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Hand Gesture Control Robot

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Abstract: ***In this paper we have designed a basic robotic chassis which can be easily controlled with the help of accelerometer instead of using button control. Here the most significant device is accelerometer. The accelerometer is the 3 axis estimation gadget with +-3g range. This gadget is made by utilizing polysilicon surface sensor and signal controlling circuit to quantify acceleration. The outcome of the accelerometer is analog in nature and corresponding to the acceleration. This gadget measures the static acceleration of gravity when we tilt it. And gives an outcome in type of movement or vibration. The hand position is sensed and the coordinates generated is considered as the parameter and if neccessary conditions are met, the statement prescribed in the arduino code is executed and the direction of the robot chassis is changed accordingly. So that it can perform the task such as forward moving, backward moving, turning left, turning right and stop. In many cases, the robot devices are some tough and complex while we control it with the help of buttons and switches. The major fields that prefers hand gesture robots are Defence field, industrial robotics, vehicle part assemble in civil side, medical field for surgery. In these fields if we are using remote controls and the button, the task will become complex. Sometimes the operator may get confuse in the switch control and button control, so a new concept is used to manage the gadget with the motion of the hand and at the same time it will manage the motion of the device.***

Keywords: Accelerometer, Axis control, Hand tilting

I. INTRODUCTION

Robots are used to do the work, that human cant perform. To raise the usage of robotics where restrictions that are not mandatory, for example, fire handling task or protection task. The device receives the input from the user and work out according to the received input.

Human hand motion are received by the wire connected to the accelerometer. The robots travel by motion made by the user hand tilting. The objective of this wired control device is achieved using Arduino, accelerometer. The Arduino microcontroller receives the analog input values (x axis, y axis) from the accelerometer and converts that analog value to digital value.

The input is received by the Arduino Uno microcontroller after titling. The robot turns left and right when we tilt our palm to left and right.it moves towards front when the palm tilted towards forward and the device halts while it is corresponding to the surface.

In this manner, we are able to Use the device to work out those tasks that will be useful for human beings.

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In the venture we portray regarding the signal to manage robot that can be manage by your typical hand motion. Here, the program is planned by utilizing Arduino Uno.

PROBLEM DEFINITION:

The objective of this paper is to potray the control of the robot using the accelerometer with the help of human hand tilting. Accelerometer signals are received and assisted with wired correspondence. The robot moves depends upon the signal made by your hand and from a separation. In this paper we describe approximately the gesture manage robot which may be managed through your everyday hand gesture Here, the program is designed by using Arduino Uno.

SOFTWARE SPECIFICATION:

Arduino UNO

HARDWARE REQUIREMENTS:

- Arduino board
- DC Motors
- Accelerometer
- Motor Driver L293D
- Volt Battery
- Battery Connector
- USB cable
- Wires
- Robot Chassis
- switch

II. LITERATURE SURVEY

Ronny mardiyanto, heri suryoatmojo [1] “Development of hand gesture recognition sensor based on accelerator and gyroscope for controlling arm 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 underwater operated vehicle and it is attached with a hand. The expert operator may use the joystick for aquatic manage system easily and it is little bit complex for the starting users. This system has two main part, ground station and aquatic remotely operated robot arm.in this paper the hand gesture recognising sensor used by the user and the floor station and he can able to control the arms of robot at the underwater. Here accelerator and gyroscope are fitted in arm joint,arms. The device assess the 3Dimensional spot of every part for making 3Dimensional spot of hand. Here we used the CAD software.This device can be operated without any training. Underwater application can be easily done with this device.

Anala pandit, Dhairya Dand [2] A simple wearable hand gesture device using institute of medical and early modern studies. Interacting with systems is done with the help touch screen, wired or 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 re being implemented use of hand gesture.

Here accelerometer used to migrate the touchpad to revolve 3Dimensional object. Accelerometer changed to wireless communication 3Dimensional graphics can be done easily. Effective interaction.

Christian manery [3] **"**hugging a wobot weird? Investigating the influence of robot appearance on user's perception of hugging". Humanoid robots are able to interact with humans using physical interaction like hugging and handshaking. 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 participants and the humanoid robot ARMAR – lllb. It gives the best result after testing among the various factor. Userfriendly, Easy to work.

