

Three phase motor controlling using concept of IoT

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Abstract

The induction motor has remained the most popular type of motor for industrial applications. The primary advantage of the induction motor is its straightforward rotor construction leading to low cost, ruggedness, and low-maintenance requirements. This paper presents a remote control system for an induction motor based on Internet of Things (IoT) for safe and economic data communication in industrial fields. The system also presents the Automatic and manual control methods to stop or start the induction machine to avoid system failures. To make the system fast and user friendly it provides an android application or through web. To make the system fast and user friendly it provides an android application. For this purpose, user can use android mobile phones which can use the Wi-Fi for switching and fault detection of the electrical devices/appliances

Keywords: Induction Motor, Internet of Things, wireless Wi-Fi module, android application, web.

I. INTRODUCTION

Three phase motor is part of many applications. These motors are widely used in industrial and agriculture area. Traditionally these are either controlled by user manually where protections are mostly not taken care or may be done using isolated unit. In industry, induction motors are used in hazardous area where human presence might be risky. In this project we are going to control three phase induction motor through web or android application. Here we are using NodeMCU which is development board for ESP 8266, which will create a server through which we can on or off the motor. In this project we will create the web GUI using web technology. Hence, we are controlling the three-phase motor using concept of IOT. To start and control the motor with the help of mobile application or internet protocol. The aim of this project is an approach for automated operation of three phase induction motor using application of IoT. Here we are dealing with the controlling of motor within the safe limits and operating it by using internet protocol. Hence, the system is designed such that motor can be operated from remote location where user gives Command/instructions, by android application via Wi-Fi to unit which automatically turns the motor ON/OFF. Motor protection and control unit by wireless media has a great significance and it will be widely used in industries. India is an agricultural country. The 85 % of people are engaged in farming. The economic system of India depends on agriculture.

II. SYSTEM WORKING

In this project we are going to control 3-phase induction motor through web or android application. Here we are using NodeMCU which is development board for ESP 8266, which will create a server through which we can on or off the motor. In this project we will create the web GUI using web technology. In this proposed system we are connecting our system to three phase motor with the help of Wi-Fi module which control the motor using the concept of IoT. The technologies which are used to to connect the motor to the Wi-Fi module are as follows

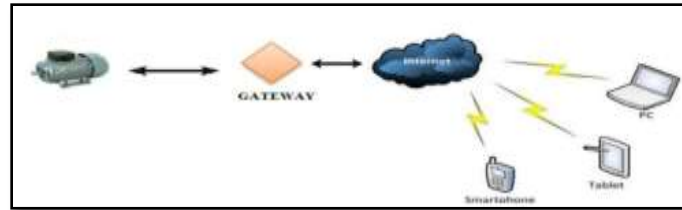


Fig.1 proposed system architecture.

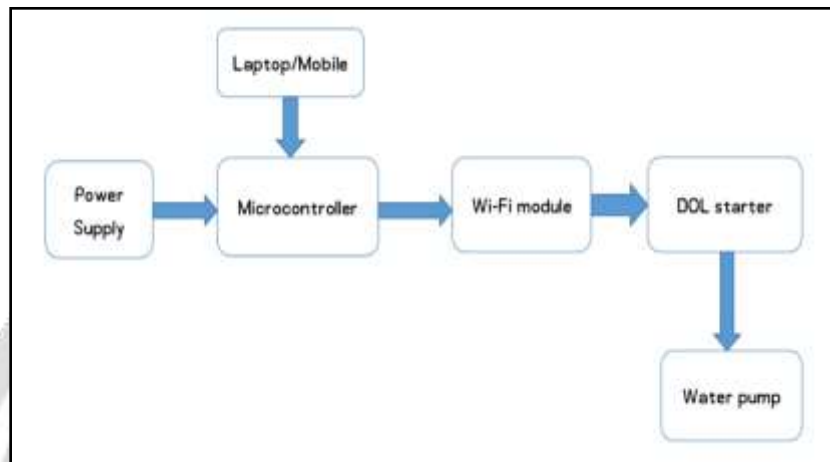


Fig.2 Block diagram of system.

