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Preventive Maintenance - IOT based Real Time Monitoring of Motor Induction Type

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Abstract—The speedy development of technology presently revolves considerably around web of Things (IoT). Numbers of things area unit expeditiously interconnected, particularly in industrial automation that ends up in condition and controlled watching to extend productivity. The purpose of this development is to chic and employment of IOT expertise to witness and spot the ailment of Induction internal combustion engine. The planned methodology contains of Associate in Nursing IoT primarily based platform to gather and method the induction motor parameters. the info collected is keep within the cloud platform and same is accessed through the online page. And additionally timely alerts are going to be received for any violation in desired limits of parameters beneath watching, so immediate action is taken to avoid unwanted time period of the motor that saves time and cash. blessings of this methodology includes continuous watching of the instrumentation, receiving alerts, and knowledge availableness for prophetical maintenance.

I.INTRODUCTION

The most used machine in any section of the society as well as industries is Induction machine. ideally 3 section induction motors area unit utilized in industrial drives. Besides their dependability, Induction motors are subjected to several faults. The components of induction motor that area unit most valueable to faults area unit bearing, mechanical device snaking, rotor tavern and trough. totally different faults occurring in induction motors includes mechanical device faults, Single phasing, bearing faults and winding faults. Considering factors for failure of commercial motors includes lubrication, motor ventilation, electrical factors, alignments and motor load that leads to motor vibrations or motor temperature rise to important levels.

Any tiny fault occurred during a motor can cause complete motor failure if not self-addressed in time. thus condition monitoring of induction motors is fascinating to avoid time period of any trade. Condition watching (CM) suggests that watching of in operation parameters of a machine so as to assists maintenance before any failure happens. Condition watching of induction motors is vital for his or her economical and reliable operation, because it reduces maintenance value, enhancing in operation potency and decreasing the motor harm by prophetical maintenance supported real time knowledge. The health of Associate in Nursing induction motor is simply calculable by condition watching.

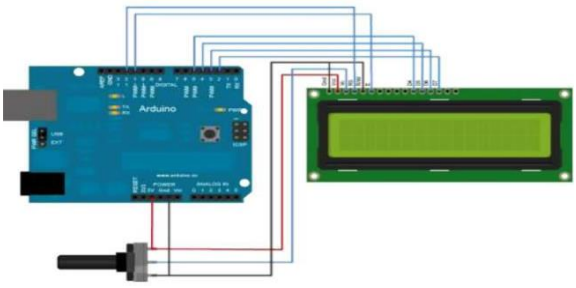
Condition watching overcomes the difficulties caused by the previous methodology of maintaining motors condition on time basis. Maintenance of motors on time basis could cause shutdowns that area unit sudden. On the opposite hand condition watching can offer data not solely on motor standing and performance however additionally the kind of maintenance needed. Condition watching has an excellent significance currently since it helps to predict instrumentation health, to optimize instrumentation performance and reduces maintenance value.

There area unit varied strategies of condition watching viz. Signal process, thermal watching, motor current signature analysis, vibration analysis etc. of induction motors. The planned methodology of condition watching of induction motors victimization web of Things (IoT) can offer knowledge on health condition and additionally the info is accessed from any remote place. Parameters like vibration, bearing and winding temperatures, current area
unit detected by victimization varied sensors and area unit analyzed by a small controller, to grasp the health condition of the induction motor.The analyzed knowledge is accessed or monitored from a far off place employing a internet application developed. Instant alerts is received on web content, whenever there's a violation of prescribed limits of parameters.

II.MATERIALS

1. Arduino:

TheArduino Mega 2560 may be a microcontroller board supported the ATmega2560. It embody everything required to support the microcontroller; merely connect it to a pc with a USB cable or power it with a AC-to-DC adapter.



2. ESP8266-12E (Node MCU one.0 DevelopmentBoard):

It is a powerful, low value Wi-Fi module which might be used for adding Wi-Fi practicality via a UART serial affiliation to the prevailing small controller comes. Scripting language employed by the Node MCU is Lua. Its in operation voltage is three.3v and has eleven digital input/output pins. The board encompasses a nonvolatile storage of 4MB.

3. liquid show

A typical {lcd|liquid crystal show|LCD|digital display|alphanumeric display} display consists of sixteen pins that management varied options of the screen. The Arduino microcontroller will output voltages of either five V or three.3 V, that the alphanumeric display is high-powered by wiring VSS and VDD to the bottom and five V pins on the microcontroller. The alphanumeric display screen will operate in each 8-but mode and 4-bit.

