THE GESTURE CONTROLLED ROBOT

Dr. C.K. Gomathy, Mr. G. Niteesh, Mr K. Sai Krishna

ABSTRACT: A robot is the system which deals with construction, design and operation. This system is related to robot and their design, manufacture, application. Robotics is currently focused on developing systems that modularity, flexibility, redundancy, fault tolerance and some other researchers are on completely automating a manufacturing process or a task, by providing sensor based to the robot arm. Recently developing industry and man power are critical constraints for completion of task. To save human efforts the automation playing important role in the system. This system is used for regular and frequently carried work. One of the major and most commonly performed works is picking and placing of jobs from source to destination. In the earlier systems, the motion of the human hand is sensed by the robot through sensors and it follow the same. As the human travels their hand, the accelerometer also start moving accordingly motion of the hand sensor displaces and this sensor senses object or parameter according to motion of hand.

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

I. INTRODUCTION

Recently, strong efforts have been carried out to develop intelligent and natural interfaces between users and computer-based systems based on human gestures. 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.

ROBOT :-

A robot is usually an electro-mechanical machine that can perform tasks automatically. Some robots require some degree of guidance, which may be done using a remote Control or with a computer interface. Robots can be autonomous, semi-autonomous or remotely controlled. Robots have evolved so much and are capable of mimicking humans that they seem to have a mind of their own.

HUMAN MACHINE INTERACTION :-

An important aspect of a successful robotic system is the Human-Machine interaction. In the early tears 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 minimised the need for text interfaces an GUIs (Graphical User Interface).

GESTURE :-

A gesture is an action that has to be seen by someone else and has to convey some piece of information. Gesture is usually considered as a movement of part of the body, especially a hand or the head, to express an idea or meaning.

MOTIVATION FOR PROJECT :-

Our motivation to work on this project came 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.

OBJECTIVE OF PAPER :-

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 purposes.

II. LITERATURE SURVEY

Development of hand gesture recognition sensor based on accelerator and gyroscope for controlling hand of underwater remotely operated robots".

In this paper hand gesture sensor depends on accelerometer and gyroscope. Gyroscope is the sensor which is used to capture the position the operator hand when he is working in operated vehicle and it is attached with a hand. The expert operator may use the joystick for manage system easily and it is little bit complex for the starting users. This system has two main part, ground station this paper the hand gesture recognising sensor used by the user and the floor station and he can able to control the hands of robot at the . Here accelerator and gyroscope are fitted in hand joints. The device assess the screen, wireless mouse and with the keyboard. In this paper people machine communicating device, most intuitive communicating device, to interacts to the device and the other appliance. In case of communicating to the machine commands are being implemented use of hand gesture.

Here the physical interaction has to be planned carefully as a userfriendly system which interact normally and minimize repulsion. The experiments consists of physical interaction between the human and the humanoid robot .

It gives the best result after testing among the various factor. Userfriendly, Easy to work.

A driven is operated to the system to follow the

human's mechanism. Manpower is reduced incase of lifting objects of High weights can be lifted**.**
the physically challenged humans to do primary actions.
Electromygraphy input and output are gathered Muscle mass
. wirelessly connected to the
computer. Simple to use. Have no constraint. Efficient and accurate performance. In indoors works we must manage the course of a robots the use of gestures and clap sounds. The hardware is predicted on microcontroller code to keep away from unessential motion of the robots. The clap sound is to actuate the gesture tracking mode to transport the robot and deactivate the gesture monitoring mode after last ceasing the robot.

PROPOSED SYSTEM

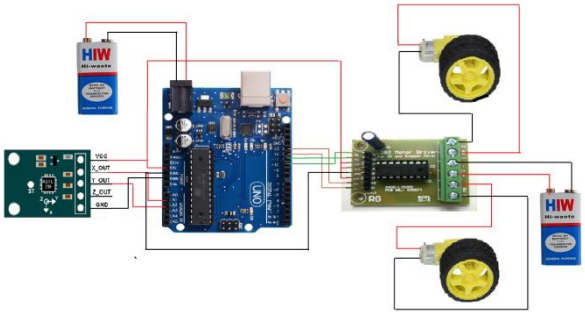
In this project, a mobile robot that is controlled by the gestures made by the hand, is designed. As mentioned earlier, the gesture-controlled robot has accelerometer sensor (ADXL335), Arduino UNO, Motor driver Circuit(L293D) as main parts. When the robot is powered on, the Accelerometer Sensor senses the input and transmits it into Arduino UNO.

