ANDROID CONTROLLED ROBOTIC ARM (ACRA)

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Keywords

Robotics, Android, Wi-Fi, Robust, Cost effective.

Introduction

In a world of science fiction of yesterday is becoming a reality today such a world needs more productivity and less human interaction. We present you Android device controlled Robotic Arm using Wi-Fi technology in this paper. Such a device is very much applicable where human reach is not possible or must be avoided. This tool is useful in multiple industries as the design of this project is cheap and robust. The robotic arm, as the name implies, is designed to do the similar tasks as that of a human hand. The main vision of this project is to come up with a technique for operating a robotic arm using an android application. A signal is produced when certain keys on the Android mobile application are clicked, allowing the microcontroller to move the arm as per the specified program. Using Android JAVA and a microcontroller, the Android program acts as the robotic arm's command location, guiding the arm to move or retrieve required parts. The signal is sent from the receiver to the microprocessor, which uses multiple scaling factors to manipulate the data and control the motors that move the robotic arm's velocity and direction.

Objective

(a) In a typical household, robotics such as kitchen bots, lawnmowers, and vacuum cleaners support people by easing their efforts and acting as helpful assistants to fulfill given duties swiftly and smoothly.

(b) Risky activities that require the usage of robots by doctors is quite beneficial. Robotic equipment in hospitals can provide 3D vision, a 10-fold increase in surgical area, and even instruments that are more mobile than human hands.

(c) By delivering great precision and accuracy, robotics helps to decrease human errors in traditional procedures scent include installing and inspecting dangerous gas pipes, disarming bombs, clearing hazardous nuclear waste, working as a firefighter, and even cleaning sewage systems.

(d) Welding.

(e) Painting.

(f) Picking, Packing, and Palletizing.

(g) Assembly.

(h) Mechanical Cutting, Grinding, Deburring, and Polishing.

Methodology

One of the most severe difficulties our country's defence sector faces is the spread of bombs. Because there is no physical danger to the warriors, this problem is overcome with a Robotic Arm. The android-based robotic arm can also enter locations where humans are not allowed, such as areas with extremely low or extremely high atmospheric pressure, conflict zones, and even biohazardous areas. It can also be used for boring and repetitive activities in manufacturing operations, such as vehicle painting and assembly. This Robotic Arm may also be used to accomplish any tedious work that a regular person would wish to.
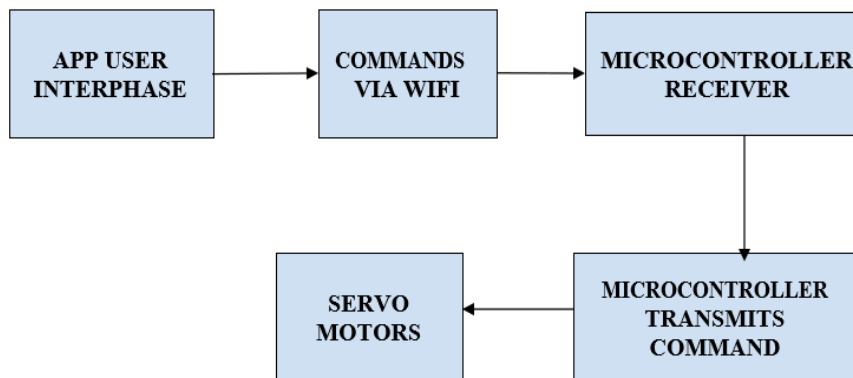

Figure 1: Block Diagram of proposed solution

When the operator sends a command to the robotic arm from an Android phone, the transceiver sends signals to the microcontroller, which completes all essential tasks. The microcontroller then sends an instruction to each of the communication links individual channels. The reaction of the electric motor is determined by the type of order sent, and the microcontroller controls the motor's direction, speed, and motion. The rotation of the powered motor impacts the movement of the robotic arm by moving the impacted link attached to the motor.

Results and Conclusion

In this proposed work, the commands given, are successfully transmitted via Wi-fi module and by the user app interface. With the help of this, the desired operations can be successfully carried out. This project minimizes human effort and time in places or situations where it is difficult to intervene. Such systems can be used in a variety of settings, including industry, military, defense and research.

Future Work

As we all know, there is nothing in this world that is flawless, thus people are constantly working to improve technology and make it more efficient. On the other hand, this technology still needs a lot more work. Thus, by improvising its applications little more farther, where at present we can think of installing a camera so that it can be detected and displayed on LCD making it more user friendly. The robot can be converted into a fully autonomous robotic system by including certain extra features in it.