International Conference on Science, Technology and Management (ICSTM-2020)
Guru Gobind Singh Polytechnic, Nashik, Maharashtra (India)
15th - 16th February 2020 www.conferenceworld.in ISBN : 978-81-944855-1-3

GSM AND IOT UTILISED ROTATING OF 3 PHASE INDUCTION MOTOR

Ajay Achari[1], Chetan Chahakar[2], Pranav Shelke[3], Prof. Sanket Wankhede[4]

[1,2,3]Diploma Students, Department of Electrical Engineering

[4]Professor, Department of Electrical Engineering

Department of Electrical Engineering

Guru Gobind Singh Polytechnic,Nashik, India

Abstract –This paper deals with the control of 3 Phase Induction Motor that is away from it's controlling point. For the purpose of this the personnel can use any type of mobile phone i.e. whether it may be an iPhone or an android or a windows. Using IoT,can switch the speed of the motor and using GSM, can turn it on and off. This is usedfor agricultural, industrial, domestic, commercial applications. The circuit diagram consist of GSM module and Wi-Fi modules are connected to microcontroller. At the load side theloadshouldbe3-phase.Inthispaper, the three phase induction motor is controlled by using microcontroller (Arduino UNO). In this proposed system, we are monitoring and controlling the speed of induction motor. This system consists of microcontroller, induction motor, WI-FI module and a GSM module. The main manifest of this paper is to maintain the speed of the three phase induction motor which can be controlled easily. It reduces the harmonic content of motor current and increases the motor efficiency. The speed control of the motor can be achieved by varying the input parameter of the motor such as current,voltage and frequency.

Key words: Arduino, IoT, Three Phase Induction Motor, GSM

I INTRODUCTION

The internet of things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.IOT has evolved from the convergence of wireless technologies and the Internet. The internet of things is also called as Internet of objects. Online monitoring system for continuous casting equipment is established based on IOT sensing technology and communication technology. The parameters such as frequency, speed and torque of induction motor were monitored.

The various control methods are: Field control method, Armature control method, Ward-Leonard method. The advantages of the IOT and GSM are highly automated, improvesefficiency, reduces the manual work, easy to access and easy to shut down at the time of fault.

The GSM commonly known as Global System for Mobile communication digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot.

 ISBN : 978-81-944855-1-3

II EXISTINGSYSTEM

TheExistingsystemusesrelay, Bluetooth and a lot of relay driversforsharingthedatabetween main control unit and sub units.

A. SystemHardware

1) PIC 16F877A - 8bitmicrocontroller.
2) Bluetooth LE - RF transceiver.
3) ESP8266 - Wi-FiTransceiver.
4) Relay Drivers.
5) IR Based Speed sensor.
6) Current transformer and Voltagetransformer.
7) LCD Displayunit.
8) Pump and Flow Sensors.

B. Bluetooth Low Energy(BTLE)

Bluetooth Low Energy (BTLE) is an emerging wireless technology developed by the Bluetooth Special Interest Group (SIG)for short-range communication. In contrast with previous Bluetooth flavors, BLE has been designed as alow- power solution for control and monitoringapplications.