Akitoshi harada [4] Robot finger design for myoeletric hand and recognition of finger motion via surface ElectroMyGraphy. In this paper, robots hand layout forcing to the software to a ME prosthetic hand and action of finger operation through ground ElectroMyoGraphy are detailed. The robots consists of index fingers or thumb fingers, is produced to apply basic actions needed in real time, holding or grabbing. A driven is operated to the system to follow the human's mechanism. For controlling each finger of the developed myoelectric prosthetic hand independently,Manpower is reduced incase of lifting objects.High weight can be lifted**.**

Jianhua Ren, Huichao Wang, [5] **"**A portable artificial robotic hand controlled by EMG signal using ANN classifier." In this paper, creating a transportable robots for the physically challenged humans to do primary actions. Electromygraphy input and output are gathered Muscle mass of human being arm to get the intensions of actions, where 6 types of Geesture are choosed to exchange ideas . An ANNis skilled in steps with the feature tookup from the ME signal. The robots hand is made with 7 stage of freedom and hardware with sign acquisition electricity control and micro processor are designed. wirelessly connected to the computer. Simple to use. Have no constraint. Efficient and accurate performance.

Vinayak kamanth, Sandeep Bhat [6] "Kinetic sensor based real-time robot path planning using gesture and clap sound."At present many of the indoor works like cleaning.,object reputation and so on. Are carried out by using the robotic. For the indoors works we must manage the course of a robots the use of gestures and clap sounds. Here superior approach is used for adjusting the clap sound gesture commands from kinetic sensor related to the computer and mobile phone is hooked up via RF hyper link. 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.

III. DESIGN OF SYSTEM

3.1 CIRCUIT DESIGN:

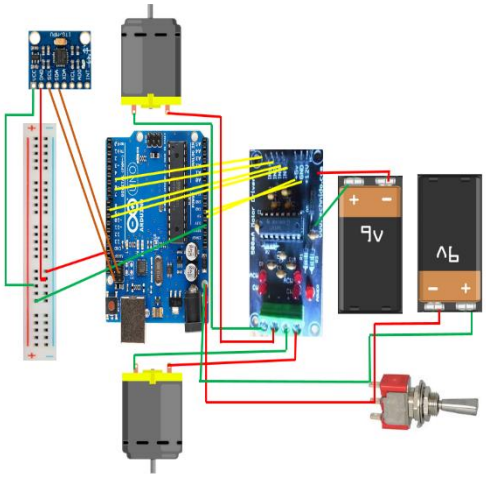

Fig 3.1: Circuit Design

3.2 FLOW CHART

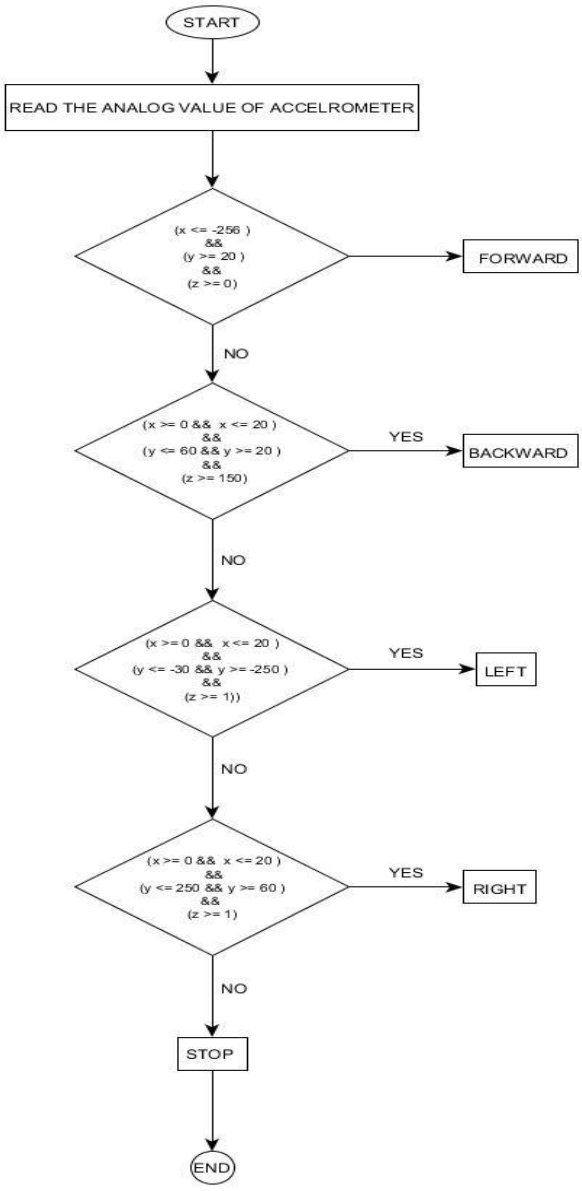

Fig 3.2: Flow Chart

IV. MODULES

4.1 MODULES:

The accelerometer is kept on the palm of the user and the robot moves in steps with the palm movement. In this paper we explained about 5 distinctive gestures role of the persons hand i.e halt condition, front moving, backward moving and turns towards right and left.

