Speed Monitoring and Protection of single phase Induction motor By Using Internet of Thing

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ABSTRACT

We know that there are various inventions as well as development take place in the field of Science and technology in past few years as result of this there is rapid increase in industries and factories across the world .The invention in technology is very beneficial for human being because it reduce the work as well as human effort along with benefit invention in such as automation prove to be very revolution development for industries.

Automation plays important role in industrial because one can easily control all machineries and equipment used in industry from one place, mainly in industries various machines are used whose controlling is very important.so in our project , we going to control motor speed by using internet of thing technology . in this proposed we are going monitoring , controlling speed of single phase induction motor and protect machine from fault by using mobile or personal computer.

Keywords :- *Wi - Fi module, Transformer , microcontroller, mobile or pc, induction motor*.

I. INTRODUCTION

In addition, the availability of fast-processing, stable and sensitive products provided particular benefits in industrial automation. As a result of the developments in Communication technologies, systems are no longer monitored and controlled by personnel using classic methods, but automatically by computer controlled or remote-controlled devices. Industrial environmental conditions have been upgrading day by day with this newly introduced automatic techniques as a result of getting rid of the conventional procedures of manufacturing increasing huge workloads. The next generation industries will be Technological developments have enabled to be taken classic systems place by Automatic and advanced systems definitely more advanced and automatic as compared with existing ones. This brings on a new terminology of "Smart Industries" in this new era of Monitoring as well as controlling of various Industrial applications. As an emerging technology brought about rapid advances in modern wireless telecommunication, Internet of Things (IOT) has attracted a lot of attention and is expected to bring benefits to numerous applications. The newly introduced concept of "Internet of Things" (IOT) is providing a helping hand to achieve the Industrial automation through remote access. In IOT each device or devices constituting a system will be able to communicate with the other devices or system in the same premises over a common platform. Hence this leads to exchange of relevant data, statistics, logs and various other parameters information among various devices to improve their performance, which will help industries to have better productivity, management and increased throughput.

II. PROPOSED PLANE

in our proposed system we are going use of the following components single phased induction motor , transformer 12V , IC7805, charge control circuit , Wi-Fi module , relay 12V DC, microcontroller AT89S52, capacitor 1000/35 microfarad , relay driver IC. Here in our project we make us of transformer this is because the output of transformer is connected to the microcontroller with the help of rectifier. As result of this micro-controller get 12V DC as input, then as soon as the command or programming is given to the micro-controller it control the operation of induction motor according to the given command.

A. Transformer and rectifire

We have use single phase step down transformer in our project which is going to step down 230 volts the output of transformer is then to the rectifier because we required DC voltage at output for the operation of micro-controller.

B. Voltage regulator

The output of rectifier in pulsating DC hence pure DC at out filter is and after that the pure voltage fed to the voltage regulator so that we get constant pure DC voltage which is then given as an input to the microcontroller.

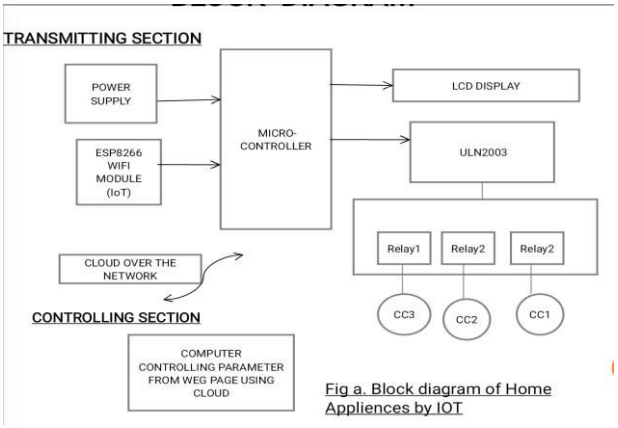


Fig.1. Block diagram

III. HARDWARE IMPLEMENTAION

A. Microcontroller AT89S52

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density non-volatile memory technology and is compatible with the industry stan

