



ANDROID BASED 5 DOF ROBORUKA FOR INDUSTRIAL APPLICATIONS

ÓÉÇÉ ÁS { æÉK. Ashitha Rohi, Hima Bindu. D, K. Bharath Mohan Chandra, B. Prathyusha, D. Rajeshwari

Abstract—Today technology is developing in the same direction in line with rapidly increasing human needs. The work done to meet these needs makes life easier every day, and these studies are concentrated in robotic arm studies.

Robot arms work with an outside user or by performing predetermined commands. Nowadays the most developed field of robot arms in every field is the industrial and medicine sector.

Designed and realized in the project, robot arm has the ability to move in four axis directions with five servo motors we can take the desired materials from one place and carry it to another place, and also mix it with the material from one place and carry it to another place, and also mix it with the material it receives.

While doing this, robot control is provided by connecting to the android application via bluetooth module connected to arduino DUE arm microcontroller.

Index Terms—Arduino IDE, HC 05 Bluetooth Module, MIT App, Servo Motors.

1 INTRODUCTION

These days' people always needed additional help systems. With the rapid increase in the flow of information, people are now guided to search for different markets and people have entered the competition to manufacture quality products cheaply. Automation systems are also needed to realize this. Because standardized automation systems are required to minimize errors as well as to have experienced and well-trained employees for quality products. Because of their physical characteristics, people needed to use auxiliary machines in places where their strength was not enough. These machines, which are operated with the need for human assistance in advance, have been made to operate spontaneously without the need of human power with the progress of technology. One of the most used components of automation systems is robots. Robotic systems; Mechatronics Engineering, Mechanical Engineering, Electrical Engineering and Computer Engineering have all come together to work together. In the 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 fulfil the tasks determined in accordance with predetermined commands.

First, it was determined what function the robot arm would be and what movements it could make. Robotic arm made of Android phone or tablet control; it can carry the desired material, mix it up and perform the commands previously determined by a user. If this project is also designated task; the robotic arm takes a piece of material and brings it to the desired position and then records its movements and lets it do the same action until we stop

it. The servomotor is preferred in order to be able to perform these operations properly since the motor to be selected must operate precisely and must be at high torque. The robot arm is composed of 5 servo motors and can move in 4 axis directions with these motors.

In the project, Arduino Nano microcontroller written in Java language is Programmed and servo motor control is provided. Thus, it is possible to perform the desired operations by means of the elements located on the Arduino without any circuit construction other than the circuit where the servo motor inputs are located. For the mechanical part, the robot arm is drawn with the Solid Works program and the dimensions of the robot arm are specified. A 5V power supply is also preferred for the robot to work.

2 PROBLEM STATEMENT

In present generation we see growing industries as well as harmful virus effecting the humanity. In harmful industries people dealing with harmful chemicals are at high risk as well as the doctors dealing with the testing of harmful virus or infected people.

In such dangerous circumstances people or human race need some innovations which will help them do their work without coming in contact with the material or other people. The robotic arm is one such project helpful in such cases.

In industries dealing with harmful chemicals or materials as well in hospitals where harmful virus are diagnosed-instead of people dealing with them we can use a robotic arm to handle the chemicals. This makes work easy and less harmful.

3 LITERATURE SURVEY

Robotic arms are widely used in industries, manufacturing lines and other industrial purposes. Robotic arms are used to implement complex industrial automation functionality which only humans can achieve.

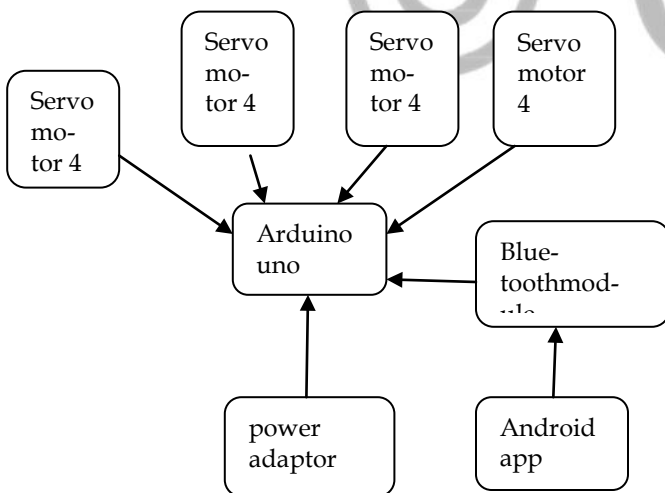
These functionalities include picking up a part and placing it horizontally into another machine or picking parts and placing it in packing boxes and more. So here we propose the design and fabrication of a fully automated robotic arm that can automate various industrial tasks.

