IJAREEIE

e-ISSN: 2278-8875
p-ISSN: 2320-3765

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

Volume 11, Issue 1, January 2022

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.282

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 11, Issue 1, January 2022 ||

DOI:10.15662/IJAREEIE.2022.1101009

Hand Gesture Controlled Robot

Prof. Vishal. M. Joshi[1], Master. Sapkal Vivek Jitendra[2], Master.Salunke Yogesh Sunil [3], Miss. Phopse Kalyani Shukleshwar[4]

Professor, Dept. of Electrical Engineering, Adsul's Technical Campus Ahmednagar (Maharashtra), India[1]

UG Student, Dept. of Electrical Engineering, Adsul's Technical Campus Ahmednagar (Maharashtra), India [2]

UG Student, Dept. of Electrical Engineering, Adsul's Technical Campus Ahmednagar (Maharashtra), India [3]

UG Student, Dept. of Electrical Engineering, Adsul's Technical Campus Ahmednagar (Maharashtra), India [4]

ABSTRACT: Gesture Controlled Car is a robot which can be controlled by simple human gestures. The user just needs to wear a gesture device in which a sensor is included. The sensor will record the movement of hand in a specific direction which will result in the motion of the robot in the respective directions. The robot and the Gesture instrument are connected wirelessly through radio waves. User can interact with the robot in a more friendly way due to the wireless communication. We can control the car using accelerometer sensors connected to a hand glove. The sensors are intended to replace the remote control that is generally used to run the car. It will allow user to control the forward, backward, leftward and rightward movements, while using the same accelerometer sensor to control the throttle of the car. Movement of car is controlled by the differential mechanism. The mechanism involves the rotation of both forth & rear wheels of left or right side to move in the anticlockwise direction and the other pair to rotate in the clockwise direction which makes the car to rotate about its own axis without any kind of forward or backward motion. The main advantage of this mechanism is the car with this mechanism can take sharp turn without any difficulty. The design and implementation of a gesture control robotic arm using flex sensor is proposed. The robotic arm is designed in such a way that it consists of four movable fingers, each with three linkages, an opposing thumb, a rotating wrist and an elbow. The robotic arm is made to imitate the human hand movements using a hand glove.

KEYWORDS: Gesture, Radio waves, Transformer

I. INTRODUCTION

Many parameters of robot are designed according to requirement. There are different ways to control robotic arm like Voice Controlled, Keypad Control, Gesture Control, etc. Implemented system consists of transmitter & receiver. Transmitter is nothing but human hand with flex sensors & receiver is robot manipulator. Motion of transmitter is wirelessly transmitted to receiver module. Robotic arm which is receiver is nothing but a mechanical system formed by different joints and end and effectors i.e. gripper movements of these fingers or gripper can be carried out using stepper motor or servo motor when user carry out motion of hand for any application at transmitter side same movement is copied by receiver as on transmitter there are flex sensors mounted on glove at transmitter which change its resistance depending on movement of user. In the research group of intelligent robot, one of the biggest issues is autonomous-driving of robot.

Hand-gesture-based interface for navigating a robot. A robot can be controlled by user using his or her hand gestures. A 3- axis accelerometer is adopted to record a user's hand trajectories. The trajectory data is transmitted wirelessly via an RF module to a computer. The received trajectories are classified into six control commands for navigating a robot. The classifier adopts the dynamic time warping algorithm to classify hand trajectories. The existing work also has limitation that Simulation results shows the classifier could achieve 92.2% correct rate.

II. LITERATURE SURVEY

Recently, strong efforts have been carried out to develop intelligent and natural interfaces between users and computer based systems based on human gestures provide an intuitive interface to both human and computer. Thus, such gesture-based interfaces can not only substitute the common interface devices, but can also be exploited to extend their functionality.

Gesture recognition technologies are much younger in the world of today. At this time there is much active research in the field and little in the way of publicly available implementations several approaches have been developed for

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 11, Issue 1, January 2022 ||

DOI:10.15662/IJAREEIE.2022.1101009

sensing gestures and controlling robots. Glove based technique is a well-known means of recognizing hand gestures. It utilizes a sensor attached to a glove that directly measures hand movements.

