IOT BASED INDUCTION MOTOR SPEED CONTROL AND MONITORING SYSTEM

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ABSTRACT

Today, the AC motor is still the most popular type of motor in industrial applications. Monitoring and control of induction motor parameters is very important in many applications and there are several techniques to ensure reliable operation. This project deals with the remote monitoring and control of various parameters of an Internet of Things [IOT] based three-phase induction motor. The sensor and sensor module monitor parameters such as short circuit motor temperature, current and voltage and send them to the processing unit which displays the parameter on the server. The system also introduces automatic and manual control methods to stop or start the short-circuit motor to prevent system failures through the server gateway. The introduction of this system improves the efficiency of the machine by continuously monitoring it to prevent breakdowns and determine preventive maintenance.

Keywords: Internet Of Things, Parameter Monitoring, AC Motor, Parameter Controlling Etc.

I.   INTRODUCTION

In today's manufacturing industry, mechanical and electromechanical systems are mostly driven by electric motors. Before the invention of AC short- circuit motors, DC motors were widely used in industrial applications. After the invention of AC shunt motors, because they have better performance than DC motors, they are often used in industrial automation. The main advantages of the

AC motor are its direct rotor design, which results in low cost, durability and low maintenance. A study of induction motor construction and operation shows that the main faults in short-circuit motors can be classified as follows:

(a) Electrical faults: faults caused by unbalanced supply voltage or current, single-phase, under- or over-currents. . Voltage, overload, etc.

(b) Mechanical faults: broken rotor rods, mass imbalance, air gap eccentricity, bearing faults, rotor winding faults, and stator winding faults.

Environmental Faults: Faults under this classification are caused by ambient temperature, ambient humidity, and mechanical vibration. Since the performance of a AC motor depends on the electrical, mechanical and environmental parameters of the motor mentioned above, AC shunt motor control methods are very sensitive to motor parameters. Therefore, it is necessary to check the parameters of the short-circuit motor to ensure uninterrupted operation and evaluate the pre-failure condition to avoid possible failure conditions.

As emerging technology has led to rapid development in modern wireless communication, the Internet of Things (IOT) has received much attention and is expected to benefit many applications. The recently introduced concept of the Internet of Things offers help to achieve industrial automation through remote control terminals. In IOT, each device or devices that make up a system can communicate with other devices or systems through a common platform. Thus, better communication with the "System- System" is achieved.

II.   LITERATURE SURVEY

Shyamala.D "IoT Platform for Condition Monitoring of Industrial Motors" [1], several things are efficiently linked together to result in condition monitoring and performance enhancement. Data availability for continuous equipment monitoring, receiving alerts and preventive maintenance. The engine is efficiently and

continuously monitored via web-based tracking.

Bhambulkar, A.V. ,2011;Ganorkar R. A. et al. ,2014 ,IoT-Based Traction Motor Drive Condition Monitoring in Electric Vehicles: Part Power Electronics and Drive Systems (PEDS), 12th IEEE International Conference, 2017, Dedicated[2]. In an electric vehicle, the operation of the Veto engine was monitored through a wireless Internet of Things (IoT) implementation. Development and testing of a prototype using the ESP8266 microcontroller module to determine engine health is presented.

Rahul Mishra et al.,2013;John, B., 2012 "Smart Shutdown and Recovery of IoT-Enabled Industrial Machinery". 2018 8th International Conference on Cloud Computing, Informatics and Technology (Confluence). IEEE[3], preventative maintenance of industrial motors requires continuous monitoring to detect degradation or motor failure. The recovery engine provides a backup engine that runs when the primary engine shuts down. This helps reduce possible losses during downtime. This improves reliability.

Shen, Mehmet and Basri Kul. "Wireless monitoring of IoT-based induction motors. » Electronic Science Conference (ET), 2017 XXVI International. IEEE, 2017, in this way the manufacturing process is not disturbed and necessary maintenance or replacement can be performed with minimal disruption. This study not only created a mathematical model, but also pulled statistics from this CMS-i operator to prepare a maintenance schedule for the engine.

Xue, Xin, V. Sundararajan and Wallace P. British "Application of wireless sensor networks to condition monitoring of three-phase induction motors". 2007 Electrical Insulation Conference and Exhibition of Electrical Engineering. IEEE 2007. The most commonly used method for fault detection in large short-circuit 3-phase motors is to measure the input current supplied to the motor and analyze the signal spectrum. This aspect allows companies to reduce downtime during machine repairs and ensure that productivity is not affected.

III.   OBJECTIVES

The main goal is to increase the reliability of the engine application by taking advantage of recent technological developments. This work ensures continuous monitoring and easy control of high power induction motors used in various industries. By ensuring system reliability, abnormal conditions can be easily identified and corrected. With almost 90% use of AC machines in the industry, there is a need to track financial data. Industrial productivity can be increased by pre-maintenance of induction machines. Proactive measures are used to protect against system failures and high power motor costs.