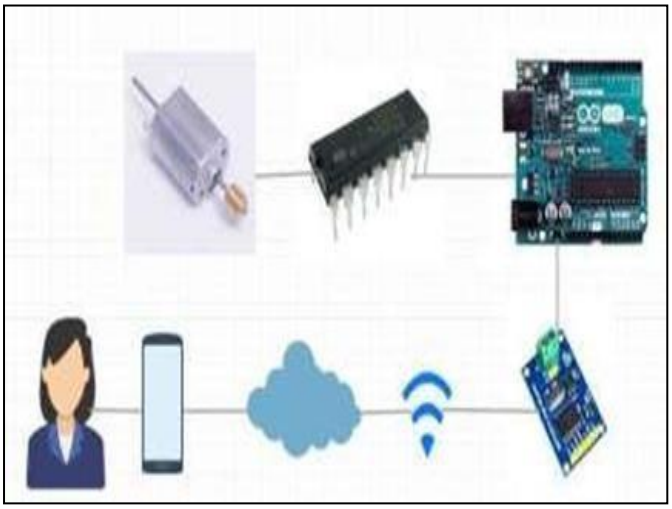
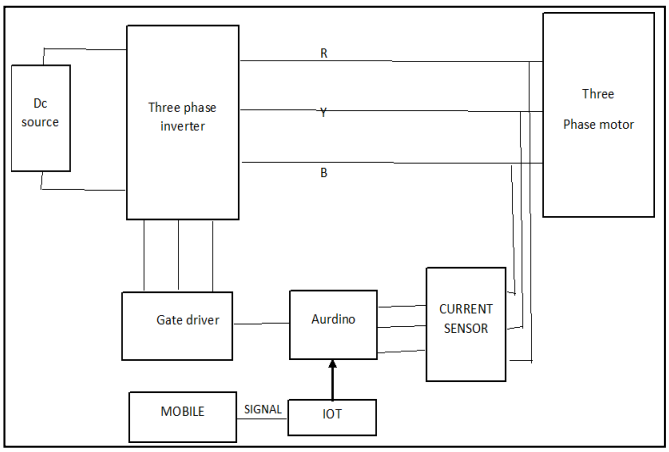


Fig. 1. Human Machine Interface



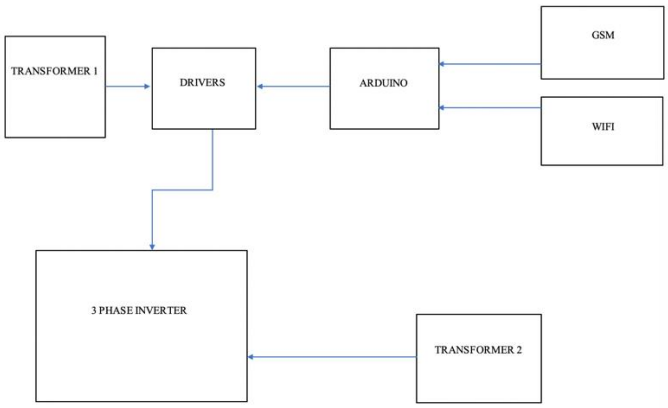
Existing System

The Advantages of BTLE are low power consumption, low cost and BTLE uses a frequency hopping spread spectrum that is inherently more robust to jammingin RFenvironment.

The disadvantages of BTLE are Covers low area and Wide range control is notpossible.

III PROPOSEDSYSTEM

The proposed system consists ofArduino UNO microcontroller, 3 phase Induction motor, Wi-Fi module and a GSM module. This system makes it is easy to control the speed of themotorusingwebpagethroughWi-Fi. Simultaneously, it is also possible to turn the motor on and off, through GSM service, at the same time. The PWM method is not used here to control the induction motor else we use a transformer to control the voltage and hence the speed of the motor.



Block Diagram of the Proposed System

A. Microcontroller

A microcontroller (MCU) is a small computer on a single metal – oxide - semiconductor (MOS) integrated circuit chip. In modern terminology, it is similar to, but less sophisticated than, a system on a chip (SoC); anSoC

may include a microcontroller as one of its components. A microcontroller contains one or more CPUs along withmemory and programmable input/output peripherals. The Arduino microcontroller can be classified into various types based on the size and number of pins in it. They are NANO microcontroller, UNO microcontroller and MEGA microcontroller.

The Arduino UNO microcontroller is loaded with a program written onit's on arduino software which is based on C programming.

B. Smartphone

A smartphone is a cell phone that allows you to do more than make phone calls and send text messages. Smartphones can browse the Internet and run software programs like a computer. Smartphones use a touch screen to allow users to interact with them.

C. *Motor Driver*

This IC is controlled using the arduino microcontroller and it serves as the final step for the proposed system. Using the motor driver IC, the motor can be made to operate in all the four quadrants. Output diodes are also included in the IC for protection against any back EMF produced by themotor.

D. Wi-Fi Module

The ESP8266 is a low-cost Wi-Fimicrochip with full TCP/IP stack and microcontroller. Using this chip,we connect the Arduino UNO microcontroller with the internet.

E. GSM Module

A GSM module or a GPRS module is a chip or circuit that will be used to establish communication between a mobile device or a computing machine and a GSM or GPRS system.

