

# Controlling of a 3DOF Robotic Manipulator using IoT

## **ABSTRACT:**

Fabricating a 3DOF robotic manipulator and controlling it using concepts of IoT using the Blynk app.

## **APPARATUS REQUIRED:**

1. Arduino board - 2
2. Bread board
3. Jumper wires
4. Servo motors - 4
5. Robotic manipulator outline fabrication parts
6. USB cable

## **CODE:**

```
#define BLYNK_PRINT Serial //redefine BLYNK_PRINT as Serial
#include <ESP8266WiFi.h> //header file for controlling wifi #include
<BlynkSimpleEsp8266.h> //header for blynk #include<Servo.h>

Servo servo1;

Servo servo2;

Servo servo3;

Servo servo4;

char auth[] = "----- "; // indentification of your board
```

```
char ssid[] = "--"; // your Hotspot name
```

```
char pass[] = "-----"; // your Hotspot password
```

```
//.....setup().....
```

```
void setup() {
```

```
  servo1.attach(D9);
```

```
  servo2.attach(D10);
```

```
  servo3.attach(D11);
```

```
  servo4.attach(D12);
```

```
  Serial.begin(9600); //setting the speed of communication  
  between your laptop and board, 9600 baud rate
```

```
  Blynk.begin(auth, ssid, pass); // connecting to WiFi Network }
```

```
//.....writing positions to respective servos.....
```

```
BLYNK_WRITE(V1)
```

```
{
```

```
  servo1.write(param.asInt());
```

```
  Serial.println(param.asInt());
```

```
}
```

```
BLYNK_WRITE(V2)
```

```

{
  servo2.write(param.asInt());
  Serial.println(param.asInt());
}
BLYNK_WRITE(V3)
{
  servo3.write(param.asInt());
  Serial.println(param.asInt());
}
BLYNK_WRITE(V4)
{
  servo4.write(param.asInt());
  Serial.println(param.asInt());
}
//.....loop().....
void loop() {
  Blynk.run(); //Blynk communicate begins to mobile
}

```

### **WORKING:**

1. The robotic manipulator is fabricated and 4 servo motors have been arranged in order to make the movements possible in the necessary directions.
2. The 4 servos are arranged in following areas:
  - a. In the end effector place for its movement.

- b. To move down
  - c. To move up
  - d. To move in circular way in the bottom side
3. The idea behind taking 2 Arduino boards is to supply the necessary power to the 4 servo motors. So, I have connected 2 servos to the first Arduino and 2 servos to the second Arduino board.
  4. The code is uploaded into the microcontrollers and jumper wires are connected.
  5. Now for controlling through IoT I have used the blynk app and I have used the slider widgets available in the app for controlling the slider mechanisms.
  6. Authentication code along with the Wi-Fi hotspot name and password has been updated in the code in order to establish a connection between the microcontrollers and the blynk app.
  7. Now that we are ready to go, I have controlled using the blynk app.