

A PROPOSED MODEL ON VOICE CONTROLLED ROBOTIC ARM

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ABSTRACT

In today's world, in almost all sectors, most of the work is done by robots or robotic arm having different number of degree of freedoms (DOF's) as per the requirement. This paper deals with the Design and Implementation of a "Voice Controlled Robotic Arm". The system design is divided into 3 parts namely: Voice recognition module, Robotic Arm and Platform. Voice recognition is "the technology by which sounds, words or phrases spoken by humans are converted into electrical signals, and these signals are transformed into coding patterns to which meaning has been assigned". The different motions performed by robotic arm are: PICK and PLACE / DROP, RAISING and LOWERING the objects. Also, the motions performed by the platform are: FORWARD, BACKWARD, RIGHT and LEFT.

KEYWORDS: *Voice recognition, DOF, TTL Logic, DC Geared Motor*

I. INTRODUCTION

A robot may define as an electro-mechanical device, which is capable of sensing its surrounding and taking its decision (command). In general, robot must be able to move (by mechanical movement), it must be able to sense (by transducer) and it should be take decision (by remote control or artificial intelligence). A robotic arm is a robot manipulator, which can perform similar functions to a human arm.

Robotics arm is vital role of industrial application. Most robotics arm perform the task such as welding, trimming, picking, placing and painting etc. Moreover the biggest advantage of these arms is that it can work in hazardous areas and also in the areas which cannot be accessed by human few variants are Keypad Controlled, Voice Control, Gesture Control, etc. However, most of the industrial robots are still programmed using those process which is a tedious and time-consuming task that requires technical expertise. Therefore, there is a need for new and easier ways for programming the robots. The prime aim of this project is the platform started with movement as soon as the voice command receive by operator. The voice is not audible then the alternative method is remote control accessing Robot.

The goal of this paper is to develop methodologies that help users to control and program a robot, with a high-level of abstraction from the robot specific language i.e. to simplify the robot programming.

II. METHODOLOGY

The project titled "VOICE CONTROLLED ARM" Describes the design of a simple, low-cost microcontroller based arm for helping disabled persons. Arm is an intelligent agent that can perform tasks automatically or with guidance, typically by remote control. An Arm is usually an electro-mechanical machine that is guided by computer and electronic programming. An embedded system is a system which is going to do a predefined specified task is the embedded system and is even defined as combination of both software and hardware.

A general-purpose definition of embedded systems is that they are devices used to control, monitor or assist the operation of equipment, machinery or plant. "Embedded" reflects the fact that they are an integral part of the system. In many cases their embedded may be such that their presence is far from obvious to the casual observer and even the more technically skilled might need to examine the operation of a piece of equipment for some time before being able to conclude that an embedded control system was involved in its functioning. At the other extreme a general-purpose computer may be used to control the operation of a large complex processing plant, and its presence will be obvious. All embedded systems are including computers or microprocessors. Some of these computer share however very simple systems as compared with a personal computer.

The very simplest embedded systems are capable of performing only a single function or set of functions to meet a single predetermined purpose. In more complex systems an application program that enables the embedded system to be used for a particular purpose in a specific application determines the functioning of the embedded system.

III. BLOCK DIAGRAM

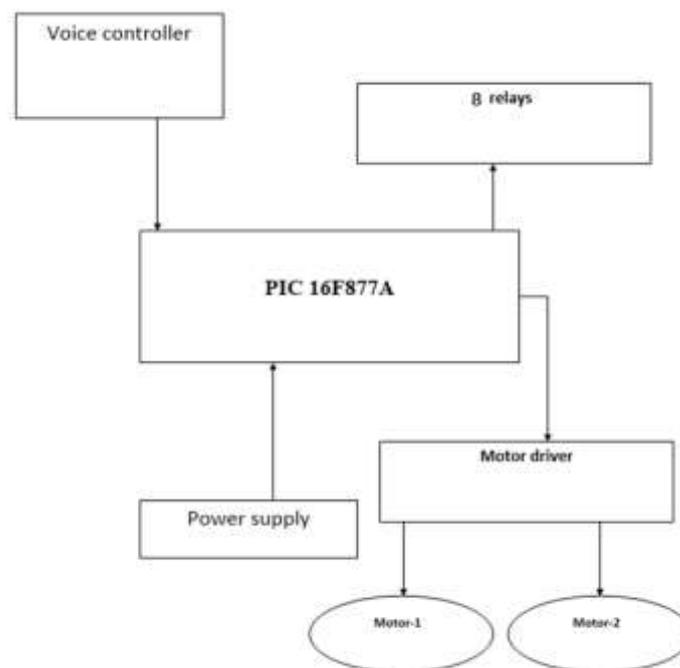


Figure 1:-Block Diagram

1. SPDT Relay

- Used to resolve the ambiguity
- Used for logical control of complex switching

2. Micro Controller

- Processes data
- Provides control voltage to motors

3. DC Motors

- Drives the wheels of the chair in necessary modes

4. Voice Recognition IC

- It's a single chip CMOS voice recognition module
- 5 -10 isolated word voice can be recognized
- It compares the input voice signal with the previously recorded signal
- Insensitive to environmental sounds.
- Its output serves as a input to microcontroller.