4.2 STOP CONDITION:

The user holds the accelerometer towards parallel to the ground. At that time the signal from the accelerometer is sent to the Arduino and the robot stop moving. This state is referred here as stop condition.

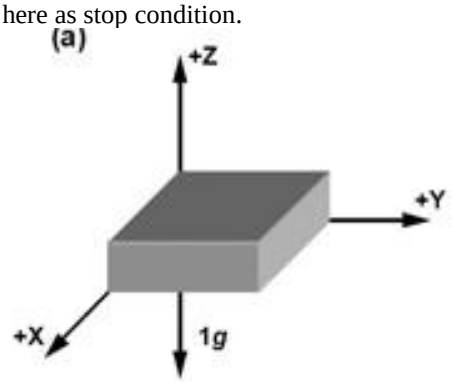

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Fig 4.2: Stop Condition

4.3 FORWARD TILT:

The user holds the accelerometer and the accelerometer tilted towards the front the x,y,z axis is sent to the Arduino. If the x,y,z axes satisfies the condition x>-*250,y>=20 ,z>=0, the robot moves front.

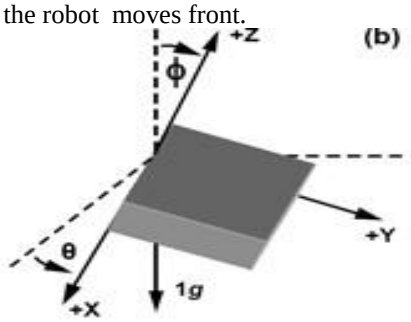

Fig 4.3: Forward tilt

4.4 BACKWARD TILT:

The user holds the accelerometer and the accelerometer tilted towards the back the x,y,z axis is sent to the Arduino. If the x,y,z axes satisfies the condition x>=0 and x<=20,y<=60and y>=20 ,z>=150, the robot moves back.

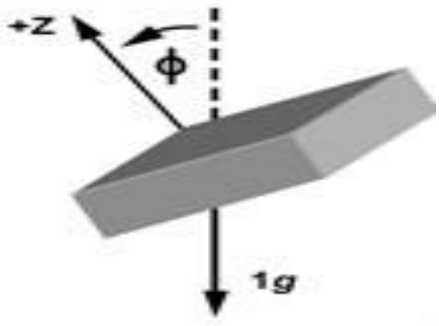

Fig 4.4: Backward tilt

4.5 RIGHT TILT:

The user holds the accelerometer and the accelerometer tilted towards the right the x,y,z axis is sent to the Arduino. If the x,y,z axes satisfies the condition x>=0 and x<=20,y>=250,y>=60 ,z>=1, the robot moves right.

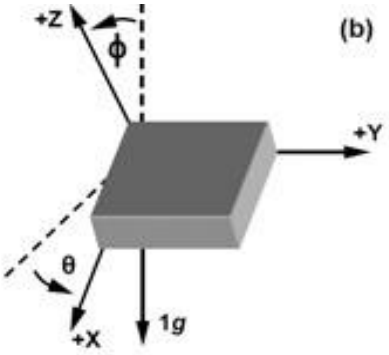

Fig 4.5: Right tilt

4.6 LEFT TILT:

The user holds the accelerometer and the accelerometer tilted towards the left the x,y,z axis is sent to the Arduino. If the x,y,z axes satisfies the condition x>=0,x<=20,y>=-3,y>=-250 ,z>=1, the robot moves left.

