A STUDY ON INDUCTION MOTOR: EFFICIENT OPERATION OF INDUCTION MOTOR USING IOT [SPEED CONTROL]

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Abstract :- The Internet of Things (IoT) nowadays is crucial to how we live our daily lives. The hardware for tracking ongoing parameters and the induction motor's speed regulation are the topics of this paper's thesis. Voltage, current, speed, and temperature sensors are among the sensors used to measure the parameters that are being watched. furthermore by using PWM methods to manage the induction motor's speed component. By keeping an eye on the induction motor's settings, it should be possible to maintain the dependability of the device before any problems arise and avoid production delays. Utilising IoT technology, an induction motor should be automatically removed from the supply if any kind of malfunction occurs. Analyse the outcomes graphically as well. Proteus software is used to simulate parameter monitoring and induction motor speed control.

Index Terms - Induction Motor, Internet Of Thing, NODE MCU ESP 32 SERIES , Optocoupler & Optoisolator, Cloud, Speed Control Technology.

I. INTRODUCTION :- Induction motors are currently the most prevalent motor type across all industries. the brilliant scientist Nikola Tesla's development of the induction motor. The induction motor is responsible for almost 50% of the world's electricity use. 90% of industries utilise induction motors because they have the essential properties such being naturally "self-starting" motors, not requiring permanent magnets, brushes, commutator rings, or position sensors. Induction motors are also more affordable than other types of motors, operate more simply and robustly, retain a good power factor, require less maintenance, are extremely efficient, compact, and dependable. The key benefit of an induction motor is that its speed can be readily controlled due to its strong speed regulation and sustained overload. Due to all of these benefits, induction motors are commonly employed in a wide range of applications, including those in industry, residential and agricultural motors, electric trains, electric vehicles, cranes, and lifts. There are many different forms of faults in induction motors, and they are categorised into three crucial categories, including:

1. Electrical flaws include, among others, single phasing faults, reverse phase sequencing faults, oversupply voltages, overload faults, earth faults, etc.
2. Mechanical Faults: A rotor broken bar fault, a stator and rotor winding defect, a bearing fault, etc. are examples of mechanical faults that frequently occur.
3. Environment Faults: An induction motor's vibration is a typical environment defect. A number of factors, including moisture, temperature, and others, can impact an induction motor's performance.

II. BLOCK DIADRAM OF THE SYSTEM.

In this block diagram, there is a node MCU that compares the input parameter and sends a further signal to the motor driver circuit. The Node MCU is also a WiFi device that helps connect to the internet. THEN DATA IS STORED IN THE CLOUD, WHICH IS RECIVED FROM THE NODE MCU. WHEN THE USER GIVES COMMAND FROM THE APPLICATION, THE MOTOR CHANGES SPEED AUTOMATICALLY. THE REAL TIME MOTORING WILL BE DISPLAYED ON THE USER INTERFACE ON THE APPLICATION.