- Internet of Things (IoT) Based AC Motor Monitoring and Control for Safety and Economic Data in Industry.
- Start or stop an induction machine to avoid system faults using automatic and manual control methods.
- Monitor and control of motors used in electric vehicles (automating an electric car).
- Detects various parameters of an AC motor such as voltage, current, frequency, speed and temperature.

IV.   WORKING

To receive information from the mobile application if Block diagram has four sensors which measure the respective four parameters which are voltage, current, speed and temperature. with the help of a sensor that checks the parameters of the motor condition and provides the current state of the short-circuited motor to the Arduino Uno and from the Arduino Uno via wifi, the module provides information to the cloud, where the data is stored. , and the cloud can be used necessary.

If a fault occurs in the short-circuit motor, it must be automatically disconnected from the network. Whatever parameter is being monitored, it should be displayed one by one on the LCD screen. We can monitor temperature, current, voltage and speed of induction motor with LCD screen and IOT.

V.   HARDWARE & SOFTWARE

- Induction Motors
- Arduino UNO
- ESP8266 (WI-FI Module)
- Condition Monitoring Sensors
- Voltage Transformer
- Current Transformer

• Temperature Sensor
• Speed sensor

VI.   PROJECT DESCRIPTION
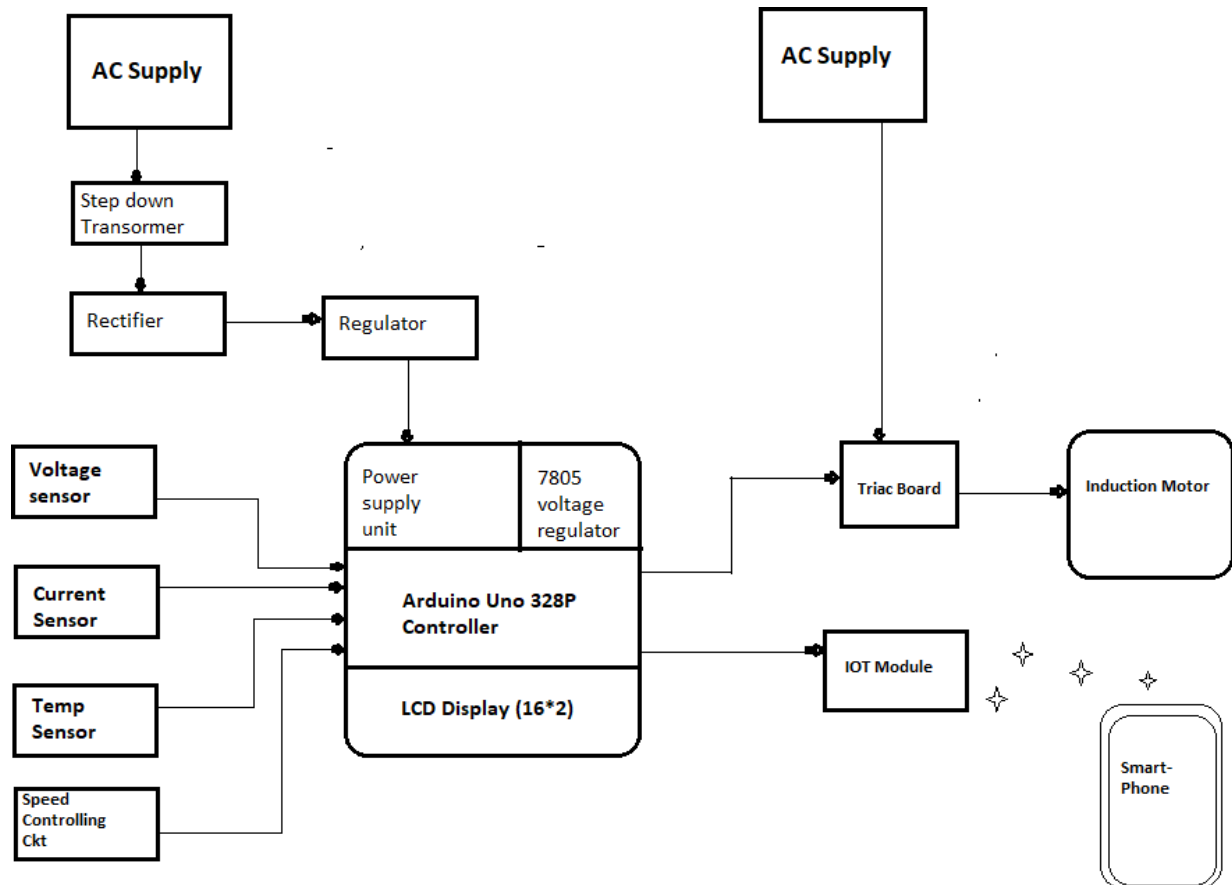

Fig.1. Block Diagram of system

VII.   PROJECT FLOW CHART

