

Review Paper on Gesture Controlled Robotic Arm Using IoT

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Abstract:- In this paper, we have discussed how human efforts can be reduced with the implementation of a robotic arm. Since automation is been implemented in many aspects and the requirement of robotics is also increasing day by day. We have taken account into different existing technology and work in the field of robotic arms and IoT. Going through all the existing technology, we can say it opens up a new door for the technology that can be used to accomplish a new project. It also discusses about the scope of the existing technology and their field of applications.

Keyword:- Robotic Arm, Degree of Freedom, Arduino, Servo Motor, Internet of things.

I. INTRODUCTION

Nowadays, everything is somehow related to technology, and everyone is majorly dependent on technology and automation. Work Load on humans is increasing day by day and it is tough to handle a lot of tasks in less time and that too with high accuracy. Using a human arm to lift heavy objects and working long hours it becomes very hard to provide the amount of energy needed to finish work and takes a lot of time to accomplish a task. It takes a lot of manpower and time to accomplish the task. That's where, Robotics comes into usage which reduces human effort, and robots can work with high precision and also help to save time, money, and resources. Robots can reduce most of human work. One such use is of Robotic arm which is designed to mimic the human arm movement can improve the quality and efficiency of task and can save a lot of time. Apart from it, robots can be used for various works such as handling of hazardous objects, can be used in medical. This will help humans to perform tasks safely and more precisely.

II. LITERATURE SURVEY

A Gesture-controlled robot car and joystick-controlled robotic arm [1] was designed. They implemented a robotic arm on a robotic car. The robotic arm was controlled using Joystick, specific threshold values were assigned with the particular hand gesture for movement of the robotic car in a direction such as forward, backward, left and right. The hardware used were accelerometer, Atmega328 Microcontroller having 8 bit AVR, RF module, L293D motor Driver, joystick. It can be used for construction work, military fields and firefighting. Since RF modules are used for controlling robotic arm the range with which robotic arm

and car can be operated has increased and decreased the use of traditional way of wiring.

IOT based robotic arm using arduino [2] was designed and implemented. Four servo motors were attached to robotic arm giving it 4 Degree of freedom and along with it four potentiometers were also connected with the arduino. The four servo motors were directed by the four potentiometers each. The robotic arm was used to pick and place objects easily. The main components were servo motor, arduinoUno, and potentiometer. More power is required to operate. This may be used for small surgeries, to dislodge hazardous objects safely.

Robotic arm Control based on IOT [3] has been using 6 Degree of freedom robotic arm to provide better accuracy and to work in more complex environments. They have implemented a web-based control of the robotic arm using MQTT (Message Queuing Telemetry Transport) communication protocol and ESP8266 (for network data transmission). This makes their robotic arm work in real time, so it provides better accuracy remotely. Main components 6DOF robotic arm, arduino, servo motor, Wi-Fi module (ESP8266). It helps robotic hands complete high-quality and large-scale tasks in the mechanical manufacturing industry, such as automobile manufacturing, ship manufacturing. Major disadvantage of this model is the design of automation for controlling the robotic arm.

An inflatable robotic arm controlled by a joystick [4]. The robotic arm is controlled by a joystick. In this arm of entirely plastic is used, airbag actuators, inflatable links, and acrylonitrile butadiene styrene (ABS) joints. Hence, it is softer and lighter than other common robotic arms that are made of metal and heavy elements. It is suitable for healthcare applications because the lightness and softness of the inflatable robotic arm is intrinsically safer. The joysticks are used for control. Robotic arm is of 4 Degree of freedom. It can be used to assist the patient in eating.

Robot assisted sensing, control and manufacture in automobile industry [5]. In this movement is directed by a program that directs the proper actions and motion of a controller or robot arm that operates manually. Operational movements are contributed by how fast the robot unit accelerates or gains speed. Each updated movement eases the operation in some operating situation. Hence, the idea that of a circular rotating base can prove to be very useful as it's not much expensive and takes less time to rotate than to turn the assembly.

III. COMPARISON BETWEEN EXISTING TECHNOLOGIES

S.no	Existing Work	Components Used	Advantages	Scope of Improvement
1	Gesture-controlled robot car and joystick-controlled robotic arm	accelerometer , Microcontroller,RF module , motor Driver, joystick	Faster Response time	Interference problem can be improved
2	IOT based robotic arm using arduino	servo motor, arduino Uno, potentiometer	Better Accuracy	Power consumption can be improved
3	Robotic arm Control based on IOT	arduino, servo motor , Wi-Fi module(ESP8266)	Higher DOF robotic arm help in complex task	Response can be improved by using RF module
4	An inflatable robotic arm controlled by a joystick	airbag actuators, Inflatable links, and acrylonitrile butadiene styrene (ABS) joints, joystick	Light weight and easy to operate	More complex task can be performed if other material is used for arm to increase durability
5	Robot assisted sensing, control and manufacture in automobile industry	Servo motor, 8051 microcontroller	Used to perform multitask in less time.	More accuracy could be provided to improve the efficiency

Table 1

IV. CONCLUSION

After going through different technology in the field of robotics and Iot. We can say that robots have decreased the work load from human very efficiently. Once where human do the entire task using their hands, which required a lot of man power. With the rise of robotics arm and robots, the efficiency and accuracy of work is increased lot of time can be saved with the help robots? Many different technology used to mimic human arm have some of further scope of improvement, which can be improved by using latest and cost effective components and technology. To increase the efficiency and to complete more complex task a better robotic arm can be used .Which will have better efficiency to perform complex task.

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