F. 3 Phase Inverter

The proposed design consists of 6 N channel MOSFETs that are switched in a particular order as described in a further section such that at any time 3 switches are closed. This creates a path consisting of 2 load phases in parallel with one phase in series to it at any time. Thus, the voltage across any phase passes through the following levels. It converts the DC input to AC output, which works as input for the 3 Phase Induction Motor.

G. Simulation and Results

The simulation of the system is very simple. The inverter is designed with the IGBT or MOSFET elements. The DC supply is given to the inverter input and the inverted AC supply (three phase) is obtained. The PWM pulse is obtained from the pulse generator and given to the gate terminal of the inverter element. The inverted output is passed to the filter circuit. The filter circuit consist of inductor and capacitor. It is used to reduce the harmonic level which passed to the load.

The Fig. 2 represents the output waveforms of voltages at various voltage level and frequencies of different countries. The Fig. 3 and Fig. 4 are the simulation codes of Node MCU and Arduino UNO and GSM.

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IV SIMULATION

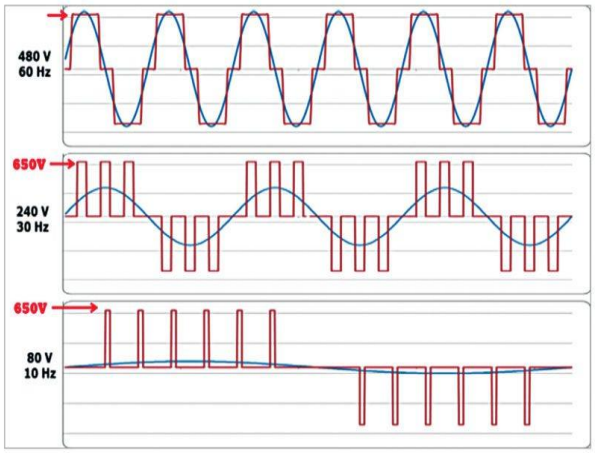

Fig. 2.Voltage Output Waveforms

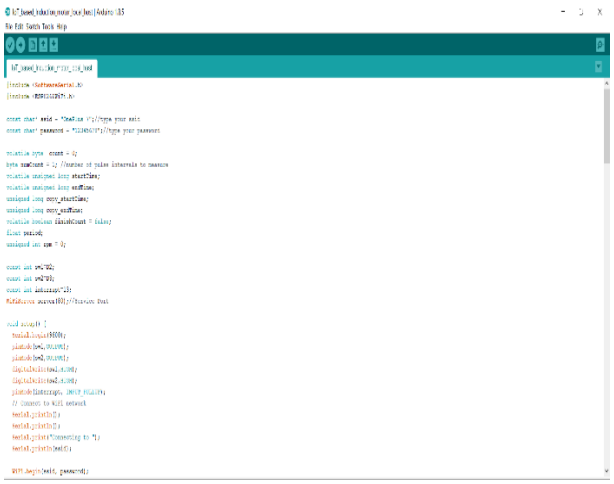

Fig. 3.Simulation of Node MCU

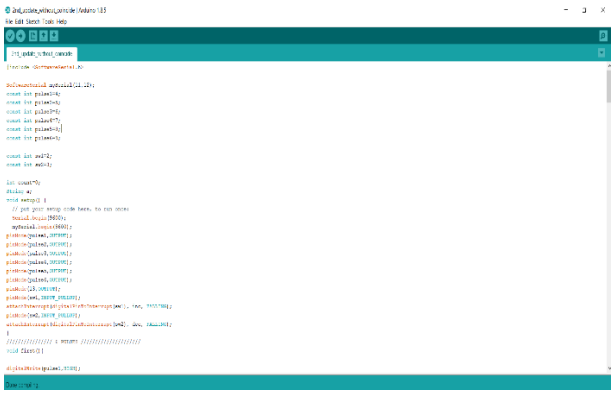

Fig. 4.Simulation of Arduino UNO and GSM

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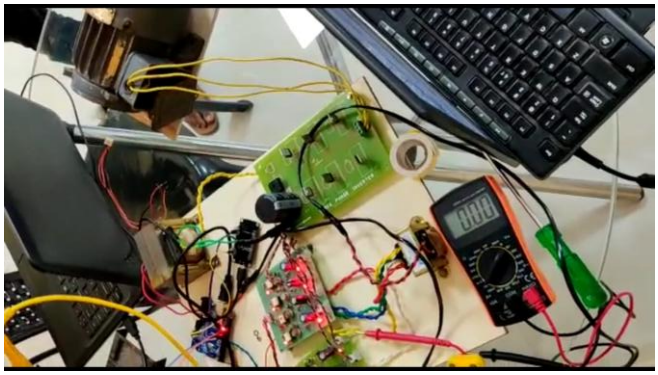
V HARDWARE DIAGRAM



VI RESULTS