III. OBJECTIVE

A. Motivation

We got our motivation to work on this project from a disabled person who was driving his wheel chair by hand with quite a lot of difficulty. So we wanted to make a device which would help such people drive their chairs without even having the need to touch the wheels of their chairs.

B. Objective

Our objective is to make this device simple as well as cheap so that it could be mass produced and can be used for a number of purpose

C. Role of Robot

Robots are playing an important role in automation across all the sectors like construction, military, medical, manufacturing, etc. After making some basic robots like line follower robot, computer controlled robot, etc. we have developed this accelerometer based gesture controlled robot by using Arduino Uno. In this project we have used hand motion to drive the robot. For this purpose we have used accelerometer which works on acceleration. A gesture controlled robot is controlled by using hand in place of any other method like buttons or joystick. Here one only needs to move hand to control the robot. A transmitting device is used in your hand which contains RF Transmitter and accelerometer

IV. PROPOSED SYSTEM

.

Our gesture controlled robot works on the principle of accelerometer which records hand movements and sends that data to the comparator which assigns proper voltage levels to the recorded movements. That information is then transferred to a encoder which makes it ready for RF transmission. On the receiving end, the information is received wirelessly via RF, decoded and then passed onto the microcontroller which takes various decisions based on the received information. These decisions are passed to the motor driver IC which triggers the motors in different configurations to make the robot move in a specific direction. The following block diagram helps to understand the working of the robot.

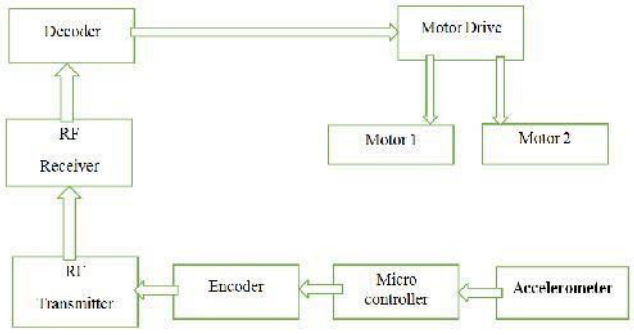


Fig 1: Block Diagram of our proposed system

We divided our task into two parts to make the task easy and simple and to avoid complexity and make it error free. The first is the transmitting section which includes the following components:

- Accelerometer
- Comparator IC
- Encoder IC
- RF Transmitter Module

The second is the receiving end which comprises of following main components:

- RF Receiver Module
- Decoder IC

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 11, Issue 1, January 2022 ||

DOI:10.15662/IJAREEIE.2022.1101009

- Arduino
- Motor Driver IC
- DC Geared Motors

V. SCHEME OF IMPLEMENTATION

Different hand gestures are used to make robot move in a specific direction Hand-gesture-based interface for navigating a robot. A robot can be controlled by user using his or her hand gestures. A 3- axis accelerometer is adopted to record a user's hand trajectories. The trajectory data is transmitted wirelessly via an RF module to a computer. The received trajectories are classified into six control commands for navigating a robot. The classifier adopts the dynamic time warping algorithm to classify hand trajectories.
Here the most important component is accelerometer. Accelerometer is a 3 axis Acceleration measurement device with +3g range. This device is made by using Polysilicon

