Voice and Touch Screen Based Speed and Direction Control of DC Motor Drive for Industrial Application

Lokesh.R[1], Mr.Ganesh Kumar.S.S[2]

[1] Student, [2] Assistant Professor, Electrical and Electronics Engineering

Ganadipathy Tulsi's Jain Engineering College, Kaniyambadi, Vellore, Tamil Nadu, India.

Abstract:

This Paper gives a brief idea of voice and touch screen technology and its interfacing with a controller to control the speed and direction of DC motor. When we want to change the direction, the touch screen is modeled to direct the user to required destination using direction keys on the screen and that values are given to NodeMCU. The speed controller works by varying the average speed sent to the motor. The aim of this paper is to have remote sensing and speed and direction control of an DC motor. The direction selected on the voice and touch screen NodeMCU to motor speed control. The speed controller works by varying to the voice and touch control. And will be used for the temperature sense the height value and then gas sensor will be detected in the gas.

Keywords: Arduino IDE, Motor Drive L293D, IC 7805, DC Motor, Temperature Sensor, Gas Sensor.

1. I.INTRODUCTION:

Driving an industrial application in environments is difficult task even for a normal person and becomes even more difficult for people with arms or hands impairments. This is a dual input type operated industrial application that is mode to work based on voice and touch screen commands. The voice recognition is done by IOT. The microcontroller NodeMCU with motor driver L293D is used to drive and control the two DC motors. Then the relay will be used in the method for control the light. And the motor will control by the forward and backward direction control and speed will be control. If the dual input type the system is designed such that based on the switch state the input is selected.

2. BLOCK DIAGRAM:
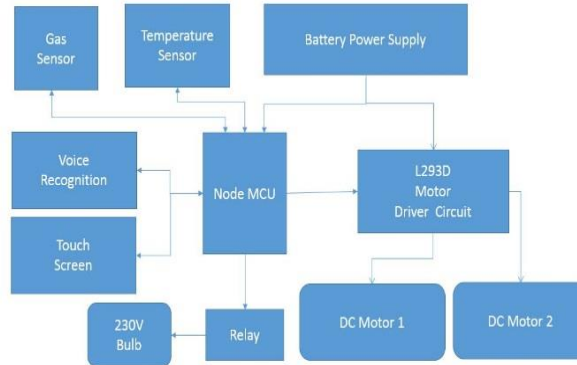
3. WORKING:

In this system there are two input devices, voice recognition system and touch screen. In order to select a specific input device we are using a switch to voice recognition system and touch screen is considered. In this, two DC brushless motors are used for controlling the industrial application.

The different directions of motions possible are:

> - **Forward:** Both the motors in the forward direction.
> - **Backward:** Both the motors in the
>   Reverse direction.

The code is written in ardunio such that the speed of the motors is controlled by using PWM output pin of ardunio. The motors is controlled with three different speed levels that is with motor 1 for speed minimum, speed medium, and speed maximum. And motor 2 for minimum speed, medium speed, and maximum speed.

4. EXISTING SYSTEM:

> - In the existing model motor are controlled by Non programmatically power electronic devices.

> - These devices are having their own loss while switching and regulating.

> - Draw Backs of existing

1. Switching losses.

2. High Cost.

3. PROPOSED SYSTEM:

➢ In our proposed system, we use a programmatical controller based control, which control speed and direction of motor with out switch losses.

➢ And control are done with user friendly graphical interface, So that a lay man can also use this.

➢ If new technology used in the temperature sensor sense by the surrounding temperature value.

➢ And the anther new technology used for gas sensor will be sense the gas detection.

➢ Advantage of Proposed System:

1. Less Switch loss.

2. User friendly control.

3. High Efficiency.

4.   HARWARD DESCRIPTION:

This paper consists of the following hardware's:

Node MCU:

Node MCU is an open source IOT platform. It includes firmware by which runs out on the WI-FI and the hardware is based on the ESP-12 module. The term "NODEMCU" by default refers to the firmware rather than the development kits.

Fig.1 Front side surface of Node MCU

Fig.2 Bottom side surface of Node MCU

L293D Motor Driver:

   L293D Motor driver Integration is a driver system which has 20 pins motor in which there are 2H bridges.L293D, which is generally preferred motor driver to control DC motors, and the two motors can be independently controlled in bidirectional ways. It is possible to control PWM by using enable pins. L293D within the range of 4.5 V to 36 V can be used maximum 600 MA current limit.

DC Motor:

   A **DC motor** is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic; to periodically change the direction of current flow in part of the motor. Then the DC motor will be control by the speed and direction and the two DC motor will be used for M1 and M2 motor.