This data is captured by the Arduino, which then transmits a corresponding data to the Motor Driver Circuit . Based on the data, the movement of the motors, and hence the movement of the robot is defined.

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

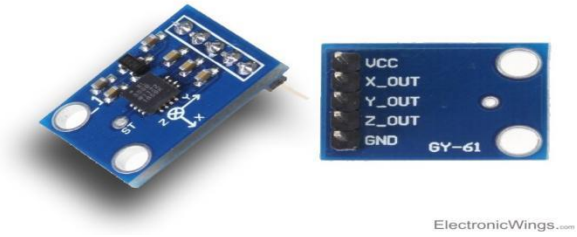
How to use Arduino Board :-

The 14-digital input/output pins can be used as input or output pins by using pin mode(), digital read() and digital write() functions in arduino programming. Each pin operates at 5V and can provide or receive a maximum of 40mA current, and has an internal pull-up resistor of 20-50 K Ohms which are disconnected by default. Out of these 14 pins, some pins have specific functions as listed below:

Communication :-

Arduino can be used to communicate with a computer, another Arduino board or other micro controllers. The ATmega328P microcontroller provides UART TTL (5V) serial communication which can be done using digital pin 0 (Rx) and digital pin 1 (TX). An ATmega16U2 on the board channels this serial communication over USB and appears as a virtual com port to software on the computer. The ATmega16U2 firmware uses the standard USB COM drivers, and no external driver is needed. However, on Windows, a .inf file is required. The Arduino software includes a serial monitor which allows simple textual data to be sent to and from the Arduino board. The Arduino software includes a Wire library to simplify use of the I2C bus.

2.ACCELEROMETER (ADXL335)
An accelerometer is an electromechanical device that willmeasure acceleration force. It shows acceleration, only due to cause of gravity i.e. g force. It measures acceleration in g unit.



ADLX335 Accelerometer

On the earth, 1g means acceleration of 9.8 m/s2 is present. On moon, it is 1/6th of earth and on mars it is 1/3rd of earth.Accelerometer can be used for tilt-sensing applications as well as dynamic acceleration resulting from motion, shock, or vibration.

3.MOTOR DRIVER CIRCUIT (L293D)

- Can be used to run Two DC motors with the same IC.
- Speed and Direction control is possible
- Motor voltage Vcc2 (Vs): 4.5V to 36V
- Maximum Peak motor current: 1.2A
- Maximum Continuous Motor Current: 600mA
- Transition time: 300ns (at 5Vand 24V)
- Automatic Thermal shutdown is available
- Available in 16-pin DIP, TSSOP, 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. A single **L293D IC** is capable of running two DC motors at the same time; also the direction of these two motors can be controlled independently. So if you have motors which has operating voltage less than 36V and operating current less than 600mA, which are to be controlled by digital circuits like Op-Amp, 555 timers, digital gates or even Micron rollers like Arduino, PIC, ARM etc.. this IC will be the right choice for you.

2. DC MOTOR

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

As well as conventional rotary DC motors, linear motors are also available which are capable of producing a continuous liner movement. There are basically three types of conventional electrical motor available: AC type Motors, DC type Motors and Stepper Motors.

AC Motors are generally used in high power single or multi-phase industrial applications were a constant rotational torque and speed is required to control large loads such as fans or pumps.

In this tutorial on electrical motors we will look only at simple light duty **DC Motors** and **Stepper Motors** which are used in many different types of electronic, positional .

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 chassis is 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. A chassis is sometimes referred to as the robot's frame. An

example of a chassis is then the assembly is described as a rolling chassis.

Examples of use :-

Vehicles

In the case of vehicles, the term *rolling chassis* means the frame plus the "running gear" like engine, transmission, drive shaft, differential and suspension. An under-body which is usually not necessary for integrity of the structure, is built on the .chassis to complete the vehicle.

For commercial vehicles, a rolling chassis consists of an assembly of all the essential parts of a truck to be ready for operation on the road. car chassis will be different from one for commercial vehicles because of the heavier loads and constant work use. Commercial vehicle manufacturers sell "chassis only", "cowl and chassis", as well as "chassis cab" versions that can be outfitted with specialized bodies. These include motor homes, fire engines, ambulances, box trucks, etc.

