

## An Approach to Accelerometer Based Controlled Robot

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**Abstract** – Now-a-days, everyone is familiar with robot. Human-Machine interaction is becoming easier to do day to day work. Robots are becoming more popular for human helping purpose. So we have decided to make a robot. But in our project there is not particular human robot. We are going to make a robotic car for handicapped or for ourselves also. We can use the robotic car by simply moving the hands without any physical connection. More probably, we are using hand gestures for movement of a robotic car which can be also called as Auto Drive module as in our project. By simply hand movement, we can move the car left, right, forward or backward in any direction. The robotic car can consist of robotic arm which is beneficial for doing work where human being cannot go. Similarly we can attach voice camera which can be used for communication and also to see that where our robotic car is. Now we have named the modules for the project as Hand Gesture Module, Auto Drive Module, Voice Interaction and Robotic Arm.

**Key Words:** Hand Gesture, Auto Drive, Accelerometer, Arduino UNO, Robotic Arm.

### 1. INTRODUCTION

We all are familiar with a normal robot. A normal robot is somewhat a type of human being. Now-a-days we are using more machine weapons i.e. there is more interaction between human and machine. So we decided to make a robot which can be helpful for human being.

In our project we are going to make a robotic car which is handled by hand position. We are going to recognize the position of hand by accelerometer. By the hand position, we give the instruction to the robotic car so that it can move left, right, forward, backward.

In [1], the system is about arduino used robot. In that the movement of robot is done by arduino. Arduino consists of program code and according to that the robot moves. In [2], the system consists of arduino and android. In this system, we use android device for movement of the robot. By using android mobile we can move the robot. In [3], the system uses robocar which is used for movement. In this system, there is being constructed here is attributed with the qualities of being the multitasking machine. But in our system we are going to use Wi-Fi Module, Robotic Arm, etc. which is not being used any further.

### 2. PROPOSED METHODOLOGY

To develop a Accelerometer Based Controlled Robot, in which the robot can move as per the instruction given by hand gesture i.e. left, right, forward, backward.

The below figures are some of the components which will be used in our system. Some of them are Accelerometer, Arduino UNO, Ultrasonic Sensor, Wi-Fi Module.

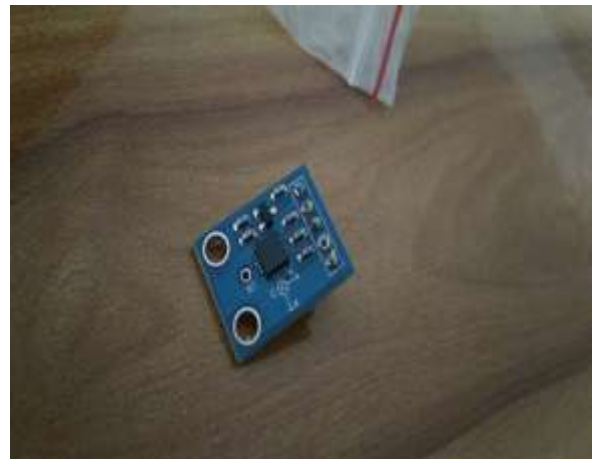


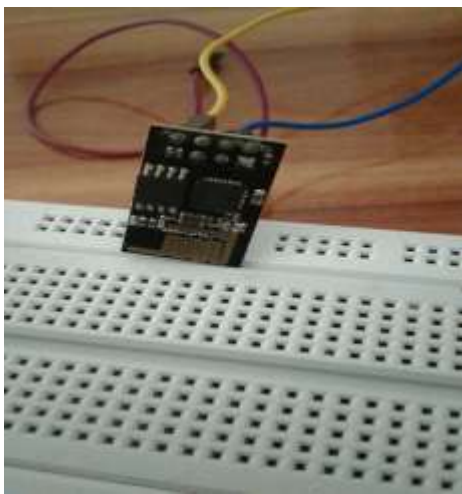
Fig -1: Accelerometer



Fig -2: Arduino UNO



**Fig -3:** Ultrasonic Sensor



**Fig -4:** Wi-Fi Module

There are four modules in our project: Hand Gesture, Auto Drive, Voice Interaction, Robotic Arm