Fig.3 DC Motor Diagram

Temperature Sensor:

DHT11 is a Humidity and Temperature Sensor, which generates calibrated digital output. DHT11 can be interface with any microcontroller like Arduino, Raspberry Pi, etc. and get instantaneous results. DHT11 is a low cost humidity and temperature sensor which provides high reliability and long term stability. In this project we will build a small circuit to interface Arduino with DHT11 Temperature and Humidity Sensor. One of the main applications of connecting DTH11 sensor with Arduino is weather monitoring.
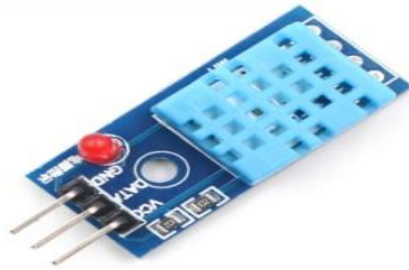
Fig.4 Temperature Sensor Diagram

Gas Sensor:

The Grove - Gas Sensor (MQ2) module is useful for gas leakage detection (home and industry). It is suitable for detecting H2, LPG, CH4, CO, Alcohol, Smoke or Propane. Due to its high sensitivity and fast response time, measurement can be taken as soon as possible. The sensitivity of the sensor can be adjusted by potentiometer.

Fig.5 Gas Sensor Diagram

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Relay:

A **relay** is a switching device as it works to isolate or change the state of an electric circuit from one state to another. Different types of **Relays**. Classification or the types of **relays** depend on the function for which they are used. A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays.
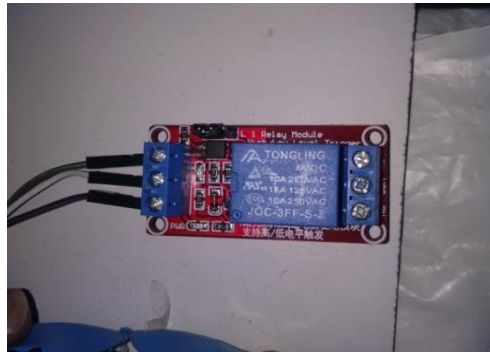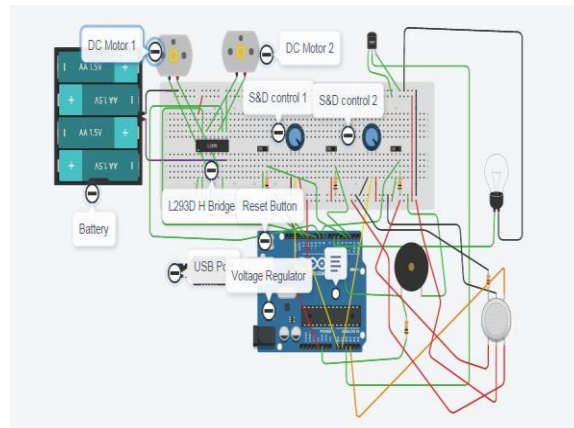

Fig.6 Relay Diagram

SIMULATION RESULT:

Fig.7 Simulation Diagram
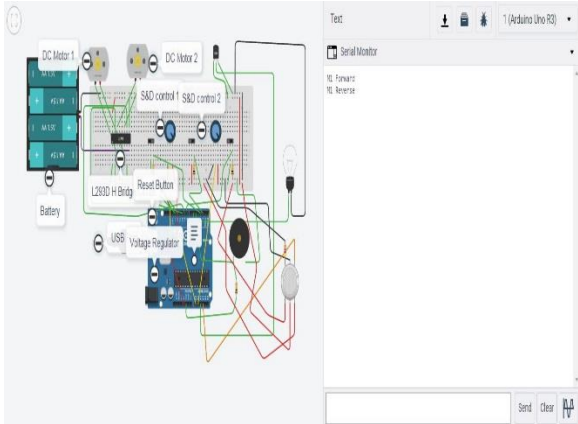
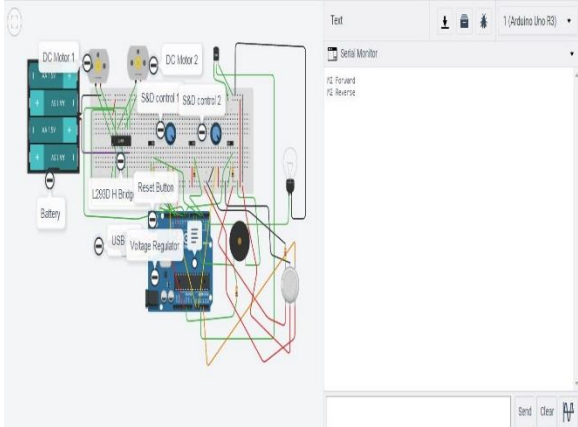*Fig.8 Simulation Result for Motor1*
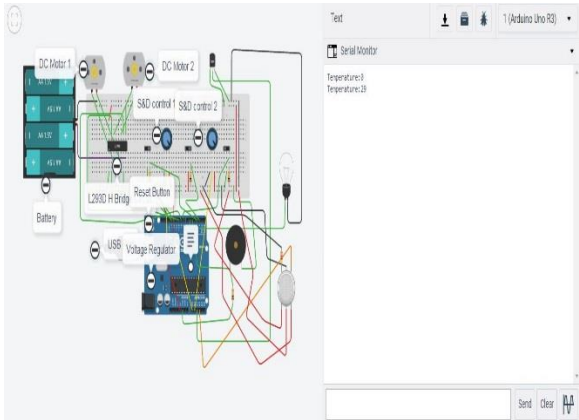