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 control robotics.
- Medical application for surgery purpose.
- 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 one place to another.

FUTURE SCOPE & CONCLUSION

Future Scope :-

In future we are going to design an automated wheel chair for handicapped people. This wheel chair can be operated by a wireless remote which can reduce the wiring arrangements. Instead of using acceleration motion we can use eye retina using optical sensor to move the wheel chair accordingly. We can use voice command IC's to interface our voice signal with micro controller. This system can be extended by including GSM which sends an SMS during emergency.

Conclusion :-

This technology advances in computing, sensor devices, materials and processing/ classification techniques will make the next generation of this devices cheaper, more powerful, versatile and more ubiquitous. The gesture controlled robot system gives an alternative way of controlling robots. Gesture control being a more natural way of controlling devices makes control of robots more efficient and easier.

REFERENCES

[1] RiyazMansuri, SandeshVakale, AshishShinde, Tanveer Patel, "Hand Gesture Control Robot Vehicle", IJECT, Vol-4, Issue SPL-2, PP. 77-80, JAN-MARCH 2013.

[2] Aswath S, Chinmaya Krishna Tilak, Amal Suresh and GaneshaUdupa, "Human Gesture Recognition for Real-Time Control of Humanoid Robot", International Journal of Advan

[3]Dr.C.K.Gomathy,K.Bindhusravya,P.Swetha,S.ChandrikaArticle:ALocationBasedValuePredictionforQualityofWebService,PublishedbyInternationalJournalofAdvancedEngineeringResearchandScience(IJAERS),Vol-3,Issue-4,April-2016]ISSN:2349-6495

[4]Dr.CKGomathy,Article:AnEffectiveInnovationTechnologyInEnhancingTeachingAndLearningOfKnowledgeUsingIctMethods,InternationalJournalOfContemporaryResearchInComputerScienceAndTechnology(Ijcrcst)*E*-Issn:2395-5325Volume3,Issue4,P.No-10-13,April'2017

[5]Dr.CKGomathy,Article:AWebBasedPlatformComparisonbyanExploratoryExperimentSearchingForEmergentPlatformProperties,IAETSDJournalForAdvancedResearchInAppliedSciences,Volume5,Issue3,P.No-213-220,ISSNNO:2394-8442,Mar/2018

[6]CKGomathy,Article:AStudy on the Effect of Digital Literacy andinformationManagement,IAETSDJournalForAdvancedResearchInAppliedSciences,Volume7Issue3,P.No-51-57,ISSN NO:2279-543X,Mar/2018

[7]Dr.CKGomathy,Article:TheSecuredProficientSmartElectronicVotingSystem,InternationalJournalofEngineeringandAdvancedTechnology(IJEAT)ISSN:2249–8958,Volume-9Issue-4,April2020

[8]C.K.Gomathy.(2010),"CloudComputing:BusinessManagementforEffectiveServiceOrientedArchitecture"InternationalJournalofPowerControlSignalandComputation(IJPCSC),Volume1,IssueIV,Oct-Dec2010,P.No:22-27,ISSN:0976-268X

AUTHORS PROFILE

Dr.C.K.Gomathy is Assistant Professor in Computer Science and Engineering at Sri Chandrasekharendra Saraswathi Viswa Mahavidyalaya deemed to be university,Enathur,Kanchipuram,India. Her area of interest is Software Engineering,Web Services, Knowledge Management and IOT.

Dr.V.Geethais assistant professor in computer science and engineering at Sri Chandrasekharendra Saraswathi Viswa Mahavidyalaya ,Enathur, Kanchipuram,India. Her area of intrest lies in Java Programming,SoftwareQuality Assurance,Computer System Architecture Domain.

Mr.Gajjala Nitheesh ,UG Scholar,, Computer Science and Engineering, Sri Chandrasekharendra Saraswathi Viswa Mahavidyalaya deemed to beuniversity, Enathur,Kanchipuram,India.His Area of Interest in IOT and management System.

Mr.Kandimalla Sai KrishnaUGScholar,Computer Science and Engineering, Sri Chandrasekharendra SaraswathiViswa Mahavidyalaya deemed to beuniversity, Enathur, Kanchipuram, India.His Area of Interest in IOT and management