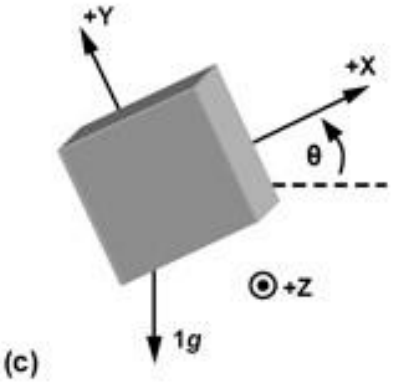

Fig 4.6: Left tilt

4.7 WORKING OF THE ROBOT BY ACCELEROMETER:

- Here we use accelerometer to transmit the axis value to the Arduino. The axis is changed according to the
- Hand tilt of the user and the axis value is sent to the Arduino repeatedly.
- If the user turns the accelerometer towards front simultaneously the robot moves forward. If the user turns the accelerometer towards backward, simultaneously the robot moves backward.
- If the user turns the accelerometer toward left, simultaneously the robot turns left. If the user turns the accelerometer towards right, simultaneously the robot turns right.
- If the user keeps the accelerometer parallel to the ground, simultaneously the robot stops moving. The movement of the robot is based on the tilting of the accelerometer.
- There are total five conditions for this Gesture controlled Robot:

MOMENT OF HAND	INPUT FROM GESTURE					DIRECTION
	PIN 5 (13)	PIN 4 (10)	PIN 3 (9)	PIN 2 (6)	PIN1 (5)	
Static	1	0	0	0	0	stop
Tilt Right	0	0	0	1	0	Turn right
Tilt left	0	0	0	0	1	Turn left
Tilt backward	0	0	1	1	0	Reverse
Tilt forward	0	1	0	0	1	Forward

Fig 4.7: Input for the gesture

- Here the pin1, pin2, pin3, pin4, pin5 are the pins in DC motor
- when the accelerometer is tilted the axis calibration from the accelerometer is send to the Arduino and converted into as analog value
- if the x axis value <= -256 and y axis value >= 20 and z axis >= 0 the charge from battery is send to pin1 and pin 4 of DC motor via the Motor Driver L293D and it moves forward direction
- if x axis between0 and 20 and if y axis between 20 and 60 and if z axis >= 150 the charge from battery is send to pin2 and pin3 of DC motor via the Motor Driver L293D and it moves backward direction
- if x axis between 0 and 20 and if (y axis between-30 and -250 and if z axis >= 1, the charge from battery is send to pin5 of DC motor via the Motor Driver L293D and it moves left direction
- if axis between 0 and 20 and if (y axis between 60 and 250 and if z axis >= 1 the charge from battery is send to pin2 of DC motor via the Motor Driver L293D and it moves left direction
- if none of the above conditions satisfied the robot stop moving.

