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LEARNING ROBOTIC ARM

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Abstract - *It is a four axis robotic arm with small gripper and teach function. This Robotic arm is controlled by four variable resistor with which we attach each variable resistor that is used to control each servo .Servo acts as joints to the Robotic arm. we can move these servos by rotating the variable resistor to pick some object. After a reset the robot arm follows the teaching arm ,while simple mapping analog inputs every 25ms to the servo motor .Pressing the button stores each servo position in an array .The sketch reads the array step by step and moves the robot arm. This robot can follow. This robot can learn and this robot can repeat endless.*

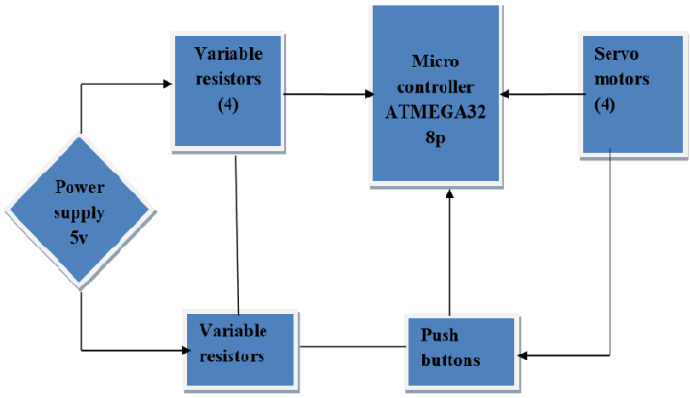
INTRODUCTION:

In this project, researchers have been done and implemented in order to have knowledge about mechanics and software during the operations carried out by the robot arm which is designed to fulfill the task determined in accordance with predetermined commands. The term robot comes from the Czech word robot, generally translated as "forced labor", this describes the majority of robots fairly well. 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 similar to a human arm it has equivalent of a shoulder, and elbow and a wrist. Typically, the shoulder is mounted on a stationary base structure base structure rather than to a movable body. This type of robot has ix degree of freedom, meaning it can robot in four different ways

1.1 Motivation:

The main motivation behind this project is the impact of the robotic arm in the manufacturing industry continues to grow with benefits in efficiency, cost savings and higher productivity, Companies using robotic arms are able to save on low skilled human labor costs with less human error and waste. A robotic arm is able to enhance both productivity and efficiency thus offering longer operating periods of the same accuracy, strength and most importantly repetitive programmed actions. So, robotic arms are also able to fill the positions that are in demand because employees cannot find workers.

2. BLOCK DIAGRAM:



Explanation of eaZh block :

2.1 Micro controller ATMEGA328p:

I ATmega328P is one of the high performances AVR technology microcontroller with a large number of pins and features. It is designed by 8-bit CMOS technology and RSIC CPU which enhance its performance and its power efficiency get improved by auto sleeps internal temperature sensor . The Atmega328P 8-bit AVR RISC- based microcontroller combines 32KB ISP flash memory with read-while -write capabilities,1 KB EEPROM,2 KB SRAM,23 general purpose I/O lines, 32 general purpose working registers. Three flexible time/counters with compare modes, internal and external interrupts ,serial programmable USART ,a byte-oriented 2-Wire serial interface ,SPI serial port,6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages),programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. The device achieves throughput approaching 1 MIPS per MHz .

2.2 Servo motors:

Servo motors detects operation error of a mechanism, provides feedback and corrects faults. They can operate steadily even at very small or very large speeds. In these motors, the large moment can few obtained from the small size In the project, pro SG90 Mini servo motor is used .Some

features of this servo motor are versatile operation,10s pulse width control, VP-P:3-5V,square wave and working voltage of 4.8-6V.The used servomotor has a working voltage of 0.12s/60 and a torque of 1.2-16 kg/cm at low operating voltage.

2.3 Variable Resistors:

Variable resistor is applied in an electronic circuit for adjusting circuit resistance to control voltage or current of that circuit for adjusting circuit resistance to control voltage or current of that circuit or part of that circuit. The electrical resistance is varied by sliding a wiper contact along a resistance tack. Sometimes the resistance is adjusted at pre set value as required at the time of circuit building by adjusting screw attached to it and sometimes resistance can be adjusted as when required by controlling knob connected to it. The active resistance value of the variable resistor. In this project, we used 10k variable resistor.

2.4 Push Buttons:

Push buttons ,are the most common type of control devices found in industrial facilities. Almost all industrial machines contain push buttons even if the facilities operation is to set to run automatically. Typical push buttons are momentary meaning they are designed with a spring to keep the button contacts open or closed at all times.

2.5 Power Supply :

After the text edit has been completed, the paper is ready for the template. Duplicate the template file by using the Save As command, and use the naming convention prescribed by your conference for the name of your paper. In this newly created file, highlight all of the contents and import your prepared text file. You are now ready to style your paper.

2.6 Arduino Board:

Arduino nano is one type of microcontroller board and it is designed by Arduino.cc. It can be built with a microcontroller like Atmega328. It is a small size board and also flexible with a wide variety of applications. Arduino Nano pinout contains 14 digital pins. 8 analog pins,&6 Power pins. Each of these Digital& Analog Pins are assigned with multiple functions but their main function is to be configured as input or output.

3. WORKING

This Robotic arm is controlled by teaching arm. We attach each variable resistor that is used to control each servo. Servo acts as joints to the Robotic arm. We can move these servos by rotating the variable resistor to pick some object. After a reset the robot arm follows the teaching arm, while simple mapping analog inputs very 2ms to the servo motor. Pressing the button stores each servo position in an array. The sketch reads the array step by step and moves the robot arm.

4. RESULT

The best and interesting part of this project is it have feature to record the motion and pay it again in infinite loop unless we press reset or pause button, after pressing reset the all old recorded moves get erased and robot is ready for new instructions

5. CONCLUSION:

The main purpose of the project is to provide control of 4 axes moving robot arm design and this robot arm with a suitable microcontroller with android application. The necessary theoretical and practical information for this purpose has been obtained and the necessary infrastructure has been established for the project. During the process of making and developing the project, a lot of theoretical knowledge has been transferred to the practice and it has been ensured that it is suitable for the purpose of the project.

6. FUTURE SCOPE:

Future enhancement can include further improvement that is by adding 360 degree rotary servo motor and making it more stable. Setup can be modified that will pick more weight compared to present model. Ultrasonic sensor can even be placed on the arm so that it can select and simultaneously pick the object and deep it on other place.

REFERENCES

[1] 1. Brooks, Rodney A., “New Approaches to Robotics”, Science, vol. 253, pp. 1227- 1232, 13 September, 1991.

[2] 2. John-David Warren, Josh Adams and Harald Molle “Arduino Robotics”, Springer Science and Business Media, 2011.

[3] Patel, R. H., Desai, A. and Upadhyaya, T. (2015), A discussion on electrically small antenna property. Microw. Opt. Technol. Lett., 57: 2386–2388. doi:10.1002/mop.29335 .

[4] Araújo, D. Portugal, M. Couceiro, C. Figueiredo and R. Rocha, "TraxBot: Assembling and Programming of a Mobile Robotic Platform". In Proc. of the 4th International Conference on Agents and Artificial Intelligence (ICAART 2012), Vilamoura, Portugal, Feb 6-8, 2012.

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