



Patuakhali Science and Technology University

Assignment On Micro Servo Robotic Arm

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Abstract

This proposed work is an overview of how we can make use of servo motor to make joints of a robotic arm and control it using potentiometer. Arduino UNO board is programmed to control the servo motors and Arduino's analog input is given to potentiometer. This modelling resembles like a robotic crane or we can convert it into robotic crane using some tweaks. Robotic arm is one of the major projects in today automation industries. Robotic arm is part of the mechatronic industry today's fast growing industry. This project is a pick and place robotic arm. On large scale it can be used as in environment, which is either hazardous (e.g. radiation) or not accessible. As the size of the robot's scale down, the physics that governs the mode of operation, power delivery, and control change dramatically, restricting how these devices operate This also include its characteristics like its extension, positioning, orientation, tools and object it can carry. This proposal is on how we can make robotic arm with non-useful materials and its application for small purposes. I conclude this proposal by future enhancement.

Introduction

Most robots in the world are designed for heavy, difficult to manufacture in work. They handle tasks that are difficulty, dangerous or boring to human beings. The most common robot is the robotic arm. This robotic arm is type of mechanical model arm, it is usually programmed, like of a human arm may be the sum total of the mechanism or may be part of a more complex robot. The links of such a manipulator are connected by joints allowing either rotational motion (such as in an articulated robot) or linear displacement.

Like as we have our arm whose job is to move your hand from place to place. Similarly, job of robotic arm's is to move an object from one place to other that is what is a pick and place robotic arm. Industrial robots are designed to do exactly in a controlled environment, over and over again.

Most industrial robots work in auto assembly lines putting cars together. Robots can do a lot of this work more efficiently than human beings because they are so precise, they always drill in the exactly the same place, and they always tighten bolts with the same amount of force, no matter how many hours, they've been working. Manufacturing of robots are very important in the computer industry.

Components Required

Before building our micro servo robotic arm project, first, we need to collect the required components and then go ahead and follow the step-by-step building process.

List of components:

| S.N | Components Name | Description | Quantity |
|-----|------------------|----------------------------------|----------|
| 1 | Arduino Board | Arduino UNO R3 Development Board | 1 |
| 2 | Servo Motor | SG90 Servo Motor | 4 |
| 3 | Potentiometer | 20K | 4 |
| 4 | Connecting Wires | Jumper Wires | >=20 |
| 5 | Breadboard | - | 1 |
| 6 | Battery | 9V | 1 |

Working

Here we are having four pots provided to the user that is by rotating these four pots, we supply variable voltage at the ADC channels of UNO. So the digital values of Arduino are under control of user. These digital values are to adjust the servo motor position, thus the servo position is in control of user and by rotating these pots we can move the joints of Robotic arm and we can pick or grab or place any object. The voltage across variable resistors is not completely linear it will be a noisy one. Robotic Arm is controlled by four Potentiometer, and we control it with the help of servo motor, we can move these servos by rotating the potentiometer to pick objects, with some practice we can easily pick and move the object from one place to another. We have used low torque servos here but we can use more powerful servos to pick heavy object.

Block Diagram

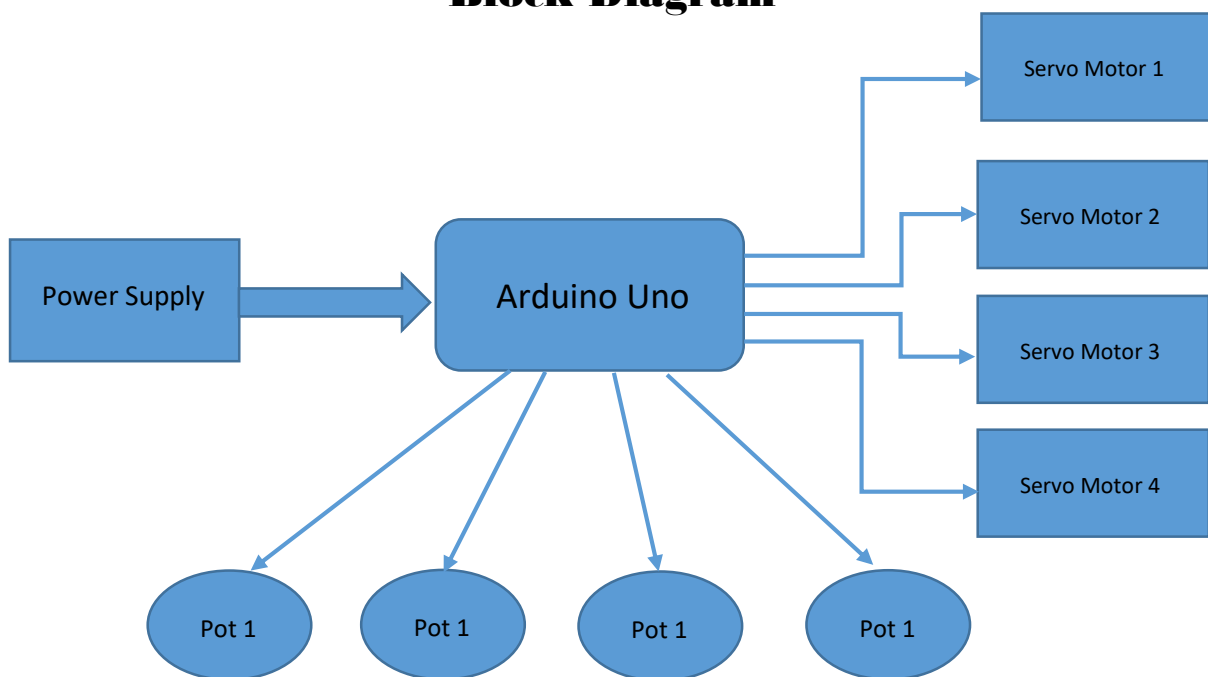


Fig: Block diagram representing the robotic arm

Conclusion

The main purpose is to design a robotic system which is beneficial to each and every individual. We designed a robotic system using Arduino. The system we designed is a success and provides service effectively. The system is cheap and affordable to everyone. Although this description is a simple collection of huge work. We can upgrade this project to large scale for future improvement.