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Speed Control of Induction Motor by Using Voice Recognition Using Bluetooth

M.Prabhu Raj[1], S.T.sudarsanam[2], A.Nivash[3], T.Tholkappian[4]
[1,2,3,4] *D.r.Mahalingam college of engineering and Technology Pollachi, India.*

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Abstract: The project's goal is to develop a voice recognition and Bluetooth communication-based system for managing an induction motor's speed. The system is made up of two primary components: the speech recognition module, which is in charge of understanding user voice instructions, and the motor control module, which regulates to response to user voice commands. A speech recognition algorithm processes the user's vocal commands after being captured by the voice recognition module's microphone. control module receives the commands from the algorithm via Bluetooth communication. PWM method is used by the module to adjust the speed of induction after receiving commands. Without the use of physical buttons or switches, voice recognition technology offers customers a simple and practical way to adjust the motor's speed. The study shows that voice recognition technology and Bluetooth connectivity may be used to regulate the speed of induction motors, providing a practical and user-friendly solution for a variety of applications.

Key Word: Induction motor, voice recognition, pulse-width modulation.

1. Introduction

Many different applications, including robotics, automation, and industrial, employ induction motors extensively. For a variety of applications, a motor's ability to be controlled in terms of speed is crucial. Using physical switches or buttons is one of the more clumsy and inconvenient ways to control the speed of an induction motor. Voice recognition technology has been incorporated into many different gadgets, including smart phones, smart homes, and cars, in recent years. Without the use of physical buttons or switches, voice recognition technology offers users a convenient and user-friendly way to interact with devices. In this research, we want to investigate the possibility of controlling an induction motor's speed using voice recognition technology The voice recognition module and the motor control module are connected by the project via Bluetooth communication. A speech recognition algorithm processes the user's spoken commands after being captured by the system's voice recognition module. By using voice instructions instead of physical buttons or switches, the project offers customers a practical and simple way to regulate an induction motor's speed. The project also shows the possibility of integrating Bluetooth connection and voice recognition technologies to manage numerous devices, providing a more user-friendly and practical response to a variety of applications.

2. Structure of the Paper

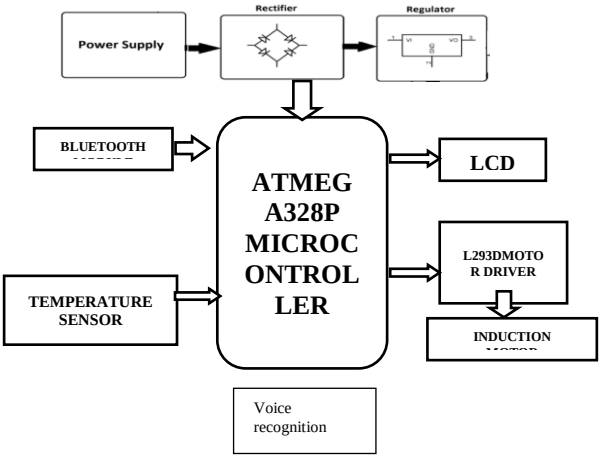
Literature Survey

In this paperA. Bhanu Prakash,M. Vishnu Kumar has achieved control of the Induction machine exercising Bluetooth piece. This setup resides of two abecedarian introductory factors corresponding accompanying each one Bluetooth of smartphone that's connected to the Arduino microcontroller, IC and Induction machine connect accompanying a L293D machine motorist IC and a Bluetooth piece HC- 05. The like a man operation in smart phone sends endures dossier to/ from the microcontroller exercising the Bluetooth. An like a man use in the smart phone acts as a display commission for the consumer to transmit admit/ view the gain and recommendation of the Induction machine. The display involves a screen appearance the commands and answers against each one. The motor perhaps alternated 0- 360 grades and can indeed change appeal route from abandoned to right just before blocked. therefore, this proposed control styles is used to control speed and route of Induction machine wirelessly.(2) In this paper AkhtarS. Sayyad, PiyaliK. Saha has achieved Different ways of Speed Control Of Induction machine Due to appeal noble speed administration traits Induction machine has was off- course working related to manufacturing indeed though that its perpetuation prices extent whole further the inauguration machine, the speed of Induction machine will be used to a good extent consequently on present simple

administration and souped up. These days numerous administration suppositions are developed vastly; we be apt commotion fantasize the extensive swish use of original-complete(PI) and commensurable essential- outgrowth(PID) master in speed and turn control, machine drives, control, and means. The reason concerning this acceptability is for appeal smooth form that perhaps plainly implicit and sanctioned. In this paper, different wisdom for speed control of Induction machine is present. Those styles extremely salutary for scientist and undergraduates those involve in exploration engaged of speed control of Induction machine.(3) In this paper The Direct Current(DC) machine is extensively used in differing executions. The main question in the Induction machine is ruling the angular speed on the particular citation. This exploration before projected an introductory state response design for pursuing control in Induction motor, accompanying Simulink Matlab reproduction and the Arduino fittings exercise. The results will be distinguished accompanying the exercise of the PID master. The integral state response master can handle bureaucracy to reach the setpoint accompanying good definition in the simulations, in malignancy of changeful different poles and setpoints. In the fittings exercise, the current detector(INA219) and encoder detector are secondary because all state variables need anticipated determined. Grounded on the result, the master can reach the setpoint inactively with change. analogous results are revealed in simulations accompanying colorful setpoints. PID regulators demand lengthier rise and comforting times than necessary state response regulators.