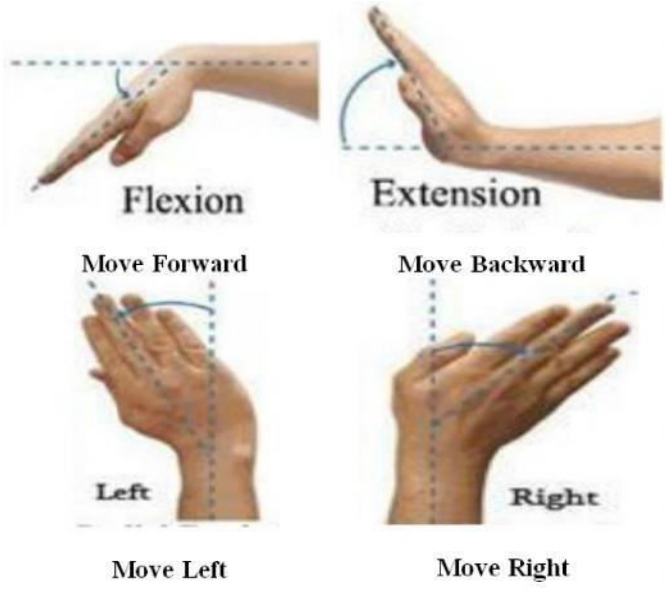


Fig 2: Hand Gesture controlling implementation.

surface sensor and signal conditioning circuit to measure and proportional to the acceleration. This device measures the static acceleration of gravity when we tilt it and gives a result in form of motion or vibration. According to the datasheet of adx1335 polysilicon surface-micro machined structure placed on top of silicon wafer. Polysilicon springs suspend the structure over the surface of the wafer and provide a resistance against acceleration forces. Deflection of the structure is measured using a differential capacitor which incorporate independent fixed plates and plates attached to the moving mass. The fixed plates are driven by 180° out-of- phase square waves. Acceleration deflects the moving mass and unbalances the differential capacitor resulting in a sensor output whose amplitude is proportional to acceleration Phase-sensitive demodulation techniques are then used to determine the magnitude and direction of the acceleration. The robot only move when the accelerometer is move in specific direction. The valid movements are as follow.

Direction	Accelerometer Orientation
Forward	+Y
Backward	-Y
Left	-X
Right	+X
Stop	Rest

Table 1: Accelerometer Orientation.

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 11, Issue 1, January 2022 ||

DOI:10.15662/IJAREEIE.2022.1101009

VI. SYSTEM OVERVIEW

The proponent used ATMEGA 328P as the main operator IC of the embedded system of the device. An important aspect of a successful robotic system is the Human-Machine interaction. In the early years the only way to communicate with a robot was to program which required extensive hard work. With the development in science and robotics, gesture based recognition came into life. Gestures originate from any bodily motion or state but commonly originate from the face or hand. Gesture recognition can be considered as a way for computer to understand human body language. This has minimized the need for text interfaces and GUI (Graphical User Interface) Gesture controlled robot moves according to hand movement as we place transmitter in our hand. When we tilt hand in front side, robot start to moving forward and continues moving forward until next command is given. When we tilt hand in backward side, robot change its state and start moving in backwards direction until other command is given.

- When we tilt it in left side Robot get turn left till next command.
- When we tilt hand in right side robot turned to right.
- And for stopping robot we keeps hand in stable.

Traditional interfaces, keyboards and mice present a bottleneck in application that rely on heavy interaction of the user with the machine due to the unnaturalness of the interaction. From reading lots of related articles, we have learnt that recent efforts have attempted to eliminate this bottleneck by developing different ways of interacting with computers, for example: speech, handwriting. Through the use of gesture recognition, remote control with the wave of a hand of various devices is possible. Gesture controlling is very helpful for handicapped and physically disabled people to achieve certain tasks, such as driving a vehicle. Gestures can be used to control interactions for entertainment purposes such as gaming to make the game player's experience more interactive or immersive

Fig 3: Hand Control Assembly

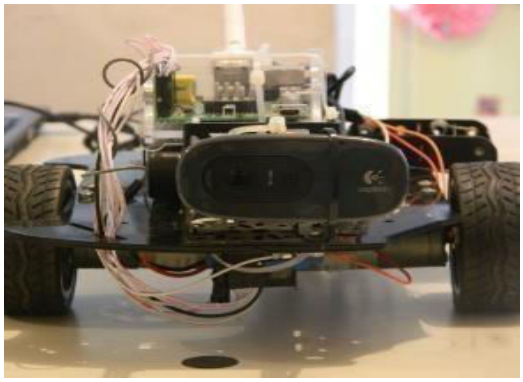


Fig 4: Robot Assembly

VII. CONCLUSION

We achieved our objective without any hurdles i.e. the control of a robot using gestures. The robot is showing proper responses whenever we move our hand. For controlling the robot remotely, Holteks' encoder-decoder pair (HT12E and HT12D) together with a 433MHz transmitter-receiver pair is used.HT12E and HT12D are CMOS ICs with working voltage ranging from 2.4V to 12V. Encoder HT12E has eight address and another four address/data lines. The data set

