International journal of Inventive Research in Science and Technology ISSN: 2583-5637 (Online)

Volume 1 Issue 12 December 2022

# THE GESTURE CONTROLLED ROBOT

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**ABSTRACT :-**A robot is the system which deals with understand human body language. This has minimised the construction, design and operation. This system is related need for text interfaces an GUIs (Graphical User Interface). Robots and their designs, manufactures, and applications. Robotics is currently focused on systems development, modularity, flexibility, redundancy, fault tolerance and some other researchers offering sensor-based robotic arms to fully automate manufacturing processes or tasks. Emerging industries and a workforce of are important constraints on getting the job done. An important role in the system is played by automation that saves human effort. System used for regular and frequent operations. One of the most frequently performed major operations is the acquisition and placement of operations from source to destination. Earlier systems used sensors to make the robot detect human hand movements and follow the same principle. When the person moves his hand, the accelerometer starts to move according to the movement of the hand sensor ( temp, gesture), and the sensor detects an object or parameter according to the movement of the hand.

**Keywords:** Robot, Automation System, Automatic control system, Sensor Control system.

## I. INTRODUCTION

Recently, great efforts have been made to develop intelligent and natural interfaces between users and computer systems based on human gestures. Gestures provide an intuitive interface for both humans and computers. Accordingly, such gesture-based interfaces can replace conventional interface devices as well as be used to enhance their functionality.

**ROBOT :-**

A robot is generally an electrical machine that can automatically perform tasks. Some robots require some control of the , and this can be done with a remote control or a with a computer interface. Robots can be autonomous, semi-autonomous or remotely controlled. The robots have evolved so much and can imitate humans that they seem to have a mind of their own.

**HUMAN MACHINE INTERACTION :-**

A critical aspect of a successful robotic system is the's human-machine interaction. In the early days, the only way to communicate with a robot was programming, which required painstaking work. Advances in science and robotics have made gesture-based recognition a reality. Gestures come from movements or states of the body, but usually from the face or hands. Gesture recognition can be thought of in terms of computers.

**GESTURE :-**

Gestures are actions that need to be seen by others and convey some information. A gesture is generally considered the movement of a body part, especially the hand or head, to express a thought or meaning.

**LITERATURE SURVEY –**

Our motivation for this project came from a person with a disability whose manually maneuvered the wheelchair with great difficulty. So we wanted to create a device that would help these people control their chair without touching the chair wheels. Our goal is to make this device simple and affordable so that it can be mass produced and used for a variety of purposes. Development of accelerator and gyroscope-based hand gesture recognition sensor to control the hand of underwater remote control robot. The hand gesture sensor in this article relies on the accelerometer and gyroscope. The gyroscope is attached to the hand as a sensor used to sense the position of the operator's hand during maneuvers on the controlled vehicle. Experienced operators can easily control the system using the joystick, but the is a bit difficult for novice users. This system consists of two main parts, the ground station, this paper, the hand gesture sensor that recognizes the sensors used by the user and the floor station, and the that can control the arm of the robot. Here, the accelerator and the gyroscope are installed on the joints of the hand. Device is rated for screen, wireless mouse and keyboard. The is a paper machine communication device, the most intuitive communication device interacts with the device and other devices. When communicating with the machine, commands are implemented as hand gestures. Physical interactions must be carefully planned here as the is a user-friendly system where the interacts normally and repulsion is minimized. The experiment consists of physical interactions between humans and humanoid robots. Provides the best results after testing among various factors

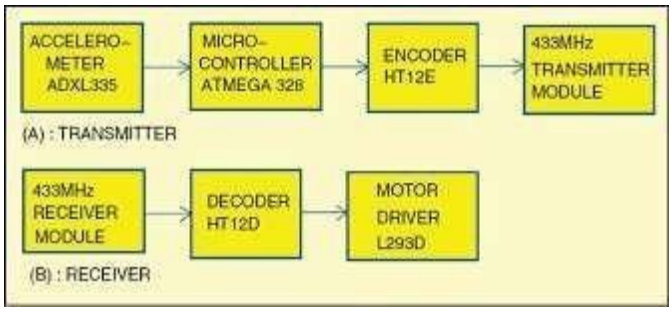
human mechanism. Lifting reduces work force. It can lift heavy objects. people with physical disabilities do the primary activities. Collected EMG input and output muscle mass. Wireless connection to a computer. easy to use. There are no restrictions. Efficient and accurate performance. You have to control the movement of robots using gestures and claps in an enclosed space. The hardware is predicted in the microcontroller code so that the does not create unnecessary robot movements. The clap sound should activate () the gesture tracking mode for robot movement and disable () gesture monitoring mode after the robot's () final stop.