Speed controlling device

• Gate Driver Circuit.
• LCD Display
• Mobile Application

Software Specifications :
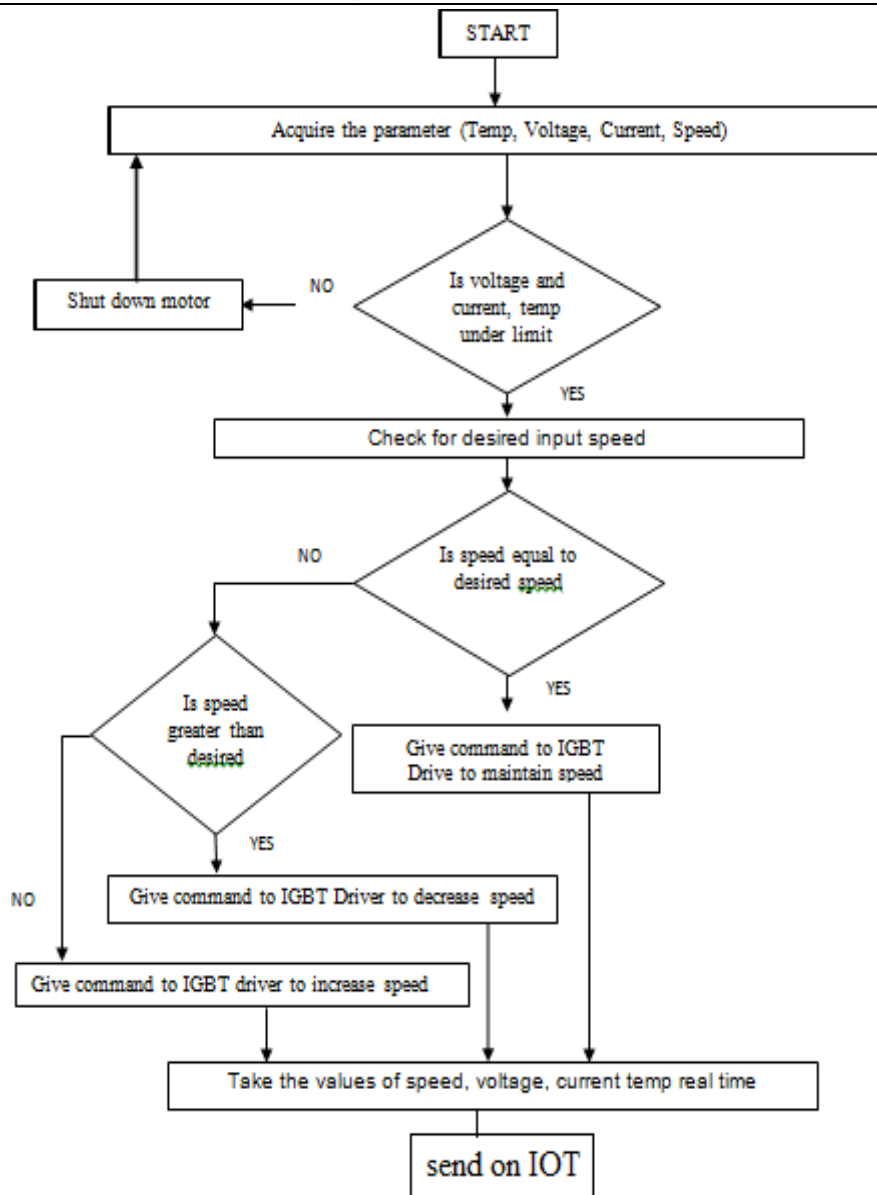
• Arduino Compiler
• MC Programming Language: C

Fig.2. Project Flow Chart

Application & Future Planning Application :-

-Used in Industrial Induction motor Control.

-Used in Electric vehicles applications.

-Used in Agriculture Motor application.

Future planning :-

· In the future lot of scope is there for IoTapplications.

· Worldwide wide all overuse the IoT applicationfor human life sophisticated.

· In 2025 millions of things connect to the cloud.

· A lot of research also done on IoT and it's moreuses for human life's easiest purpose.

VIII.   ADVANTAGES

• The system is wireless system , so there is nohazardous for human being.

• The system is cost effective.

• The system can be controlled by any one..

• The system is accurate as the system iscontrolled digitally.

IX.   CONCLUSION

In this study, an IoT-based short-circuit motor parameter monitoring system was achieved and successfully tested. The developed system is able to perform functions such as radio frequency motor rotation, stop, measurement, monitoring of most motor parameters such as temperature, speed. All these values can be transferred to the IoT platform, displayed in the user interface, presented graphically, stored for a long time. A comparison of the positive and negative aspects and its costs was made.

X.   REFERENCES

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