To interface with the alphanumeric display in 4-bit mode the Arduino solely has to be connected to pins DB4-DB7, which is able to connected to digital output pins 5-2 severally. Pin fifteen additionally as pin sixteen on the alphanumeric display screen area unit accustomed power a backlight within the screen.This makes text displayed within the screen easier to browse in poorly lit environments and is nonmandatory. To power the Arduino a nine V battery is connected to the VIn and ground pins on the Arduino.

4. Sensors

1. Potential Transformer(PT)

It is a general purpose chassis mounting mains electrical device. electrical device has 415 V primary windings and centertapped coil. The electrical device act as step down electrical device reducing AC - 415V to AC - 6V.The electrical device offers 2 outputs of 12V, 6V and 0V.

2. Current Transformer:

Current electrical device is employed to convert high current to low current.It is connected serial with the induction motor.It is performing on the attitude of alluring force induction. electrical device used has one ampere of current at primary that is reborn into one miliampere at the secondary.

3. Temperature sensor:

For measurement winding temperatures a temperature device referred to as luminous flux unit thirty five is employed and is shown in Fig.3. The luminous flux unit thirty five may be a

precision temperature device and might be simply label. it's a linear output. It operates over 55°C to 150°C vary.It has 3 pins specifically Vcc,output and ground pins.

4. Vibration sensor:

The vibration device or measuring system used is ADXL 335 that may be a tiny, thin, low power and three axis measuring system containing indication inured voltage yields. It measures each static and dynamic accelerations. The dynamic acceleration ensuing as of motion, shockwave or vibrations is measured in here.

III. diagram AND clarification

watching of initiation gas-powered is achieved by incessantly recording the thought of parameters victimization varied sensors. luminous flux unit thirty five temperature sensors area unit accustomed record winding temperatures, current electrical device is employed for current , and a Voltage sensing circuit to live voltage. All the sensors area unit connected to Arduino small controller board that is to be put in at the motor website. The sensors can sense the parameters and area unit analyzed by the small controller board consistent with the instruction coded. the info detected by totally different sensors is seen on the serial monitor of Arduino IDE.

The collected knowledge is keep on the IoT platform victimization Node mcuwi-fi module. victimization serial communication between the small controller and also the node mcu board the info is at first transferred to Node mcu board which might be seen on the serial monitor.

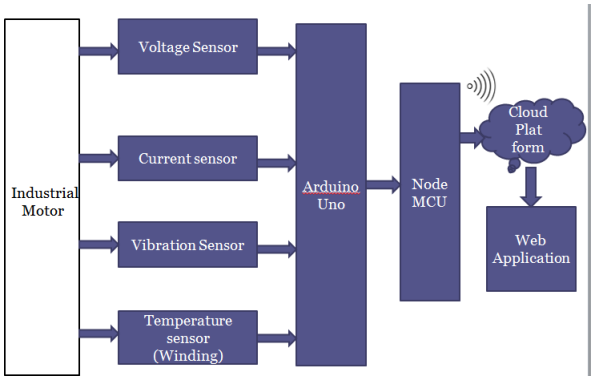


Fig five diagram

Then victimization wi-fi practicality the info out there at node mcu is uploaded to Thingspeak cloud platform. so as to transfer the info to Thingspeak platform, Associate in Nursing account is to be created in it then a brand new channel is to be created. whereas making

a channel variety of fields is to be hand-picked counting on the amount of parameters beneath watching. every field is assigned with one parameter that is diagrammatic within the graphical type.

A web application is developed for continuous watching of parameters. Instant alert are going to be received on the online page for any abnormal operation of motor.

IV. FINAL RESULT

By connecting Node MCU to the Arduino we are able to transfer the motor knowledge to the online. victimization the Wi-Fi property, the info is uploaded to cloud platform and every parameter is diagrammatic within the variety of graphs as shown within the Fig. below

V. CONCLUSION

Manufacturing motor is effectively and incessantly monitored by victimization {different|totally totally different|completely different} sensors and also the obtained knowledge is keep within the cloud platform and is accessed from different locations victimization internet application developed. The health of the motor is assessed by analysing the continual parameter knowledge obtained. additionally to continuous condition watching, receiving of timely alerts, storage of recorded voluminous knowledge for future use and knowledge watching from any totally different location, area unit supplemental blessings of this methodology.

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