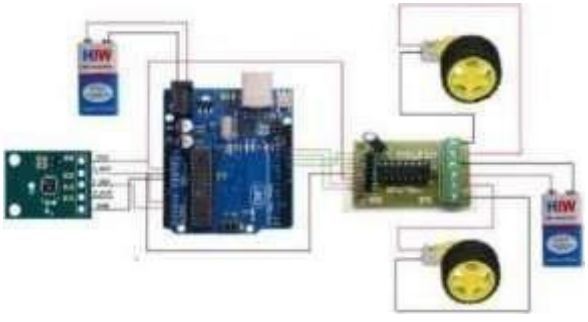
**PROPOSED SYSTEM**

In this project, a mobile robot controlled by hand gestures is developed. As mentioned earlier, the gesture control robot has acceleration sensor (ADXL335), Arduino UNO, and motor control circuit (L293D) as its main components. When the robot turns on, the accelerometer sensor detects the input and forwards it to the Arduino UNO. This data is captured by the Arduino and then passed the appropriate data to the motor driver circuit. Based on the data, the movement of the motor, i.e. the movement of the robot, is determined.The movement of robot is as follows :-

- The robot moves **Forward,** when the X-axis of ADXL335 is less than 250.
- The robot moves **Backward,** when the X-axis of ADXL335 is greater than 300.
- The robot moves **Left,** when the Y-axis of ADXL335 is less than 250.
- The robot moves **Right,** when the Y-axis of ADXL335 is greater than 300.
- The robot **Stops** moving**,** when the X-axis of ADXL335 is 250< x-axis <.300 and Y-axis of ADXL335 is 250< y-axis<.300.

**BLOCK DIAGRAM & CIRCUIT DIAGRAM**



## 1. COMPONENTS DESCRIPTION

**1 ARDUINO UNO .ArduinoUno**

isamicrocontrollerboardbasedon8-bitATmega328Pmicrocontroller.AlongwithATmega328P,itconsistsothercomponentssuchascrystaloscillator,serialcommunication,voltageregulator,etc.tosupportthemicrocontroller.ArduinoUnohas14digitalinput/outputpins6analoginputpins,aUSBconnection,APowerbarreljack,anICSPheaderandaresetbutton

**How to use Arduino Board :-**

The 14 digital input/output pins can be used as input or output pins using pin mode(), digital read() and digital() functions in Arduino programming. Each pin operates at 5V, can supply or accept up to 40mA of current, and has an internal 20-50kΩ pull-up resistor disabled by default. Some of these 14 pins have specific functions listed below.

***TheArduino Communication can be used to communicate with a computer, other Arduino boards or other microcontrollers. The ATmega328P microcontroller provides UART TTL (5V) serial communication which can be done using digital pin 0 (Rx) and digital pin 1 (TX). The ATmega16U2 on the board routes this serial communication over USB and appears as a virtual COM port to the computer's software. The ATmega16U2 firmware uses standard USB COM drivers and requires no external drivers. But Windows requires .inf files. The Arduino software includes a serial monitor that can send and receive simple text data to and from the Arduino board. The Arduino software includes a Wire library that simplifies using the I2C bus.***

***2. Accelerometer (ADXL335)***

***The accelerometer is an electromechanical device designed to measure acceleration forces. Only the acceleration due to gravity, i.e. the force g, is shown. Measures acceleration in g.***


**ADLX335 Accelerometer**

On Earth, 1 g means there is an acceleration of 9.8 m/s2. On the Moon, it's 1/6 Earth, and on Mars, it's 1/3 Earth. Accelerometers can be used to detect tilt as well as dynamic acceleration due to motion, shock or vibration.

**3.MOTOR DRIVER CIRCUIT(L293D)**

- Can be used to run Two DC motors with the same IC.
  - Speed **and** Direction **Controllable**
  - Motor **Voltage Vcc2(Vs): 4.5V to 36V**
  - Maximum **Motor** Peak **Current:** 1.2A
  - Maximum Continuous Motor Current: 600mA
  - Transition **Time:** 300ns **at 5V and 24V**
  - Automatic Thermal **Shutdown Available**
  - Available in 16-pin DIP, TSSOP, **and** SOIC packages

***Where to use L293D IC***

The L293D is a popular 16-pin motor driver IC. As the name suggests, it is mainly used to drive motors. One L293D chip can drive two DC motors simultaneously. In addition, the direction of these two motors can be controlled independently. So, if you have a motor with an operating voltage of less than 36V and an operating current of less than 600mA that needs to be driven by digital circuits such as operational amplifiers, 555 timers, digital gates, or Micron rollers such as Arduino, PIC, ARM, etc. This chip is the right choice for you. will be

2. **DC MOTOR**

**Electrical DC Motors** are continuous actuators that convert electrical energy into mechanical energy. The motor achieves this by producing a continuous angular rotation that can be used to rotate pumps, fans, compressors, wheels, etc.

