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Anthropomorphic Robotic Hand Using Android Application

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ABSTRACT: The main focus of this project was to design and develop the mechanism for robotic arm for lifting. The robotic arm was designed with four degrees of freedom and programmed to accomplish accurately simple light material lifting task to assist in the production line in any industry. 3D printing method is used in this project to fabricate the components of the robotic arm. therefore, it provide more precise dimension and huge time and cost saving in fabrication.

KEYWORDS: Research Paper, Arduino Uno, Bluetooth module, Motor driver, Robotic arm.

I. INTRODUCTION

Automated is characterized as the investigation, plan and utilization of mechanical frameworks for assembling. With the ascent in assembling modern exercises, a mechanical arm is developed to assist different businesses with playing out an errand or work as opposed to utilizing labor robots are for the most part used to perform risky, dangerous, profoundly redundant, and disagreeable assignments. Robot can perform material taking care of, gathering, curve welding, obstruction welding, machine apparatus stack and dump capacity, painting and splashing. It is extremely valuable since it has high exactness, insight and unending energy levels in managing job contrasted with individual. For a model, a mechanical arm is generally utilized in the amassing or loading line by lifting the little items with redundant movement that human couldn't tolerate doing in a significant stretch of time. The light material lifting errand should be possible by the mechanical arm effectively and efficient on the grounds that it isn't confined by weariness or wellbeing chances what man may insight. There are fundamentally two distinct kinds of robots which are administration robot and a modern automated. Administration robot is worked semi or completely self-sufficiently to perform a administration helpful to the prosperity of people and hardware with the exception of assembling operation. A mechanical robot is a re-programmable multifunctional controller configuration to move material, parts, instruments, or concentrated gadgets through factor modified movement for execution of an assortment of undertakings. This is the Definition from the Robot Institute of America to reflect primary highlights of current robot frameworks. A modern robot framework can incorporates any gadgets or sensors along with the mechanical robots to play out its undertakings just as sequencing or checking correspondence interfaces. A side from mechanical utilization, the automated arms likewise intended to mimic human development with high exactness. A plan of mechanical arm which can move, weight lifting, Chinese calligraphy composing and shading order is finished by a gathering of Korea understudies. There is additionally an eight level of opportunity automated arm planned by a gathering of USA engineers. It can get a handle on numerous articles with a great deal of shapes structure a pen to a ball and invigorating additionally the hand of person. Besides, , mechanical arm with various level of opportunity have been utilized to perform assortment of assignments in space application.

II. LITERATURE REVIEW

i. Navin Kumar Agrawal, Vinay Kumar Singh, Vinay Singh Parmar, Vijay Kumar Sharma, Dipti Singh, Muskan Agrawal, "Design and development of IOT based Robotic arm using Arduino". In this paper, the developers provided a significant advantage of 6 degrees of freedom having glued the arms at the centre of the axis. They have

made use of Potentiometer and MEMS (Micro-Electro Mechanical Systems). The paper also discusses about the technical imputation, the issue related with the implications and application of robotic arm in field of automation of industries.

- ii. Shuangquan Fu, Pritesh Chandrashekhar Bhavsar, "**Robotic Arm Control Based on Internet of Things**". In this paper, the developers have built the arm with the help of MQTT (Message Queuing Telemetry Transport) communication protocol and ESP8266(A network data transmission module), with the help of these technologies a platform independent web based control robotic arm is made, for accurate and real-time manipulator from remote environments. . Reduanur Rahman, Md Sajid Rahman, Jillor Rahman Bhuiyan, "**Joystick Controlled Industrial Robotic System with Robot Arm**". In this paper, the developers have made a simple and affordable robot with the help of joystick and Arduino, as joystick can be available in cheap manner which will result in decrement of overall project cost. To control the robot, they have used a ps2 controller which could lead to push the boundary of budget, the ps2 controller are bit expensive.

III. METHODOLOGY

Overall System Design: The project deals with simple components at a very reasonable budget which includes a smartphone, Arduino UNO, Bluetooth module and 9v battery, servo motors. The project basically works with the help of Android application as it is the main source for controlling the robot. The secondary help is done by Arduino UNO as it can read both analog and digital signal. It programmed to response if any command is received via Android application, also the Bluetooth module which acts as a bridge between Arduino and Android application for connection process.

Software design:

In this project the Arduino plays an important role because it is coded in such a way that it responds to any commands passed by Android application. As for Android application development we made use of MIT app inventor as it makes Android development simple to use.

Hardware design:

To keep it affordable the Robotic Arm is made up of wood as it is available freely/cheap cost.

Working methodology:

To make the project work first and foremost thing is to assemble the arm. After the assembling is done it will be connected with Arduino and Bluetooth Module (Soldering required) and other necessary connections made by jumper wires. After assembling the Arduino will be connected to Laptop/PC. The code will be uploaded in Arduino. As the Robot arm is made wireless it will be connected with 9v battery holder. After all the connections are made, we need to open MIT App Inventor and Scan the QR code through smartphone by which the Android application will be launched in your smartphone. As soon as the Android application is launched in your smartphone you will be able to pair the Bluetooth module from your smartphone and the Robotic arm will be ready for your command

IV. RESULT AND DISCUSSION

After completion of project and analysing our system by testing its accuracy of picking and placing objects and frequent rotation movements we saw that project was working properly. Both Arduino and Bluetooth module were supporting enough to make the project work. Also, the arm was responding to the commands given by smartphone. The batteries also provided enough voltage for all the servo motors. Range of the Bluetooth Module was around 10 meters which indicates successful implementation of our project for a shorter radius which was set as the goal. However, after numbers of successful events, frequent failing of a single servo motor was observed which was later corrected. Lastly, the coding of Robotic system was a bit difficult. And the code for Android Application was found to be easy to develop with the help of MIT App Inventor.

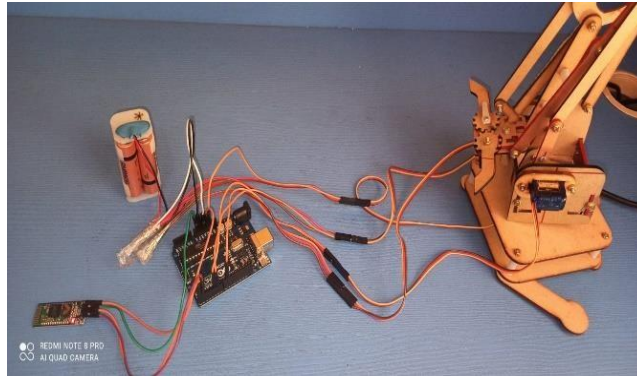


Figure 1.1 expected output

V. CONCLUSION

The main agenda of the process was to make a functioning robotic arm which can make human hand like movements, while keeping it low-cost. And as mentioned above this system was made and the process was successful as the arm is able to move in all directions as well as use the claw to pick and drop the objects. During this process it was found that it is much more cost efficient, easy and time saving compared to any working professional. From this analysis we can conclude that the robotic arm can be controlled wirelessly using a smart phone device while being cost-effective

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