The Fig. 5 and Fig. 6 represents the output from the software Arduino Serial Monitor and the RPM corresponding to the numbers in the output are given in the second figure. After running the project, along with the 3 Phase Induction Motor, we are getting the following results regarding the speed of the it:

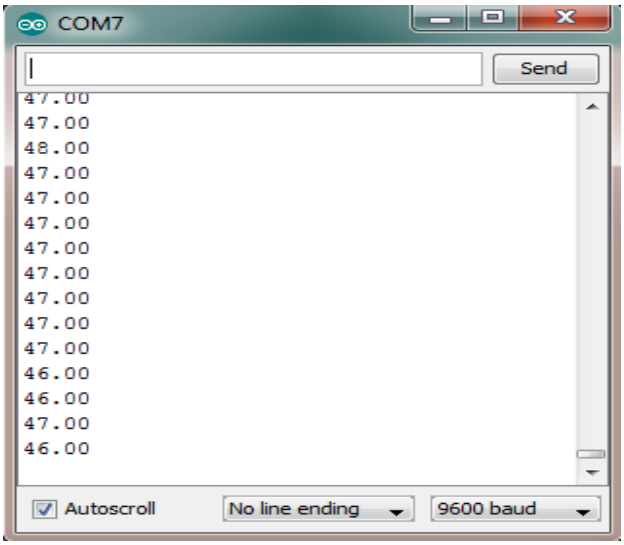


Fig. 5.Output using Arduino Serial Monitor

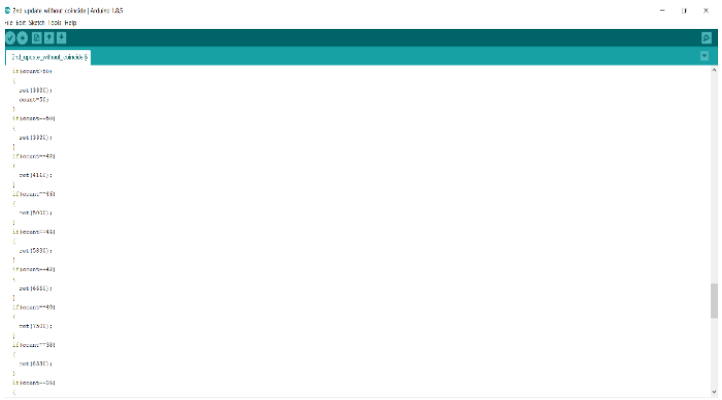


Fig. 6.Output Numbers corresponding to the RPM of the motor

VII CONCLUSION

In this project we have focused on proper and total control over a 3 Phase Induction Motor using GSM and WIFI with the help of IOT. Here we have used components such as Step-down Transformers, Drivers, Arduino UNO, NODEMCU, GSM module and 3phase inverter. We have programmed the control of the components using Arduino programming (C). The Arduino, WIFI and GSM modules are programmed to get the desired output using SMS service and using webpage service. All the components are working in harmony with each other. With the use of this project we can control the 3 Phase Induction Motor from a far distance. We have used very less components to accomplish the final result as compared to the pre-existing models.

VII FUTURE SCOPE

Right now, with the help of our project we can only control a single 3 phase induction motor. But in near future we will be able to control many sets of motors at a single time and will be able to control many other types of motors also. This project will be very much helpful in big and small-scale electrical industries as it will allow the user to control many different motors with the help of a single smart phone.

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ISBN : 978-81-944855-1-3