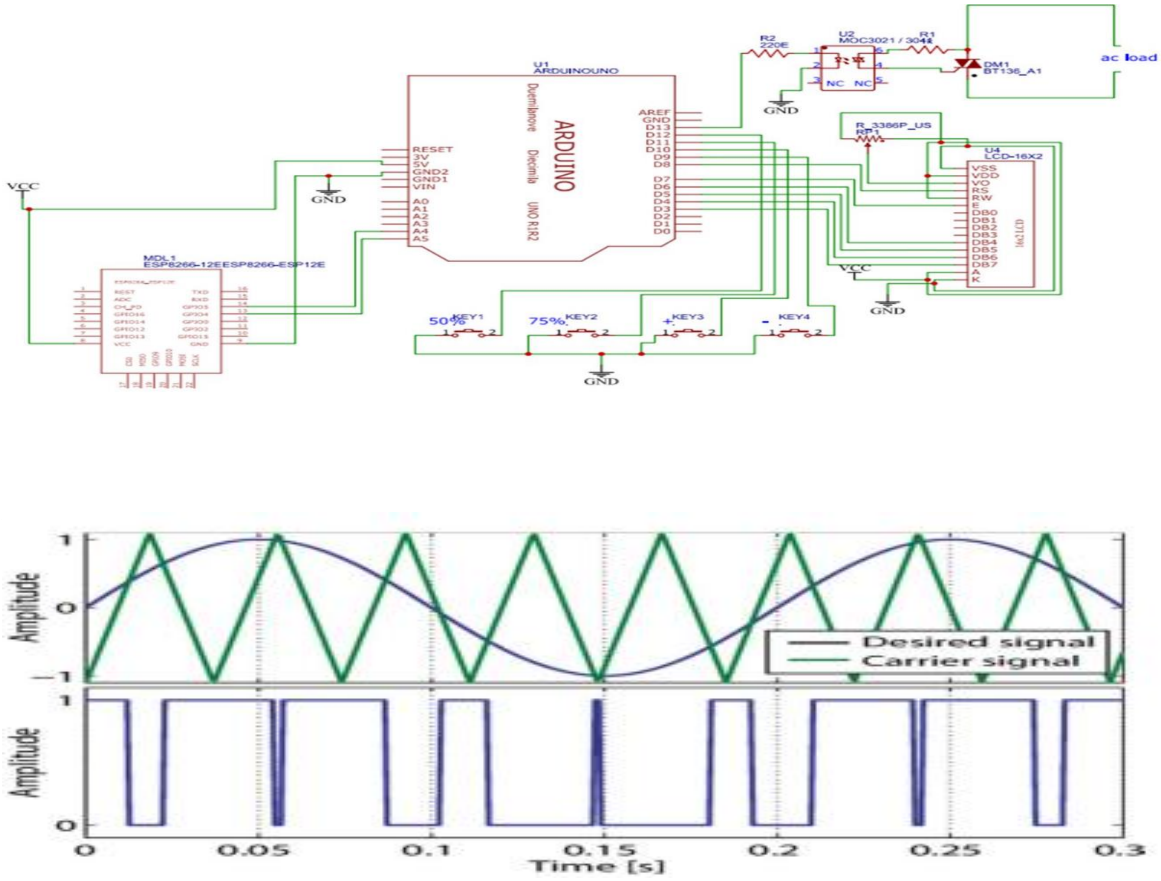


Fig. III PWM Speed Control Technique

Here, the NODE MCU needs a 5 volt direct current source to function, thus a step-down transformer is used to change 430 volts into 5 volts, together with a rectifier and regulator. The PWM method for adjusting the firing angle of switches is illustrated in the above picture. Voltage may be readily changed from voltage speed by modifying the on-off duration of the switch.

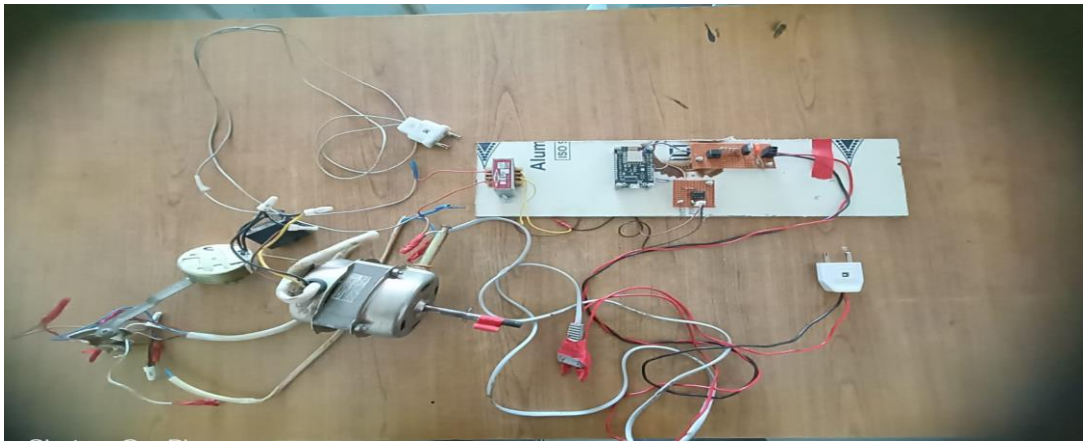
IV. HARDWARE REQUIREMENT

Basically, the following elements are needed for this suggested system:

1. INDUCTION MOTOR
2. NODE MCU
3. TRANSFORMER
4. PCB BOARD TERMINAL
5. RESISTORS
6. CAPACITORS
7. CONNECTING WIRES
8. MOC 3020
9. 4N25
10. DOT MATRIX PCB
11. THINGSPEAK

Receiving control commands from an IoT application, processing them with the Node MCU, producing control signals, isolating the control circuit from the power circuit using optocouplers and optoisolators, and adjusting the motor's speed through a motor control circuit are all parts of how the speed control of an induction motor works using IoT, the Node MCU, and these components. This configuration makes it possible to monitor, operate, and receive input from the motor remotely, which improves its functionality. ThingSpeak then stores this data on its cloud platform, making it accessible to users via a web interface or mobile application. Users can view real-time and historical data on the motor's performance, analyze trends, and make informed decisions based on the data.

V.EXPERIMENTAL SETUP



VI. CONCLUSION

With the use of THIS CIRCUIT and a Wi-Fi module, this article illustrates the Internet of Things-based condition for speed control of an induction motor. Use the PWM approach to also regulate the speed of an induction motor. An induction motor may be protected and operated safely to a significant extent. Also, the induction motor can be easily and accurately controlled thanks to the use of IOT.

VII. ACKNOWLEDGEMENT

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