dard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

B. NodeMCU ESP8266

ESP8266EX delivers highly integrated Wi-Fi solution to meet users' continuous demands for efficient power usage, compact design and reliable performance in the Internet of Things industry. With the complete and self-contained Wi-Fi networking capabilities, ESP8266EX can perform either as a standalone application or as the slave to a host MCU. When ESP8266EX hosts the application, it promptly boots up from the flash. The integrated high speed cache helps to increase pthe system performance and optimize the system memory. Also, ESP8266EX can be applied to any microcontroller design as a Wi-Fi adaptor through SPI / SDIO or I2C / UART interfaces. ESP8266EX integrates antenna switches, power amplifier, low noise receive amplifier, filters and power management modules. The compact design minimizes the PCB size and requires minimal external circuitries. Besides the Wi-Fi functionalities, ESP8266EX also integrates an enhanced version of Tensilica's L106 Diamond series 32-bit processor and on-chip SRAM. It can be interfaced with external sensors and other devices through the GPIOs.

C. Single Phase Induction Motor

When we apply a single phase AC supply to the stator winding of single phase induction motor, the alternating current starts flowing through the stator or main winding. This alternating current produces an alternating flux called main flux. This main flux also links with the rotor conductors and hence cut the rotor conductors.

According to the Faraday's law of Electromagnetic induction, EMF gets induced in the rotor. As the rotor circuit is closed one so, the current starts flowing in the rotor. This current is called the rotor current. This rotor current produces its flux called rotor flux. Since this flux is produced due to the induction principle so, the motor working on this principle got its name as an induction motor. Now there are two fluxes one is main flux, and another is called rotor flux. These two fluxes produce the desired torque which is required by the motor to rotate.

- SPEED CONTROL OF INDUCTION MOTOR
  - Control From Rotor Side
    1. By inserting resistance in rotor circuit
    2. By various ways of cascade connection
    3. By injecting EMFs in the rotor circuit.
  - Control From Stator Side:
    1. By changing the supply frequency
    2. By changing number of stator poles
    3. By changing the supply voltage

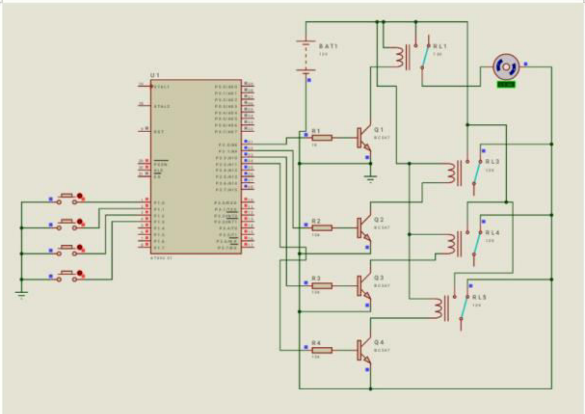
D. RELAY

A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism mechanically, but other operating principles are also used. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal.

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and most have double throw (changeover) switch contact.

The coil of a relay passes a relatively large current, typically 30mA for a 12V relay, but it can be as much as 100mA for relays designed to operate from lower voltages. Most ICs (chips) cannot provide this current and a transistor is usually used to amplify the small IC current to the larger value required for the relay coil. The maximum output current for the popular 555 timer IC is 200mA so these devices can supply relay coils directly without amplification.