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 11, Issue 1, January 2022 ||

DOI:10.15662/IJAREEIE.2022.1101009

on these twelve lines (address and address/data lines) is serially transmitted when transmit- enable pin TE is taken low. The data output appears serially on DOUT pin. The data is transmitted four times in succession. It consists of differing lengths of positive-going pulses for 'l' and 'O,' the pulse- width for 'O' being twice the pulse-width for'1.' The frequency of these pulses may lie between 1.5 and 7 kHz depending on the resistor value between OSC1 and OSC2 PINS.

VIII.ACKNOWLEDGEMENT

A seminar work of such a great significance is not possible without the help of several people, directly or indirectly. First and foremost I have immense happiness in expressing my sincere thanks my parents then my guide, Prof. Mr. V.M. Joshi for his valuable suggestions, cooperation and continuous guidance. I feel a deep sense of gratitude to project co-ordinator and It's my pleasure to thank Dr. C. V. Ghule, Principal, who is always a constant source of inspiration.

REFERENCES

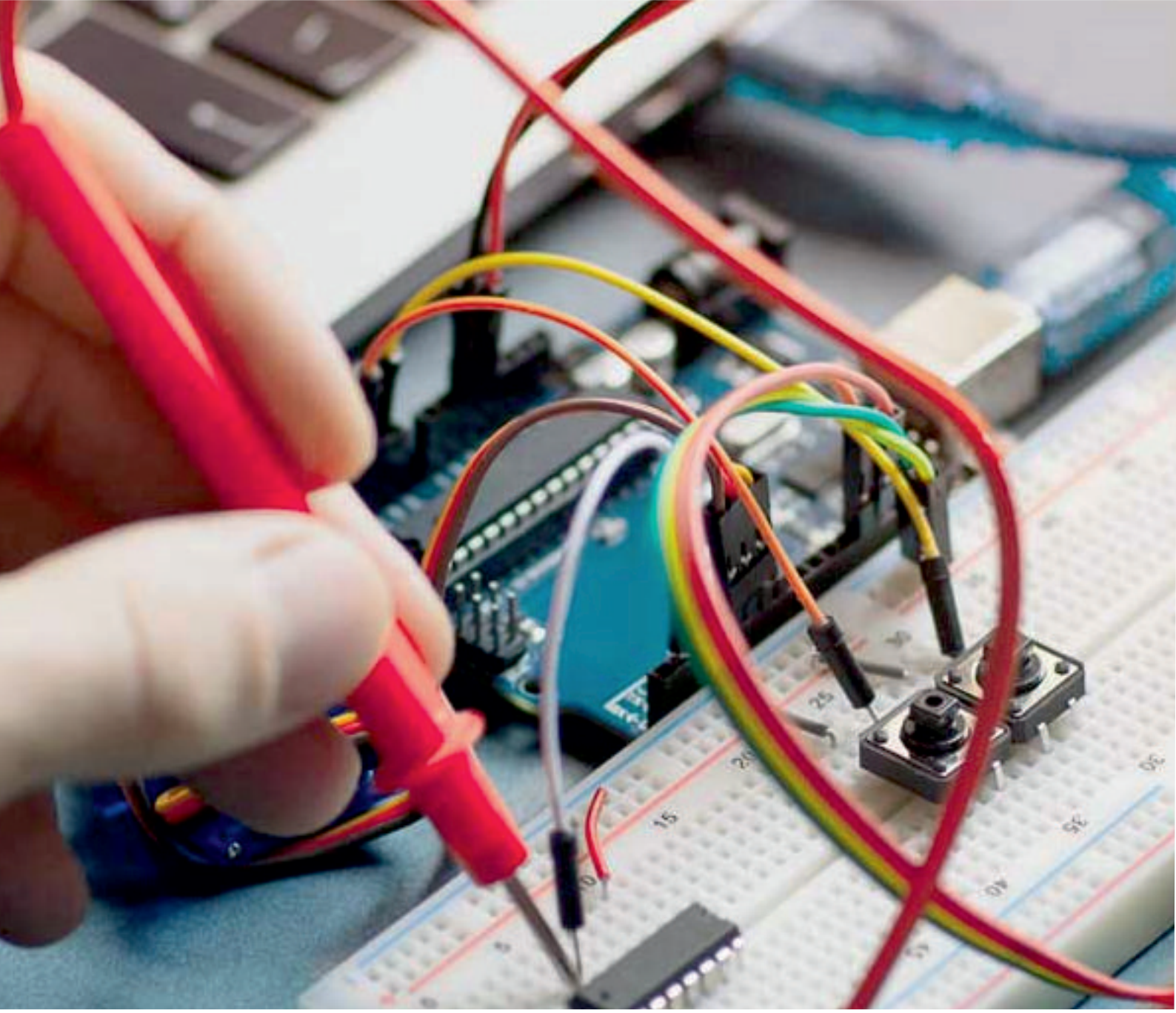
1. "Gesture Controlled Robot PPT"<http://seminarprojects
2. .com /s/hand-gesture-controlled-robot-ppt>
3. "Gesture Controlled Tank Toy User Guide"<http://www.
4. slideshare .net /neeraj18290/wireless-gesture-controlledtank-toy-transmitter>
5. "Embedded Systems Guide(2002)"<http://www.webstats checker.com/stats/keyword/a_hand_gesture_based_control_interface for a car robot>
6. "Robotic Gesture Recognition (1997)" by JochenTriesch and Christoph Von Der Malsburg<http://citeseerx.ist.psu. edu/viewdoc /summary? doi=10.1.1.37.5427>