Fig.9 Simulation Result for Motor2

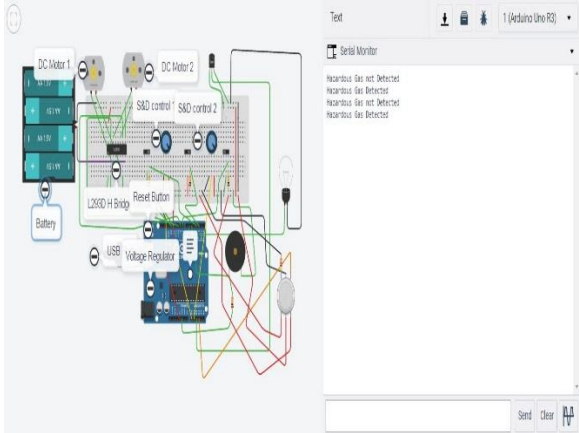*Fig.10 Simulation Result for Temperature Sensor*

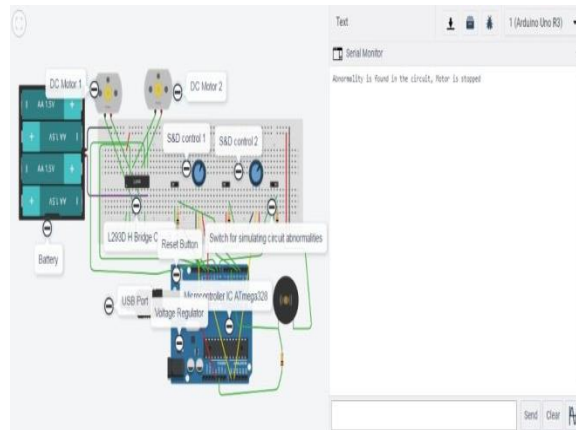*Fig.11 Simulation Result for Gas Sensor*

Fig.12 Simulation Result for Abnormality Circuit

HARDWARE KIT:

This is a project hardware kit of the voice and touch screen based speed and control of DC motor drive for industrial application. And the hardware kit is a very easy to design.
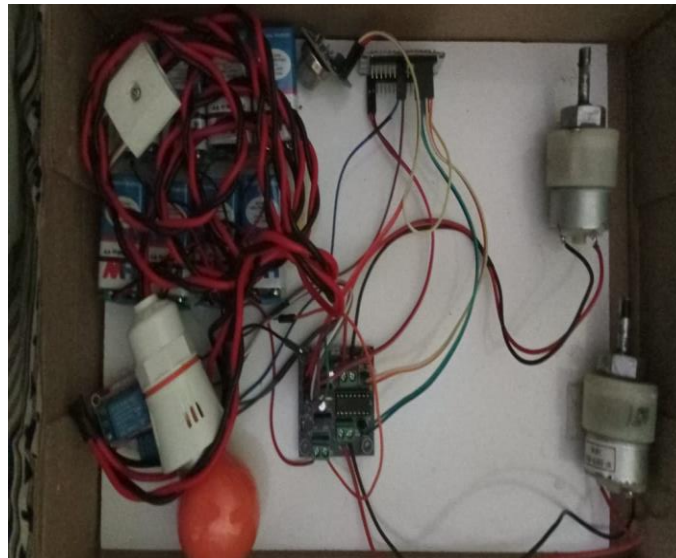

Fig.13 Hardware Kit diagram

APPLICATION:

The speed control of a motor used the following industrial applications.

➢ Machine tools.
➢ Cranes, elevators, vehicles.
➢ Rolling mills, bending machines.

CONCLUSION:

The proposed system is a wireless system with Bluetooth connectivity and is fast, so it saves the time and can be used in hazardous environments where humans cannot survive. With the speed feedback mechanism, the system is much more reliable than any other open loop control mechanism. In this project android mobile phone acts as a microphone and the voice command is given to the mobile and speed is varied, and thus the system provides a new technology for industrial and home automation.

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