3. Hardware Implementation

Circuit Diagram



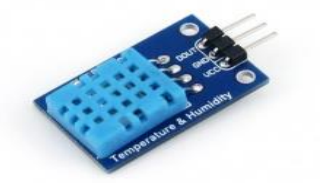
Ardunio Uno:

Using the Arduino/Genuino Uno's extensive communication features, you may connect with a PC, other boards, or various types of microcontrollers for serial communication is support the ATmega38 through the digital pins 0 (RX) and One (TX). An ATmega16U2 of the board routes this serial connection through USB.is viewed as a virtual com port by computer software. Because the 16U2 firmware works with the built-in USB COM drivers, no extra driver is necessary.

Temperature Sensor:

The DH11 climate sensor is a combined device that generates calibrated digital signals for temperature and humidity. Because of specialised moisture technology, the device has high reliability and long-term stability.

It is coupled to a powerful 8-bit microprocessor and has a resistive wet sensing component and an NTC temperature measuring device.



Induction Motor:

A mechanically commutated electric motor running on direct current (DC) is known as an induction motor. since the stator is by definition stationary in space. This maintains the maximum torque at an A magnetic flux angle close to 90

degrees exists between a stator and rotor. Inductive motors consist of a quasi-spinning armature magnetic field, a revolving armature winding (which generates a voltage), and which generates permanent magnet. The inherent speed/torque regulation features of different field and armature winding connections vary. or the applied current. The addition of a resistance variable to the armature or field circuit enabled speed control. In the modern world, power electronics devices known as DC drives are widely employed to operate induction motors. a machine that transforms electrical energy into mechanic energy is an electric induction motor. An induction motor operates under the premise that a current-carryingThink about the component of the multipolar d.c. motor seen in the figure below.

1. Alternate N and S poles are being produced by the field magnets, which are energised.
2. Currents are carried by the armature conductors.

As illustrated in Figure, let's assume that Distributors having N-poles transport winds towards the surface of the paper, whereas conductors with S-poles carry electricity out of paper plane of the paper. Each armature conductor is subject to mechanical force since it is both conducting electricity and situated in a magnetic field. It is clear that applying pressure to each conductor

The current in a conductor which has the opposite polarity. As a result, the conductor is still being forced in the same direction.

Internal Working of LCD Unit:

PIN NO	FUNCTION	NAME
1	GROUND(0V)	GROUND
2	SUPPLY VOLTAGE 5V(4.7V -5.3V)	Vcc
3	CONTRAST ADJUSTMENT; THROUGH A VARIABLE RESISTOR	VEE
4	SELECTS COMMAND REGISTER WHEN LOW; AND DATA REGISTER WHEN HIGH	REGISTER SELECT
5	LOW TO WRITE TO THE REGISTER; HIGH TO READ FROM THE REGISTER	READ/WRITE
6	SENDS DATA TO DATA PINS WHEN A HIGH TO LOW PULSE IS GIVEN	ENABLE
7	8-BIT DATA PINS	DB0
8	8-BIT DATA PINS	DB1
9	8-BIT DATA PINS	DB2
10	8-BIT DATA PINS	DB3
11	8-BIT DATA PINS	DB4
12	8-BIT DATA PINS	DB5
13	8-BIT DATA PINS	DB6
14	8-BIT DATA PINS	DB7
15	BACKLIGHT V_{CC} (5V)	LED+
16	BACKLIGHT GROUND (0V)	LED-

4. Conclusion

In conclusion, the project successfully demonstrated the potential of using voice recognition technology and Bluetooth communication to control the speed of a Induction motor. The system's voice recognition module accurately captured the user's voice commands, and the motor control module used a PWM technique to control the speed of the Induction motor accordingly. The project's use of voice recognition technology provides a more convenient and user-friendly way for users to interact with devices, eliminating the need for physical buttons or switches. This project's

approach can be applied to various applications, including robotics, automation, and industry. Future work can include expanding the system's functionality to control multiple motors and exploring the integration of other sensors and devices to enhance the system's performance and accuracy. Additionally, the project's approach can be extended to other devices and applications, contributing to the development of voice recognition technology and its integration into various devices and applications

5. Future Scope

Future Enhancement:

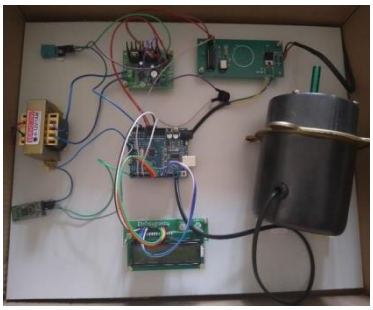
There are several possible future enhancements that can be made to the system to improve its performance and expand its functionality. These include: Multi-motor control: The system can be expanded to control multiple Induction motors simultaneously using voice commands, allowing for more complex applications and systems. Gesture recognition: Integrating gesture recognition technology with the system can provide an alternative or complementary way for users to control the motor speed, providing more flexibility and convenience. Mobile app integration: Developing a mobile app that interfaces with the system can enhance the user experience and provide additional features such as remote control and monitoring. Machine learning: Incorporating machine learning algorithms into the system can improve the accuracy and performance of the voice recognition module, making it more robust and adaptable to different environments and accents. Power management: Implementing power management techniques such as energy harvesting or battery optimization can enhance.

6. Acknowledgment

We would like to thank all the authors of different research papers referred during writing this paper. It was very knowledge gaining and helpful for the further research to be done in future.

7. Result

The paper presents the design of “Wireless Induction Motor Speed and Direction Control using Bluetooth” was designed to operate aInduction motor using PWM and controlling through Bluetooth module and the system able to monitor the motor speed on LCD display. IR sensor is used to measure the RPM of Induction motor. By using PWM signal we can control the Induction motor.



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