5. Micro Controller

- 8 Bit CPU optimized for control applications
- On - Chip Flash Program Memory
- On - Chip Data RAM
- Bi-directional and Individually Addressable I/O Lines
- Multiple 16-Bit Timer/Counters
- Full Duplex UART
- On - Chip EEPROM

6. **Motor Driver**

- Control the motor in the forward, reverse, left & right direction.

7. **Motor**

- Electric dc motor is used.
- It works on the principle of electromagnetism.

8. **Battery**

- 12volt battery
- Long life and chargeable

IV. **CIRCUIT DIAGRAM**

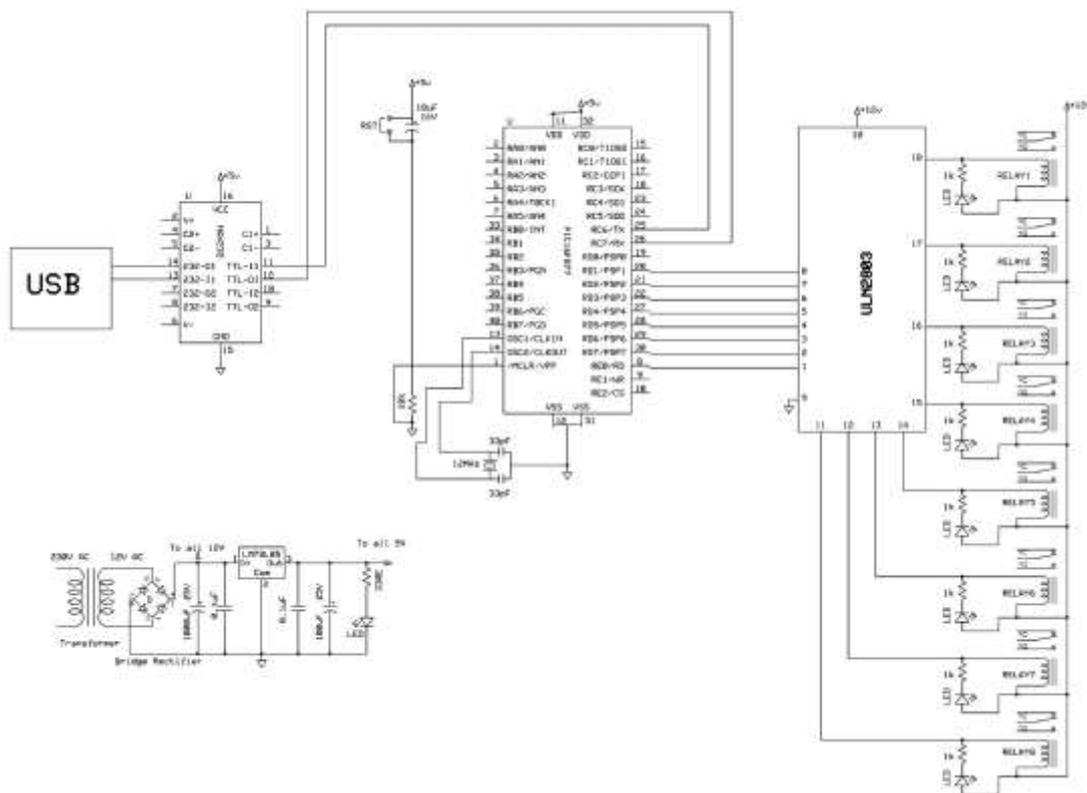


Figure 2:-Circuit Diagram

V. RESULTS

The hardware and software of the voice controlled robotic arm were setup and tested for all voice command and tasks under different operating conditions. The robotic arm was used to pick up a lightweight object and was place it in its desired position. All the movements of the robotic arm was checked using the following voice commands:

- 1) Base left
- 2) Base right
- 3) Shoulder front
- 4) Shoulder Back
- 5) Elbow up
- 6) Elbow Down
- 7) Jaw Open
- 8) Jaw Close
- 9) Stop

VI. CONCLUSION

Human Robot interaction is an important, attractive and challenging area in robotics. The robot popularity gives the researcher more interest to work with user interface for robots to make it more user friendly to the social context. Speech recognition (SR) technology gives the opportunity to add natural languages communication with robot in natural and easy way. The working domain of the voice controlled robotic arm is to help the people in everyday life and to help those with disabilities. This project provides effortless control for robotic arm. The speech recognition module was interfaced to the robotic arm with the help of the arduino board. The input and output ports were selected conveniently and the arduino board was programmed accordingly. External power supplies were connected. The voice recognition module was trained to recognize the input commands and the completed project was realized in real time. The future work will focus on introducing more complex activities and sentence to the system.

Humans normally use gestures such as pointing a particular object for a particular direction along with spoken languages. When the human speaks with another human about a close object or location, they normally point at that object or location by using the fingers. This interface called multimode communication interface, which can be incorporated in the near future.

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