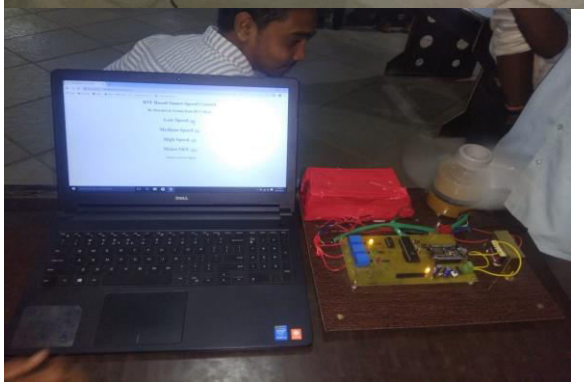
➢ SIMULATION RESULT



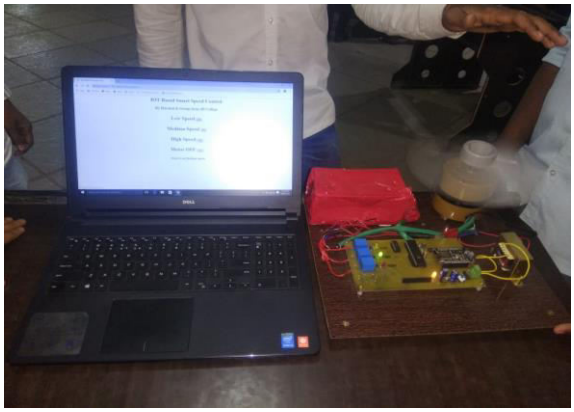
We have perform simulation on proteous software and the result of simulation is as follow.

- When 1st switch is close motor operate at slow speed and it is shown with the help of yellow LED.
- When 2nd switch is close motor operate at moderate speed it is shown with the help of green LED.
- When 3rd switch is close motor operate at high speed and it is shown with the help of LED.
- When 4th switch are used to motor stop.

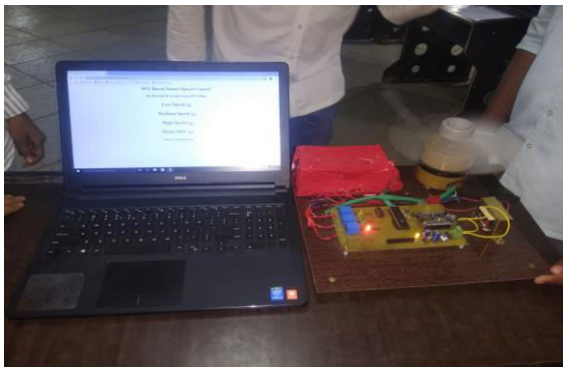
➢ HARDWARE RESULT



- A slow speed shown with the help of Yellow LED.



- A moderate speed shown with the help of Green LED.



- A high speed shown with the help of Red LED.

➢ CONCLUSION

This paper has presented the design and implementation of internet of things for monitoring and controlling of various application and parameters in industries using wireless communication technique. the key idea of the proposed work is to provide flexible and long distance connectivity between industrial environment and user. The future work will focused on improvement of above proposed work and adding features to make a reliable smart industrial monitoring and controlling system.

REFERENCES

[1] B. Sai Sindura , B. N . Kartheek, "Speed Control Of Induction Motor Using Cycloconverter", International Journal Of Engineering Trends And Technology (Ijett) 2013, Volume 4 Issue 4, Pp. 776-780

[2] Sumit Narwade, Prasad Kulkarni, C Y Patil "Fault Detection Of Induction Motor Using Current And Vibration Monitoring", International Journal Of Advanced Computer Research, 2013 Volume-3 Number-4 Issue-13,Pp. 272–279.

[3] "The 8051 Microcontroller and Embedded systems" by Muhammad Ali Mazidi and Janice Gillispie Mazidi , Pearson Education.

[4] https://openhomeautomation.net/control-relay-anywhere-esp8266/

[5] https://dashboard.arest.io/

[6] www.arduino.com

[7] International journal of research in advent technology (E- 2331-9637)

[8] "Real-Time Monitoring and Control of the Parameters of an Induction Motor", Department Of Electrical and Electronics Engineering, Technology of Faculty, Gazi UniversityTeknikokullar Ankara, Turkey

[9] www.wikipedia.org