MINI PROJECT REPORT

On

# "GESTURE CONTROL ROBOTIC ARM FOR PICK AND PLACE"

## Department of

## Robotics and Automation Engineering

SEM: 6$^{TH}$

**Submitted by:**                                                           **Mentor:**

Jay Gohil – 190305123014                                          Dr. Heli Amit Shah

RuturajSinh Gohil - 190305123015

Yash Gaddamwar - 190305123011

Yashodhan Naik - 190305123019

MayurKumar Maniya - 190305123016

SUBMITTED TO

**PARUL UNIVERSITY**

VADODARA

# ABSTRACT

mankind has always strived to give life like qualities to its artifacts in an attempt to find substitutes for himself to carry out his orders and also to work in a hostile environment. the popular concept of a robot is of a machine that looks and works like a human being. the industry is moving from current state of automation to robotization. the industrial robots of today may not look the least bit like a human being although all the research is directed to provide more and anthropomorphic and humanlike features and superhuman capabilities in these

here how a pick and place robot can be designed for a workstation. all the various problems and obstruction for the loading process has Benn deeply analyzed and been taken into consideration while designing the pick and place robot.

*Pick and Place Robots replace human workers in the manufacturing industry for repetitive jobs. Their function usually involves picking up a particular object from a defined position and place them at another defined coordinate.*

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# INTRODUCTION

Pick and place robot is the one which is used to pick up an object and place it in the desired location. the pick and place mechanical arm are a human controlled based system. it picks the object from source location and places at desired location.

The robotic arm kit is made of two sections. the bottom driving unit takes the robot to left, right, forward and backward motion. the top gripper unit is to pick and place ant object. the driving unit has two motors and also the gripper unit has two motors. the robot is strong enough to handle a task like drilling and bolting in mining industry, transporting etc.

**IMPORTANCE OF WORK**

Small pick and place robotic system is stereotypically utilized for small-sized product and also when the distance that its requirements to interchange between two fixed coordinates is small. Some examples can include chocolate packaging in boxes or placing electronic components on a circuit board and orientation of other small parts.

# Objective and Methodology

The objective of the paper is to develop a robotic arm oriented by natural human arm movements whose data is acquired through the use of a gyroscope and accelerometer. The development of this arm is based on Arduino platforms, it is use for signal processing and decision making. A flex resistor is also used, it is mounted on a glove, this resistor can sense finger movements to control the clamp of the robotic arm. A push bottom switch is used to control whether the (angles) are intended to move the Rover or the robotic arm.

On the receiving part, there is a Bluetooth device to receive the coded data, after decoding the incoming data, Arduino board translate those angles and check the status of the push bottom to either move the Rover or to control the robotic arm movements. The robot does not require any training process because it is fully controlled by the user hand movement. The hardware and software function are combined to make the system reliable.

# Prototyping Requirements

The following are the hardware requirements that have been used to implement the prototype:

1. Arduino UNO Board.

2. Robotic Arm.

3. Gyroscope and Accelerometer.

4. Wireless Transmitter / Receiver (Bluetooth).

5. A predesigned robotic arm with servo motors.

6. Flex resistor (to control the clamp of the robot arm).

# BILL OF MATERIAL

Bill of Material help us to manage the project budget as per our requirement, it include the material quotation from all of the website, shops, machine works, Our quotation helps us to explaining the overall budget use in project for gathering sponsor for project or while submitting the project to any of company or university. The project budget is made in excel sheet as per format. Also, format can available in google.

| Sr No. | Components Name | Quantity | Price | Total |
|---|---|---|---|---|
| 1 | Arduino uno | 1 | 500 | 500 |
| 2 | Breadboard | 1 | 80 | 80 |
| 3 | Servo Motor | 4 | 120 | 500 |
| 4 | Laser cutting parts | 1 | 2050 | 2050 |
| 5 | Flex Sensor | 2 | 550 | 1100 |
| 6 | Gyroscpe Sensor | 1 | 360 | 360 |
| 7 | Battery | 3 | 120 | 360 |
| 8 | Jumper Wires | 50 | 50 | 50 |
| **Total** | | | | **5000** |

# BODY OF REPORT

**Hardware Description**

GYROSCOPE:

A gyroscope sensor is a device used to sense and maintain direction, designed based on the theory of indestructible angular momentum. Once the gyroscope starts to rotate, due to the angular momentum of the wheel, the gyroscope has a tendency to resist changes in direction.
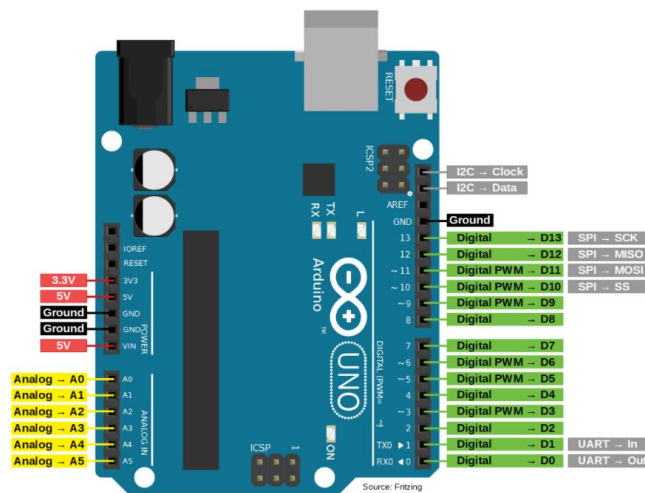