7. "Real-Time Robotic Hand Control Using Hand Gestures" by Jagdish Lal Raheja, RadheyShyam, G. ArunRajsekhar and P. Bhanu Prasad
8. "Hand Gesture Controlled Robot" by Bhosale Prasad S.,
9. Bunage Yogesh B. and Shinde Swapnil V.
10. [7]http://www.robotplatform.com/howto/L293/motor_driv er_1.htm
11. [8]<http://en.wikipedia.org/wiki/Gesture_interface>
12. [9]<http://www.wisegeek.com/what-is-a-gear-motor.htm>
13. [10]<http://www.scribd.com/doc/98400320/inTech-RealTime-Robotic- Hand-Control-Using-Hand-Gestures>
14. [11]<http://en.wikipedia.org/wiki/DC_motor>[12]http://electronics.stackexchange.com/questions/18447/ what-is-back-emf-counter-electromotive-force

BIOGRAPHY

Master. Sapkal Vivek Jitendra [2]:- My Higher studies were done in K.B.P. Polytechnic, Kopargaon and the UG is from Adsul's Technical Campus. The trend I am & will be interested is Electrical Engineering. I also wish to complete my PG in MBA operations or IT.

Master. Salunke Yogesh Sunil[3]:-
My Higher studies were done in Dr. N.J. Paulbudhe and the UG is from Adsul's Technical Campus. The trend I am & will be interested is Electrical Engineering. My Ambition is to work in Product Development Department.

Miss.Phopse Kalyani Shukleshwar[4]:-
My Higher studies were done in Sanjivani K.B.P Polytechnic, Kopargaon and the UG is from Adsul's Technical Campus. The trend I am & will be interested is Electrical Engineering. My Ambition is to work in R&D(Research & Development) Department.



INNO SPACE
SJIF Scientific Journal Impact Factor

Impact Factor: 7.282

doi cross ref

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

9940 572 462 6381 907 438 ijareeie@gmail.com

www.ijareeie.com

Scan to save the contact details