

# SPEECH AND GESTURE COMMAND IMPLEMENTATION OF A ROBOT

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**Abstract**— It is necessary to have robot based technology for the coming days, due to unavoidable circumstance. The day to day life of human illness or weak minded causing the technology to grow faster. The touch with the machine and human is reaching to be inevitable and extensively more perfect with the physical world. The alliance between human and device is increased to form a new innovation which assist the way of life. Due to above said instant the larger part of the work is to be carried out with robots or automated arm having distinctive quantity of level of flexibilities according to the requirement. This course of action initiates the pick and place robot. Voice and gesture recognition is one the controlling mechanism used in this work. The structure configuration is partitioned by Voice recognition module, Mechanical Arm and (motion) Accelerometer Part. Architecture is defined for gesture voice recognition for transmitter side and receiver side with the internal circuit diagram. Arm with Voice Acknowledgment is to make a remote voice controlled arm which can be worked through a scope of ten meters utilizing transmitter and collector. For capturing its behaviour the accelerometer is attached on the human hand, and accordingly the robotic arm will move. The final results of pick and place robot is verified and captured.

**Keywords**—MEMS Sensor, Eagle board, Motor driver, PIC Microcontroller, Voice, Gesture

## I. INTRODUCTION

Robotics is the present upcoming promising technology in the field of electronics. The robotic arm is nothing but robot manipulator, which can accept out analogous functions to a human arm. Robotic arms plays a crucial role in roughly all the industries. Welding, picking and placing are the various different task performed in industries by robotic arm. In addition the major benefit of these arms is that it can work in dangerous areas and also in the areas where the human also cannot be accessed. Another use of human arm is that it is also used to utilize highly accurate medical examinations. The robot can be designed as per the requirement.

Most of the robots designed are programmed still using some of the academic process which is time consuming and risky process. This must lead to a good programming skill and designing steps. The responsive path of the accelerometer is in the right plane of the hand. Free scale enabling technology for acceleration and pressure sensors is the Micro electromechanical systems. Micro Electromechanical system based sensor products give an interface that can sense, process or manage the neighbouring premises. On a single chip Micro Electromechanical based sensors that build very minute electrical and mechanical components. They are also very fundamental components in industries, electronics, and disk drives, components in medical fields, computer components and cell phones.

Automation is the most commonly used term in the ground of electronics and electrical. The need for automation brought numerous revolutions in the present technologies. These had better meaning than any other technologies due its available nature. In the coming years robotics is the booming field where the people can have immense use. These days an integer amount of wireless robots are being urbanized and situate to various applications. By utilizing the effective way of communicating with robots the involvement of robot in our daily lives can be enhanced. For this reason, there have been firm developments in area of human and machine interaction. Acceleration of the signal in three co-ordinates such as x-axis, y-axis, and z-axis are measured by using Micro Electromechanical accelerometer. Here movement of the robotic arm is managing by voice as well as hand gesture. Manual switch to be mounted on the robotic arm section and if we give the voice command to the robotic arm, then switch is put on to voice recognition mode finally if we give the gesture command to the robotic arm then switch is put on gesture recognition mode manually. With the help of Microphone the voice command is given to the voice recognition module. Where the user can give command to microphone. The output of a Microphone is analog in nature. It has capability to process that signal and give analog to digital output. The output signal is given to the Microcontroller and later it is given to wireless transmission module for transmission. The movement of robot is controlled by the movement of hand. The design part of robot is done by transmitter part

and the receiver part. In transmitting part the the movement of the robot is accordingly the movement of the hand where the accelerometer is mounted to the hand. Here comparator integrated circuit is also used to set the proper voltages. The four bit data is next transmitted by a transmitter model by the use of encoder IC. In receiving section the data which is encoded is decoded by the decoder IC and it is process by the PIC microcontroller and passed on to the configuration of robot where the robot will move by the direction of hand. L293D IC is a motor driver that which allows the motor to force in any directions.

## II. PROBLEM FORMULATION

We are facing quite a few problems in physical as well as remote controlling for house appliances. For a handicapped people and old people it is not easy to manage electronic devices which were used in their residence. The things which is distant from them or thing having more weight it is complicated to get when they are essential. It is very hard to the people who were busy, they frequently cannot go and pick the things, however it is waste of time and time consuming. For the people suffer from fitness problems and who were facing complexity to move towards to take the object which is far away from them. Likewise in the industries the labour can't pick up the bulky objects or always they cannot go and take the things which are essential. All these problems can be solving by voice and gesture control. So we are opting for voice and gesture controlling for picking and placing of an object.

## III. DESIGN REQUIREMENTS

### 3.1 ZIGBEE AND ZIGBEE NETWORKS

The outburst in wireless technology has seen the coming out of many standards, particularly in the industry, technical and medical radio band. There have been a massive amount of proprietary protocols for manage applications, which bottlenecked interfacing. There is a necessitate for a broadly accepted standard for communication between sensors in low data rate. The answer for the above said is ZigBee. It should not be get confused between the Bluetooth and Wi-Fi. For communication of huge amount of data with complex structure similar to the media files, Bluetooth and WiFi have been developed.