III. HARDWARE AND SOFTWARE

a) *NodeMCU (3.3v)*

NodeMCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi system of chip from Expressive Systems and hardware based on ESP-12 module. It is a single board microcontroller.



Fig 3:- NodeMCU

Developer	ESP8266 open source community
Type	Single board microcontroller
Operating system	XTOS
CPU	ESP8266
Memory	128kBytes
Storage	4MBytes
Power	USB

Table 1 :- NodeMCU Specification

b) *Arduino UNO*

The Arduino is an open-source microcontroller board based on the ATmega328P microchip which is developed by arduino.cc. The board itself contains digital as well as analog input/output(I/O) pins which are used for interfacing with various devices and circuits. The board contains 14 digital pins, 6 analog pins and programming is done with Arduino IDE (Integrated Development Environment) via B type USB cable.



Fig 4:- Arduino UNO

Developer	Arduino
Manufacturer	Many manufacturer
Type	Single-board microcontroller
CPU	Microchip AVR (8 bit)
Memory	SRAM
Storage	Flash, EEPROM

Table 2:- Arduino UNO Specification

c) *ESP8266 (Wi-Fi-Cloud module)*

It is the low cost Wi-Fi microchip wifi full IP (Internet Protocol) stack and microcontroller capability It is a 32 bit microprocessor It is having 16 GPIO pins input.



Fig 5:- ESP8266 (Wi-Fi-Cloud module)

d) *Power Board*

The power board is used to supply the power to the ESP8266 Wi-Fi module as well as to the relay board. It takes 230 volt as an input power and converts it to 3.3 volt and 5 volt as per the requirement of our project. The power from power board the 5 volt supply is going to the relay board system and 3.3 volt is supplied to the NodeMCU.



Fig 6:- Power Board

e) *Relay module*

A relay is an electrically operated switch. The main use is controlling circuits by low power signal or several circuits must be controlling by one signal. The arduino relay module is designed for a wide range for micro controllers such as Arduino board Input:- Vcc connected to the 5V current on the Arduino board, GND, connected to ground and there are two digital inputs 1 and 2. Output:- The two channel relay module is consider as the series switches: 2 normally open, 2 normally closed and 2 common pins.

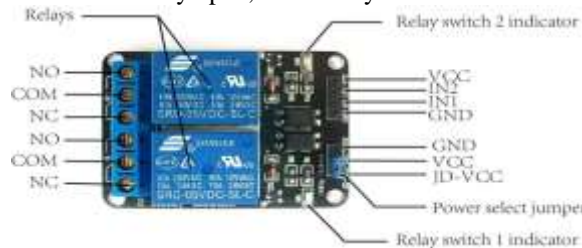


Fig 7:- Relay module

f) *Arduino Software*

Arduino is an open-source hardware and software company, project and user community that designs and manufactures single-board microcontroller's kits for building digital and interactive objects. The programming language in Arduino is C and C++ which is easy to understand and for programming it helps us to change the program very easily. This is an Arduino software which is required for the programming of NodeMCU and ESP8266. First we write the code in Arduino's software via its library. In this programming software we are connecting the Wi-Fi of mobile to the NodeMCU and ESP8266 Wi-Fi module through the SSID and the password.

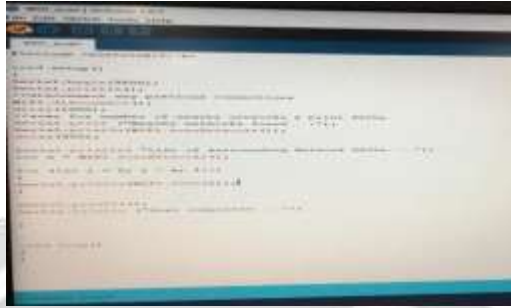


Fig 8:- Arduino Software

IV. CONCLUSION

Thus we developed the system that enhances motor control through internet technology using the ESP8266 module. The system ensures the smooth and effective ON-OFF operation of the motor. It also provides automated motor control, reducing manual labor, time consumption, and increasing operational speed. The use of mobile phones has become more common among people, and hence using our system would be very effective for them.

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