V. RESULT

5.1 STOP CONDITION:

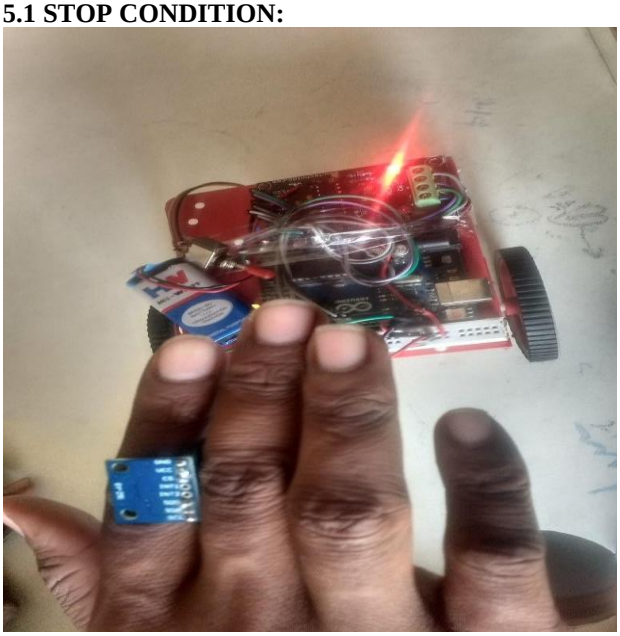

Fig 5.1: Stop Condition

5.2 FORWARD TILT:

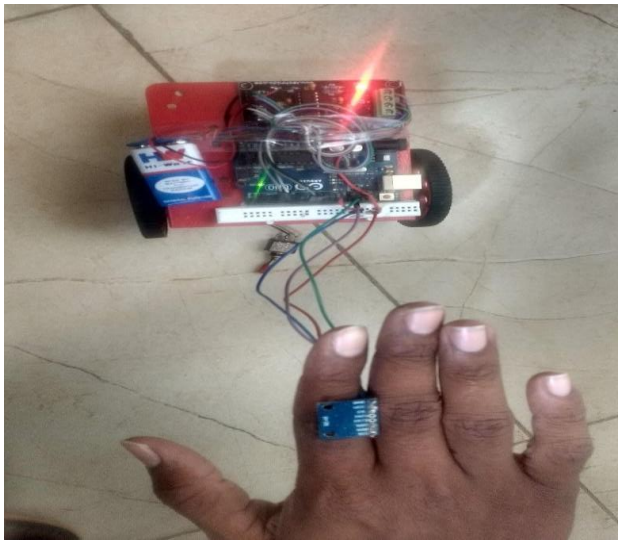

Fig 5.2: Forward tilt

5.3 BACKWARD TILT:

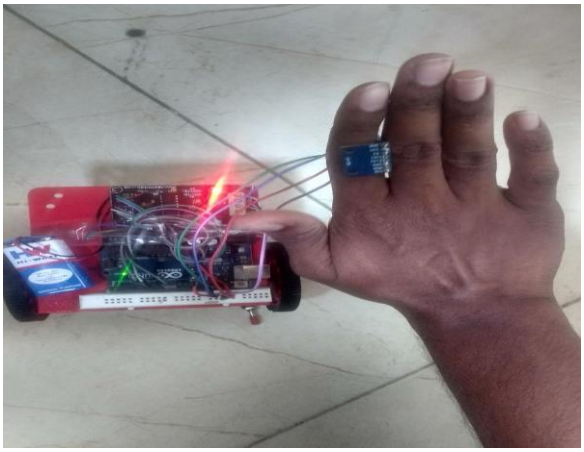

Fig 5.3 Backward tilt

5.4 RIGHT TILT:

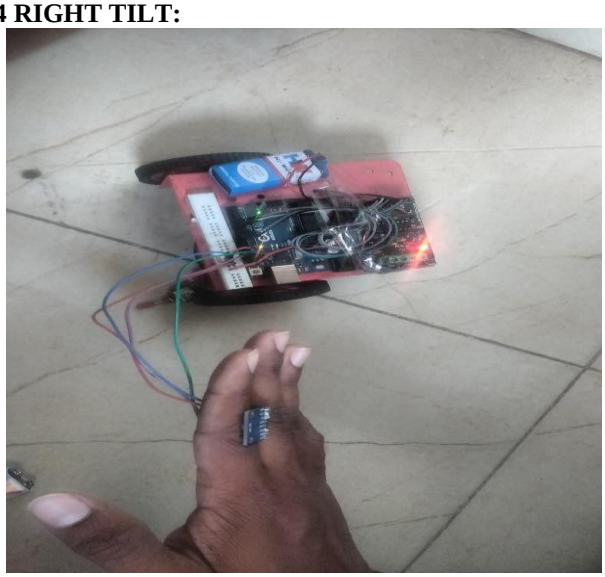

Fig 5.4: Right tilt

5.5 LEFT TILT:

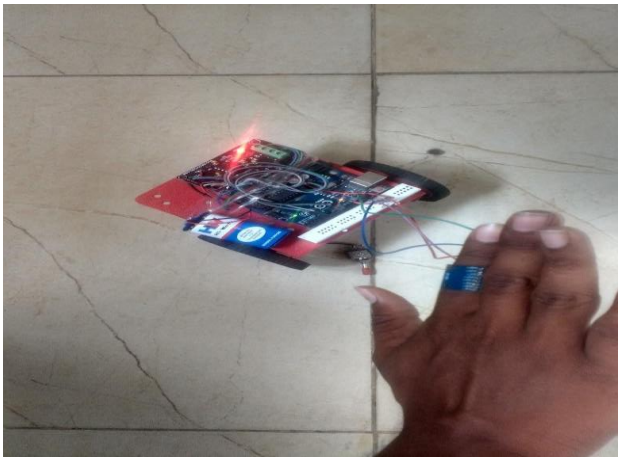

Fig 5.5: Left tilt

VI. CONCLUSION:

The robotic actions via cord consistent with palm gesture. The robotic can pass approximately 300 mtr. The expected efficiency is achieved with the above mentioned handheld device and in future we are aiming to replace the wired component with wireless technology. And it is expected to perform more efficiently such as increase in the distance travelled by the robot and the physical limitation is overcome. This robots can be upgraded to detect human life styles earthquake and landslide by ways of enforcing the sensor therefore it can also be upgraded to bomb detecting robotic because it has robotic arm it may additionally elevate the bomb which is positioned at distant location. And these type of methodology can be used in rescue operation to view the sight without any complexity.

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