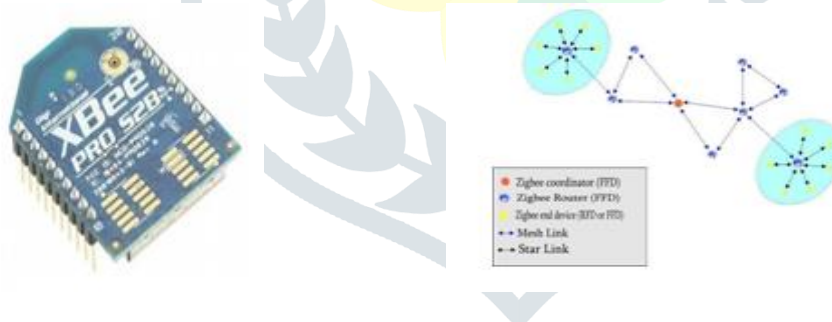


Figure 1: Zigbee and Zigbee Network

Networks with Mesh, Generic Mesh and Star topologies can be formed by the device like zigbee. The network can be prolonged as a bunch of smaller networks. Understanding of Zigbee through a distinctive usage situation in a home automation system is very important. It contains only one ZBC in a network, the one that initiates the network in the initial place and contains the information about the network. All the devices in the network must exchange data with this ZBC. It has routing capabilities and acts as a interface to other networks on other floors. A ZBE is optimized for very low power utilization and is the cheapest between the three node types. It communicates only with the coordinator and is the point where sensors are situated.

### 3.2 GEAR MOTOR

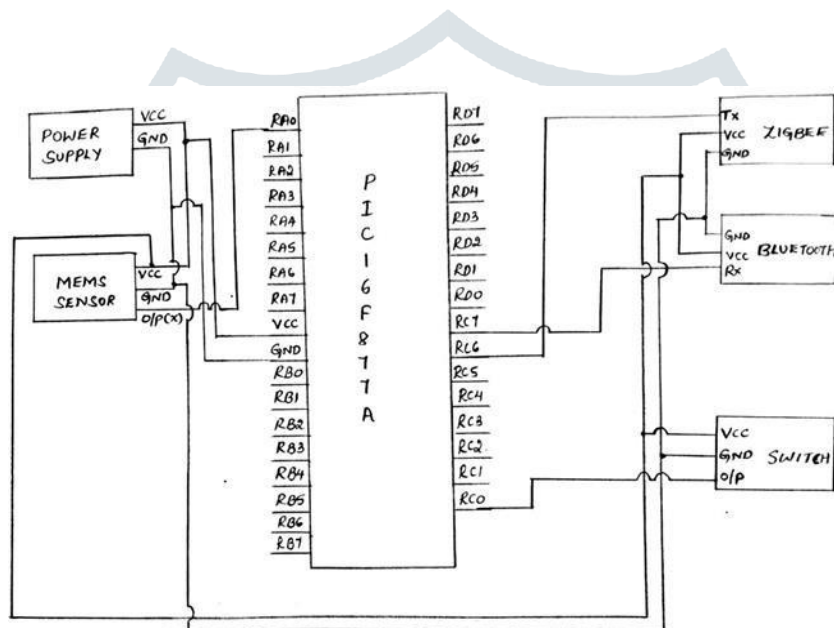
A little motor designed purposely with an integral gear reducer. It is a brushless DC motor. The end shield on the drive end of the motor is designed to provide a twin task. The side facing the motor gives the armature or rotor bearing support and a sealing provision. The other side of the end shield provides numerous bearing supports for the gearing itself. This structure provides a lot of benefits for a consumer and decreases the estimation of sizing a motor and gear reducer. By means of the right sized motor and gear head blend for an application helps to extend gear motor life and allows for best possible power management and power

utilization. Quieter process owing to fundamental castings and fundamental pinion ground or hobbled on the armature or rotor shaft. Smaller quantity parts requiring assembly resulting in near great alignment of the rotor pinion and gear train.

**IV.SYSTEM DESIGN**

**4.1 Transmitter Part**

In our proposed framework system design technology has two sides transmitting side and accepting side. The bottom piece outline demonstrates the operational of the framework. Figure 2 show the internal circuit diagram of transmitter part of the pick and place robot. It consists of Zigbee transmitter, power supply, PIC Microcontroller, MEMS sensor, Speech recognition. Power supply and mems sensor are connected to the PIC microcontroller. The zigbee is connected to the RC6 pin of the microcontroller followed by RC7 to Bluetooth and RC0 to switch. To transmit the signal it uses the speech recognition and mems sensor. The signals from these both are given to the PIC Microcontroller which detects and sends the signals to the ZigBee for further transmission.