Our system consists of an assembly of mounts and parts designed to hold motors in place in order to achieve desired movement. Also it consists of a gripper designed with gear teeth in order to achieve gripping function as per motor rotation.

The system consists of 5 motors needed to achieve the desired movement. A circuit board provided with it allows controlling the movement of the circuit according to the button pressed.

This mechanism helps in understanding the working and control flow of industrial robotic arms design and fabrication processes.

4 BLOCK DIAGRAM



5 SYSTEM COMPONENTS

Arduino board:

An Arduino microcontroller board can be thought of as a user-friendly, open-source input-output system. An input can range from anything from a finger pressing a button to a change in light intensity, and outputs can range from lighting up a simple LED light to sending out a Twitter message.

HC-05 Bluetooth module:

The HC-05 is a very cool module which can add two-way (full-duplex) wireless functionality to your projects. You can use this module to communicate between two microcontrollers like Arduino or communicate with any device with Bluetooth functionality like a Phone or Laptop. There are many android applications that are already available which makes this process a lot easier. The module communicates with the help of USART at 9600 baud rate hence it is easy to interface with any microcontroller that supports USART.

ServoMotors:

A servo motor is a rotary actuator or a motor that allows for a precise control in terms of the angular position, acceleration, and velocity. Basically it has certain capabilities that a regular motor does not have. Consequently it makes use of a regular motor and pairs it with a sensor for position feedback. Servo motors can be of different types on the basis of their applications. The most important amongst them are: AC servo motor, DC servo motor, brushless DC servo motor, positional rotation servo motor, continuous rotation servo motor, and linear servo motor.

A typical servo motor comprises of three wires namely- power, control, and ground. The shape and size of these motors depends on their applications.

In our project we used hitech servo motor

Power Supply:

Adaptor:

The input to the circuit is applied from the regulated power supply. The a.c. input i.e., 230V from the mains supply is step down by the transformer to 12V and is feeded to rectifier to convert the AC to DC with help of diodes and capacitor.

6 CONCLUSION

This project is very useful in making the things more faster and rapid as we can control it with android smart phone over Bluetooth communication, we can implement this project in food production industries, fabrication industries etc. This will reduce the man power and increase's the product accuracy and production level in positive manner. This project can be further enhanced with Raspberry pi IOT technology to achieve high performance to current technology; we can also develop android application for the user to make it easier operation side part.

7 REFERENCES

- Dinesh Mohan, Omer Tsimhoni, Michael Sivak, Michael J Flannagan Road safety in India: challenges and opportunities – Report number UMTRI-2009-1 <http://www.deepblue.lib.umich.edu>

- Manisha Ruikar, National statistics of road traffic accidents in India, *Journal of Orthopaedics, Traumatology and Rehabilitation*, 23 Sep. 2013, vol. 6, issue 1, pp. 1-6
- Daniel Brookoff, Charles S. Cook, Charles Williams, and Calvin S. Mann, Testing Reckless Drivers for Cocaine and Marijuana, *The New England Journal of Medicine*, Aug. 25, 1994, pp. 518-522
- 6-DOF PC-Based Robotic Arm (PC-ROBOARM) with efficient trajectory planning and speed control Wong Guan Hao, Yap Yee Leck and Lim Chot Hun Faculty of Engineering and Technologies Multimedia University Jalan Ayer Keroh Lama, 75450 Bukit Beruang, Melaka, Malaysia.
- Remote Learning: Android Operated Educational Robot Arm with 6 DOF: Neerparaj Rai, Bijay Rai and Pooja Rai SMIT, Sikkim and India.
- Design of a Controlled Robotic Arm Chein-wein Che Dept. of Electron. Eng., Nat. Kaohsiung Univ. of Appl. Sci., Kaohsiung, Taiwan Rui-Ming Hong Dept. of Electron. Eng., Nat. Kaohsiung Univ. of Appl. Sci., Kaohsiung, Taiwan Hung-yu Wang Dept. of Electron. Eng., Nat. Kaohsiung Univ. of Appl. Sci., Kaohsiung, Taiwan.
- Robotic arm design, development and control for agriculture applications Rajesh Kannan Megalingam Dept. of Electronics and Communication Engineering, Amrita School of Engineering, Amritapuri, Amrita Vishwa Vidyapeetham, Amrita University, India