FLEX SENSOR:

A flex sensor or bend sensor is a sensor that measures the amount of deflection or bending. Usually, the sensor is stuck to the surface, and resistance of sensor element is varied by bending the surface.
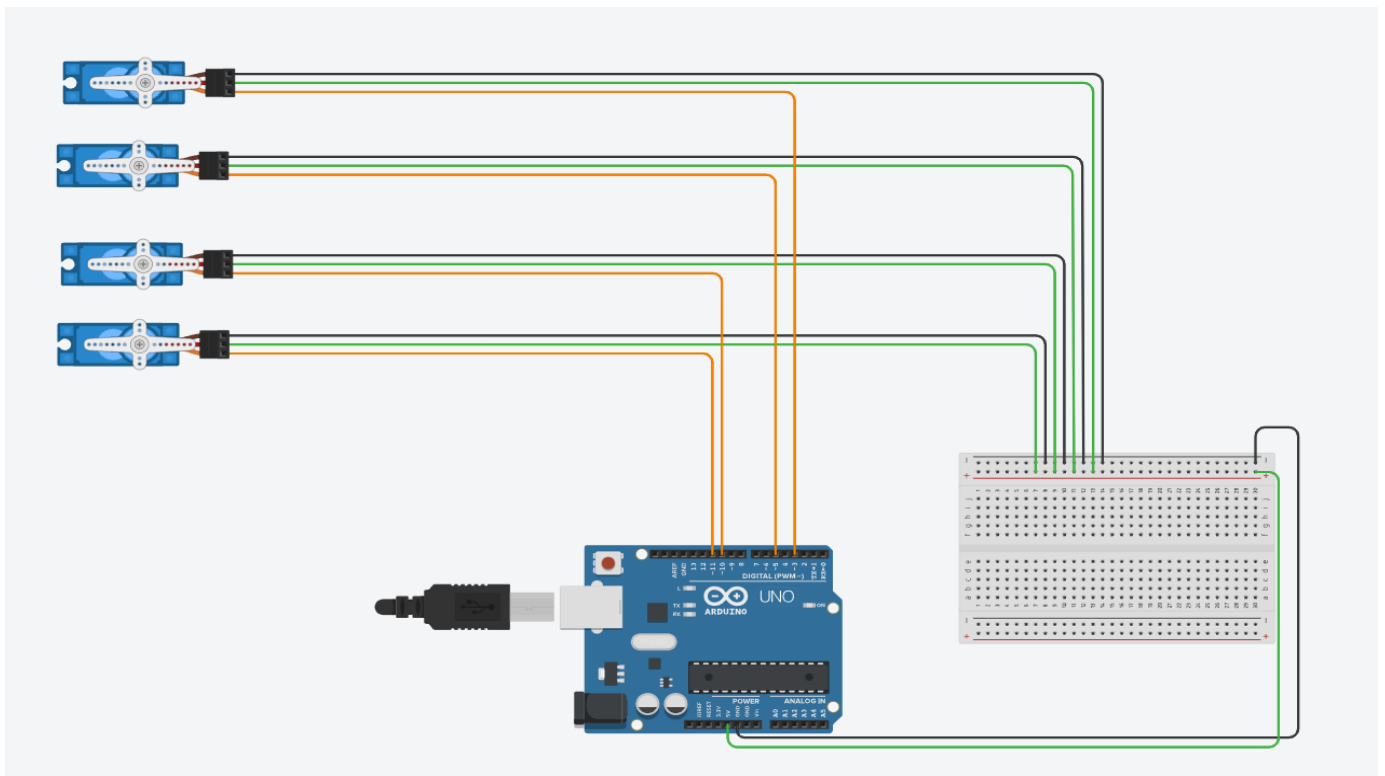
## ARDUINO UNO:



## SERVO MOTOR:

Servo motors have a high-speed response due to low inertia and are designed with small diameter and long rotor length.

# Circuit Diagram

# CODING AND TESTING

```
#include<Servo.h>

Servo servo1;

Servo servo2;

Servo servo3;

Servo servo4;


int pos(0);


void setup()
{
servo1.attach(3);

servo2.attach(5);

servo3.attach(10);

servo4.attach(11);


}


void loop()
{
```

```
servo1.write(70);

delay(1000);

servo2.write(70);

delay(1000);

servo3.write(70);

delay(1000);

servo4.write(70);

delay(1000);

servo4.write(0);

delay(1000);

servo3.write(0);

delay(1000);

servo2.write(0);

delay(1000);

servo1.write(0);

delay(1000);

servo1.write(120);

delay(1000);

servo2.write(120);

delay(1000);

servo3.write(120);

delay(1000);

servo4.write(120);

delay(1000);

servo4.write(0);

delay(1000);

servo3.write(0);
```

```
delay(1000);

servo2.write(0);

delay(1000);

servo1.write(0);

delay(1000);


}
```

# CONCLUSIONS

The research objectives have been achieved which were developing both hardware and software for controlling the robotic arm based. By reviewing the observations that have been completed, it obviously shows that the movements of robotic arm are accurate, easy control, specific, and it is friendly to use by the users. The robotic arm has been developed effectively such as the robot movements can be exactly controlled with the movements of human arm. The controlled method of the robotic arm presented in this paper is estimated to overcome many problems such as picking or placing objects that placed away from the users, pick and place dangerous objects in a very fast and easy way also, the arm presented in this paper can be used in study purpose.

FUTURE WORK…

# REFERENCES

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