DC rotary motors, linear motors are also available with which the can generate continuous liner movement.

The mainly has three types of general electric motors:

the AC motor, DC motor and stepper motor. C motors are typically used in large single- or multi-phase industrial applications that require constant torque and speed to drive large loads such as fans or pumps. This motor guide will cover only the simple lightweight DC motors and stepper motors used in the various types of electronic positioner motors.

***The Basic DC Motor***

The DC Motor or Direct Current Motor to give it its full title, is the most commonly used actuator for producing continuous movement and whose speed of rotation can easily be controlled, making them ideal for use in applications were speed control, servo type control, and/or positioning is required. A DC motor consists of two parts, a “Sta-tor” which is the stationary part and a "Rotor”which is the rotating part. Normal DC motors have almost linear characteristics with their speed of rotation being determined by the applied DC voltage and their

output torque being determined by the current flowing through the motor wingdings. The speed of rotation of any DC motor can be varied from a few revolutions per minute (rpm) to many thousands of revolutions per minute making them suitable for electronic, automotive or robotic applications. By connecting them to gearboxes or gear-trains their output speed can be decreased while at the same time increasing the torque output of the motor at a high speed

**5.ROBOT CHASIS**

The chassisis the structural component for the robot which contains the drivetrain and allows the robot to be mobile by using wheels, tank treads, or another method.

An example of a chassis is the assembly described as the chassis. Use Case Vehicles For the vehicle, the term "rolling chassis" includes the frame and engine, transmission, drive shaft, differential and suspension. Underbody bodies, which are not normally required for structural integrity, are assembled to the chassis to complete the vehicle. For the truck, the rolling chassis consists of assemblies of all major parts of the truck that must be capable of being used on the road. The chassis of a car differs from that of a commercial vehicle due to its heavier load and constant use at work. Commercial vehicle manufacturers sell "chassis only", "hood and chassis" versions, and "chassis cap" versions that can be fitted to special bodies. This includes campers, fire trucks, ambulances, RVs and more.

**ADVANTAGES, DISADVANTAGES& APPLICATIONS**

**Advantages**

- Easy to operate.
- Low power consumption.
- User friendly.
- Single equipment = multiple applications.
- When extended further in the hardware section, numerous applications can be added.
- Components are easily available.

**Disadvantages :-**

- If power supply fails system won't work
- Failure of device/components may have dire consequences, fatal accidents can occur.

**Applications :-**

- Gestures can be used to control interactions for entertainment purposes such as gaming to make the game player's experience more interactive or immersive.
- Through the use of gesture recognition, remote control with the wave of a hand of various devices is possible
- Industrial application for trolley control, lift control, etc...
- Military applications to controlrobotics.
- Medical application for surgerypurpose.
- Construction application.
- Plays a major role in helping very weak people in their daily life.
- Can be used as an autonomous for physically challenged people.
- General purpose device for better living.
- Useful for moving heavy loads from oneplace to another.

**FUTURE SCOPE & CONCLUSION Future Scope:-**

In the future, we plan to develop an automatic wheelchair for the disabled. This wheelchair can be controlled with a wireless remote control, reducing the amount of wires. Instead of using an accelerating motion, the retina with an optical sensor can be used to move the wheelchair accordingly. A voice command chip can be used to interface voice signals with a microcontroller. This system can be extended to include GSM to send SMS in case of emergency.

**FUTURE SCOPE :-**

In the future, we plan to develop an automatic wheelchair for people with disabilities. This wheelchair can be controlled with a wireless remote control, saving wires. Instead of using an accelerating motion, an optical sensor can be used to move the wheelchair accordingly using the retina of the eye. A voice command chip can be used to interface voice signals with microcontrollers. This system can be extended to include GSM to send SMS in case of emergency.

**Conclusion :-**

**These technological** advances in computing, **sensory** devices, materials and **processing/sorting technologies** will make **next-generation** devices more **affordable,** powerful, versatile and **widespread. Gesture-controlled robotic systems provide** an alternative way **to control** robots. **A** more natural way **to control a device, gesture control** makes **robot** control more efficient and easier.

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