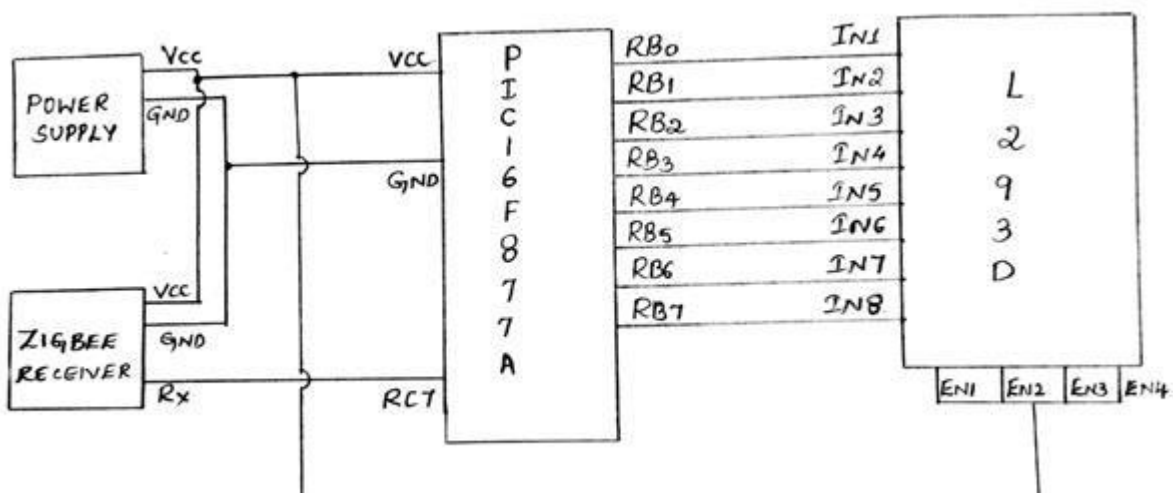


**Figure 2: Transmitter Part**

**4.2 Receiver Part**

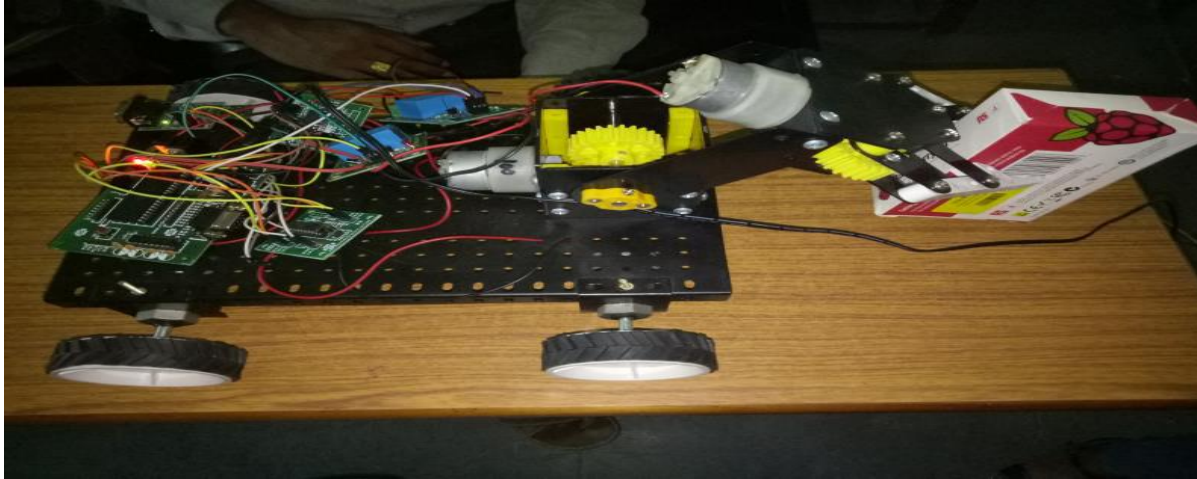
Figure 2 show the internal circuit diagram of receiver part of the pick and place robot. It consists of power supply, Zigbee receiver, PIC Microcontroller, and L293D Motor driver. The power supply is connected as shown in the circuit diagram. Zigbee receiver is connected to the RC7 pin of the PIC microcontroller. L293D a motor driver drives the motor in any direction is connected to a microcontroller as shown below. The signals from the transmitter part is received by Zigbee receiver. Then the signals are given to the PIC Microcontroller. It finds the signals and sends them to the motor driver L293D. The motor drives the robot with the analog instructions by the direction of user.

**Figure 3: Receiver Part**



## V. RESULTS

The system design for the transmitter part and receiver part is being designed for the movement of a robot using the speech and the voice recognition module. The design is verified for the voice and the gesture commands. Zigbee plays a important role in wireless technology. The robot is capable of picking the objects placing the objects as shown below in figure 4.



**Figure 4: PICK AND PLACE ROBOT**

## VI.CONCLUSION

The work presents the robot movement design and implementation by the voice and Gesture command using MEMS sensors and Zigbee. The PIC microcontroller which serve as the interface between the entry module and exit module has been productively programmed using CCS compiler software using Embedded C language. The designed model finds its most important applications in areas like homes industries, garbage collection and waste disposal operation, schools and colleges etc.

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