# VEHICLE CONTROLLED BY HAND GESTURE

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**Abstract-**Gesture controlled vehicle is the semiautonomous robot. It can be controlled by simple gestures of hand. The user just needs to carry a gesture device which in our case is transmitter section. The vehicle and gesture device are connected wirelessly by radio waves.

**Keywords**- Atmega 328, accelerometer, RF modules, Arduino

## 1: INTRODUCTION

Humans have existed on the earth for billions of years and the main characteristic of their existence is the advancement of technology which has been done for the ease of their survival. There have been many advancements in different fields from which we have benefitted and are able to reap the luxuries of our sowed labour along the way. In today's world robots have been a big advancement in the technology produced by us. They are the major reason because of which the work which cannot be done by humans is easily executed by robots.

These Robots can be characterized in two ways:-

1) Autonomous
2) Semi-autonomous

Autonomous Robots are those which are controlled by themselves and they do not require any external source to make it work.

On the other hand semi-autonomous robots are those which need an external source for their working. Majority of the industrial robots are

autonomous and are required to operate with high accuracy and speed. But some

Applications are required to be semi-autonomous or human controlled robots. One such type of semi-

autonomous robot is Vehicle controlled by the movement of Hand gestures. This robot is controlled by the motions and manipulations of the transmitter section which will be planted on the glove on our hand.

This is an easy, user-friendly method to interact with robotic system and robots. An accelerometer is implemented for detecting the tilting position of your hand, and a microcontroller initiates different analogy values and generates command signals necessary to control and move the robot. A component called Accelerometer is used for the working of this device. This component defines an axis for the movement of our device in the 3D axis.
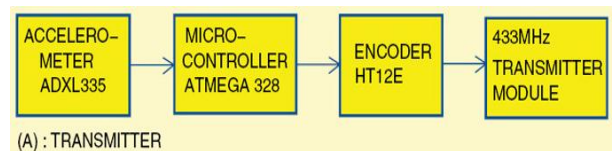
This project is divided into 2 parts

First is the Transmitter section and second part is receiver section. The transmitter includes an ADC for analog to digital conversion and an encoder IC (HT12E) At the receiving section an RF receiver module receives the encoded data and decodes it by a decoder IC (HT12D).

## 2. PRESENT THEORY

Our project that is "Vehicle controlled by hand gesture" is implemented by dividing the entity into two parts:- transmitter section and receiver section respectively.

### 2.1 Transmitter Section



(A) : TRANSMITTER

The basic block diagram of the transmitter section of vehicle controlled by hand gesture is shown in the above diagram.
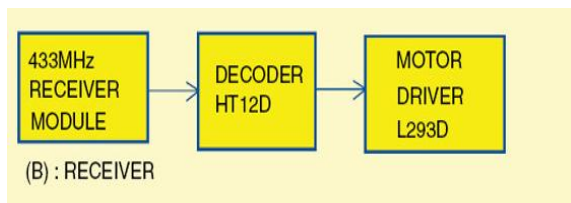
***ATmega328.*** Microcontroller that we are implementing is a single-chip microcontroller from series Atmel and belongs to the mega AVR series. It is a highly efficient and cost effective type of microcontroller. It's an   AVR RISC that stands for reduced instruction set. It is a 8 bit system

***ADXL335.*** Component is a necessary complete three-axis acceleration measurements system. An accelerometer is a type of sensor that gives an analog data while moving in the direction of X, Y and Z axis. These provided directions depend on the type of sensors that is implemented.

***HT12E*** .Encoder is implemented for the purpose of encoding the 4-bit data and then transmits the 4 bit data by using an ***RF transmitter*** module which works in a frequency of 433MHz frequency and this module is easily Available in the market with minimum costings.

## 2.2 Reciever Section

At the receiver section we used RF receiver to receive the data and then transfers it to HT12D decoder. Then further the decoder convert the Received serial data to parallel data and then   withedata is read by using Arduino software.
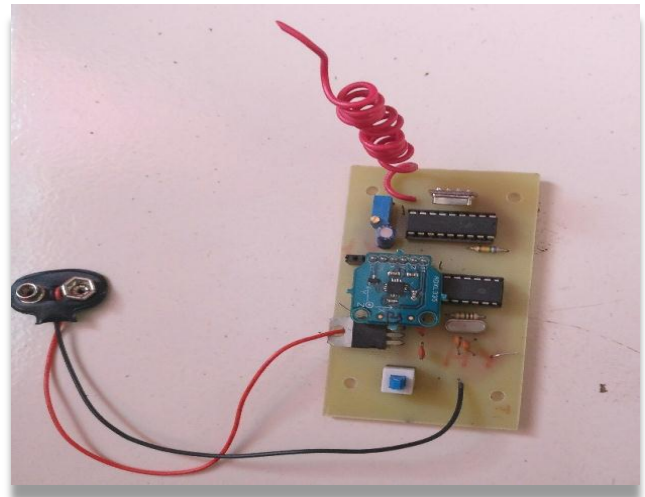


***RF Receiver*** of this project will receive the data which is particularly transferred by the transmitter and then on the reception of the received data it transfers it to the decoder.

