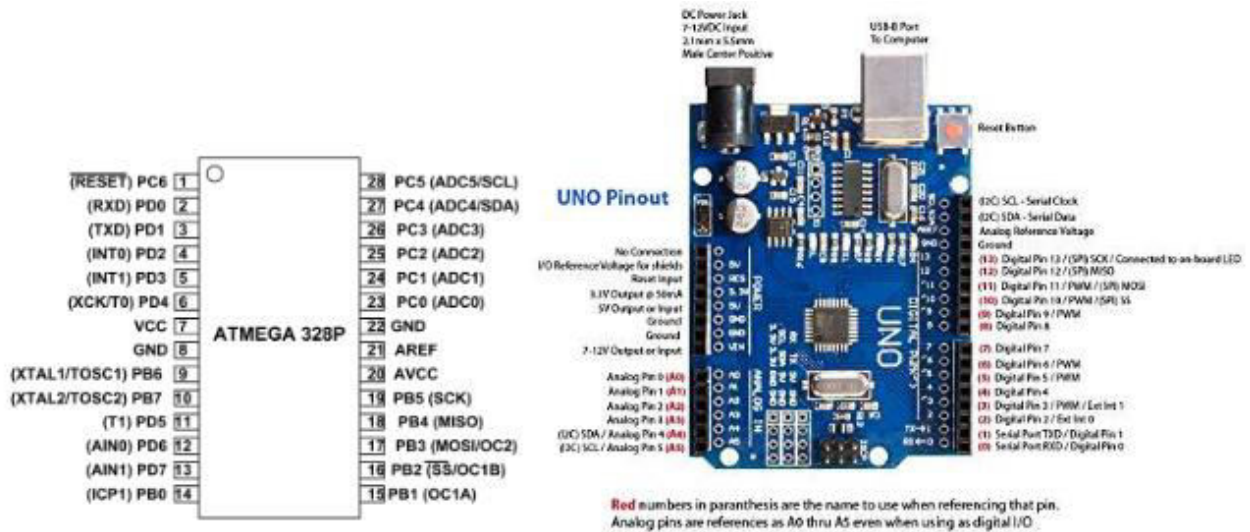


Fig :-Pin Diagram of Arduino UNO

**3. LCD Display :**

In this work 16\*2 LCD display is used for continuously display a data which is acquired from sensors. The display contains 16pins. The supply of 5V is given across the Anode and cathode pins of LCD display. Pins 3, 4 and 5 are connecting to pot, for change the brightness of the LCD display.

The LCD display contains 8 data pins and 2 control pins. By programming the process, the data is continuously displayed in the LCD screen.



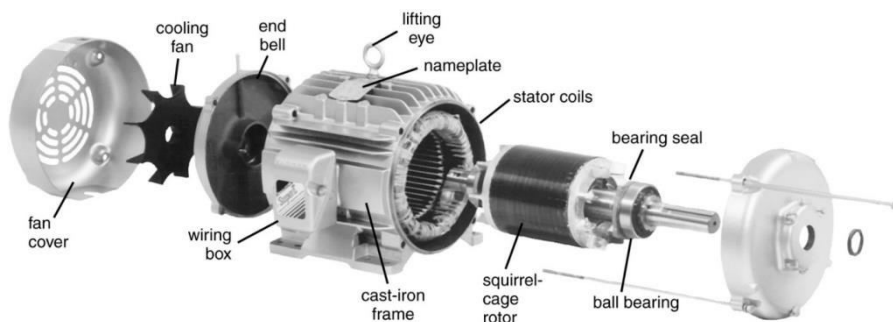
To interface LCD display to Arduino 4 data pins, 2 control pins and 2 supply wires (i.e., 5V and Ground) must be connected to Arduino. The processed data is displayed in the LCD display one by one. And also, the additional requirement of smooth motor operation is displayed.

#### 4. ESP8266 WiFi Module :

ESP8266 is a WI-FI Module (Fig 6), used for wireless communication. It is interfaced with microcontroller (Arduino) by connecting 5 pins. It needs two 3.3V supplies and one ground to operate. Also this module requires two soft serial ports. The data acquired by the Arduino are processed and sent to server by using ESP8266. ESP8266 requires additional library file to operate. By programming the microcontroller the data is updated every second. It has an advantage over Bluetooth module (i.e.) the data is sent to remote locations. ESP8266 work depends upon the AT commands.

#### 5. Three Phase Induction Motor :

A three phase induction motor is a type of AC induction motor that requires a three phase supply to function as opposed to a single phase supply for a single phase induction motor. The three phase supply current creates an electromagnetic field in the stator winding of the three phase induction motor, which causes the rotor winding to produce torque.



#### Types of Three Phase Induction Motors:

Squirrel Cage Induction Motor

Slip-ring or Wound Rotor Induction Motor

#### VI. CONCLUSION

The idea of the Internet of Things is used in this project for remote early detection and monitoring of motor system faults. The system may integrate several detected characteristics in real time to increase the accuracy of defect identification in motors. When the motor system is being monitored, many characteristics, including supply voltage, motor current, temperature, speed, and surrounding humidity, are measured. As a result, this system has more fields than other standard ways, enabling alarm, alert messages, and rapid controlling. Here, the idea of the Internet of Things is proposed for use in remote monitoring and motor control. The data received from the controller node is represented graphically using visual fundamentals. In addition, the data is shown sequentially.



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