Basically by measuring the position of the hand in X and Y axis, glove send a signal to the robot, according to which the boot moves. Our robot uses radio frequency of 433 MHZ to communicate with the glove. It can sense radio signals from 80 m round from the robot. Bending the wrist downward gives a signal to the robot by getting which the robot will move forward. If you bend the wrist upward, then another signal will generate due to which the robot will move backward. If the wrist is bent right or left, then the robot will move according to that direction respectively. If the wrist is kept horizontal, then the robot will be in stop condition. There are two antennas which are already connected with robot and glove. The length of the antenna can be expanded according to the requirement. There is tap switch in the glove, if we turn it off then, the robot will continue its last command, it will not follow the hand gestures more.

It can sense all the static objects in front of it and avoid them. Front two corners of the robot are totally safe because there are two sensors. Ultrasonic sounds are using to avoid the obstacles. Basically sonar technology means calculating the time of reflection of sounds we are doing this. If any obstacle is sensed by the sensors, then at first the robot moves

backward, then its sensor which is mounted on a servo motor rotates left to right. And then it decides where it can turn, left or right by calculating the respective distances. After turning if the obstacle is avoided successfully, then it moves in the forward direction. If not the whole process will run continuously until the front obstacle is avoided. Two other sensors which are mounted on the corners are always active to stop collision with any obstacles. It will work at all Environments. Slightly changing the main code, user can change the sensitivity of the each ultrasonic sensor.

By giving some specified instructions to our smart phone, we can change its mode of hand gesture control of self-driving very easily. The smart phone has to be connected with the robot through Bluetooth. Using a definite app, just saying "FOLLOW", the robot will start to follow my hand gestures and saying "AUTO", the robot will start its self-driving mode. We have connected another Bluetooth speaker (which is in the robot with that smart phone) through which dialogs from the bots will come.

The basic function of a pick and place robot is done by its joints. Joints are analogous to human joints and are used to join the two consecutive rigid bodies in the robot. They can be rotary joint or linear joint. To add a joint to any link of a robot, we need to know about the degrees of freedom and degrees of movement for that body part. Degrees of freedom implement the linear and rotational movement of the body and Degrees of movement imply the number of axis the body can move.

The below figure shows one of the module of the system i.e. Auto Drive. The above figure shows the module of Auto Drive. The module consists of Ultrasonic Sensor, Arduino UNO, Accelerometer, etc. Auto Drive module is used for moving left, right, forward, backward. This auto drive works on the location of the accelerometer. As accelerometer works in the X, Y, Z axis. It is useful for auto drive to take the location and move as per the location.



**Fig -1:** Auto Drive Module

### 3. CONCLUSIONS

We had done the two modules. One is hand gesture and other is auto drive. In hand gesture, we are going to make a circuit by using accelerometer which gives X Y and Z axis of the location. By using location we can recognize the movement of hand and use the location for sending to auto drive and use that location for movement of robot. On the other hand, we have auto drive, which consists of the motor which moves forward, backward, left, right. Which will help to move the robot from one place to another?

Overall we have four modules in our system. In which we have completed two modules i.e. hand gesture and auto drive. Further we are going to complete remaining modules of our project, the overall project will be completed in next semester. Further we are going to attach robotic arm to the auto drive module which will help to pick the object and can help us to move object from one place to another. Where human being can't move there we can send the robot and take the objects or do any task using robotic arm. Next Module is of Voice Interaction. In that we are going to fit the camera and recognize the voice and let the user know about the going on place and can interact with the people which are far and can know the things they need. It will be useful for us to use voice interaction. Again we can add the fire sensor to the robot. So that if there is fire then we can send robot and spray water to fire to reduce the fire.

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