***HT12D.*** Decoder is used to decode the presented data from the transmitter end. It particularly changes the serial data input into parallel data output which is received from the RF receiver module. The HT12D also provides with a 38 kHz carrier for infra-red systems.

***L293D***. This is a DIP package 16-pin motor driver IC which has four input pins and four output pins. All the four i/p pins are connected to o/p pins of the decoder IC and the four output pins are connected to DC motors of the robot. The motor driver is a device which is required for initiating appropriate functionality.
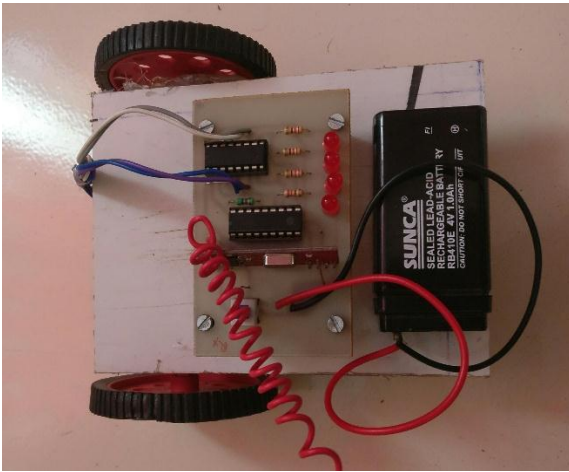
## 3: ACTUAL WORK

The semi-autonomous robot is a 3D rigid body that can be rotated about three axes .Yaw, pitch and roll are referred to as rotation. These rotations takes place at Z-axis is called Yaw, the next rotation X-axis is called Pitch and last rotation about Y-axis is called Roll. This orientations can be achieved through accelerometer which we assembled on the transmitter part of our robot.



## 3.1: Transmitter Module

An RF transmitter module is a small PCB i.e. Printed circuit board which is designed on pad to Pad software(P2P).The PCB consist of Atmega microcontroller of 8051 family along with RF transmitter, an Encoder,  Accelerometer and most importantly voltage regulator of 78XX family, making them easy to use, as well as economical and efficient use of space. The signals are encoded in digital form using encoder and this encoded signal are then sent for further operation to the receiver module.

## 3.2 Reciever Module



There are two types of RF receiver module. The receiver modules used are super-regenerative modules which are usually of low cost and low power design. They use a series of amplifier and which are used to extract modulated data from a carrier wave. The RF receiver receives the signal from the RF transmitter. Receiver

Section consist of HT12D decoder which decodes the input signal ad send it to the L293D motor drive which converts the digital signal into analog signal.

Based on the input codes transmitter will give command to receiver microcontroller and robot will behave as follow:

- Move in fwd. direction.
- Move in bwd. Direction.
- Move in lft. direction
- Move in ryt. Direction.
- Same speed in all direction.
- On the spot left or right turn to pass through narrow passage.
- We also added camera for real time monitoring.

## 3.3 Working

The transmitter section fed with the input voltage of up to certain value. The coding done in atmega is in C language where we define each and every movement of vehicle in code so for particular gesture it moves in particular direction. The signal after getting converted into the codes went to the HT12E encoder where this signal is now

converted into DC form for proper transferring of the signal (without any loss). Now this signal with the help of RF transmitter went to the RF receiver which receives this signal and send it to HT12D decoder where this signal is now converted into its actual form and went to the L293D motor which is directly connected with the wheels. L293D motors convert electrical signal into mechanical work and hence motion of the wheel or we can say vehicle is obtained.

Intelligent robot project has been designed for spying purpose. It is radio controlled and can be operated by a radial distance of 10m radius. Most probably our army need to venture into the enemy area just to track their activities. Which is often a very risky job and may cost life. Such job could be done using small spy robot, all the developed and advance nations are in the process of developing it, a robot that can fight against enemy.

## 4: RESULT

Transmission through RF (Radio frequency) is better than IR (infrared) because of many reasons some of them are:

First, signals through RF can travel through larger distances while making it suitable for long range applications. Also, while Infrared mostly operate in the line Of sight mode.

Second, RF signals can travel even when there is an obstruction between transmitter & receiver.

Third, RF transmission is more strong and reliable than IR transmission. RF communication use a specific freq. unlike IR signals which are affected by other IR emitting sources. This RF module comprises of an RF Transmitter and an RF Receiver.

The transmitter and receiver pair operates at a particular freq. A Radiofrequency transmitter receives serial data and transmits it wirelessly through RF through its antenna. The transmitted data is received by an RF receiver operating at the same frequency as that of the transmitted.

## 5: CONCLUSION

This device can perform various tasks because of camera which is implanted on the receiver section. A major advantage of the system is that it provide real time palm gesture recognition, leading to an effective and natural

way of controlling vehicle. Vehicle can be upgraded to detect humans buried in earthquake and landslides by implementing the sensor accordingly. GPS system can be added to the vehicle by which its location can be tracked. The device can also be used for military purposes to monitor those areas of battlefield where human presence cannot be found.

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