

Robotic Arm with Webcam Gesture Control

Abstract:

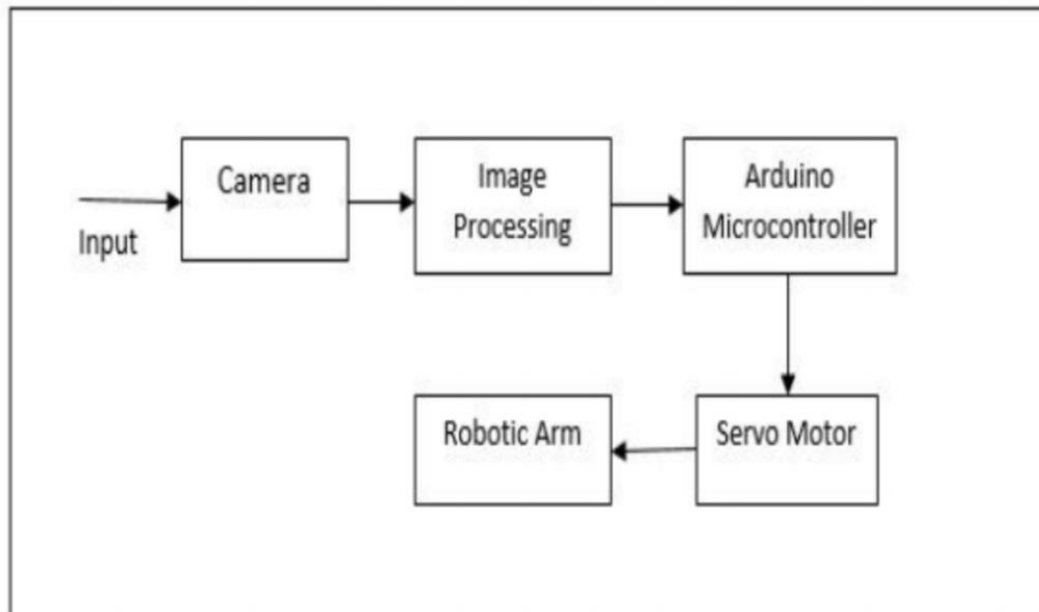
In today's world, most of all sectors, the work is done by robots or robotic arm having different number of degree of freedoms (DOF's) as per the requirement. The idea is to change a perception of remote controls for actuating manually operated Robotic-Arm. Well, this paper presents a thought and a way to eradicate the buttons, joysticks and replace them with some of the more intuitive technique that is, controlling the complete Robotic Arm by the operators hand gesture. The proposed electronics system recognizes a particular hand gesture that will be performed in front of webcam and transmitted respected signals through RF module. Depending on the received signals the robotic arm which is followed by Arduino microcontroller performs the receptive motions at the receiver section.

Introduction:

Nowadays, the most of the human-computer interaction (HCI) is based on mechanical devices such as keyboards, mouse, joysticks or gamepads. In recent years there has been a growing interest in a class of methods based on computational vision due to its ability to recognize the human gestures in a natural way. Such methods use as input the images acquired from a camera or from a stereo pair of cameras. The main goal of such algorithms is to measure the hand configuration in

each time instant. To facilitate this process many gesture recognition applications resort to the use of uniquely coloured gloves or markers on hands or on the fingers. In addition, using a controlled background makes it possible to localize the different hand efficiently and even in real-time. These two conditions impose restrictions on the user and on the interface setup. We have specifically avoided solutions which require coloured gloves or markers and a controlled background because of the initial requirements of our application. It must work for different people, without any complement on them and for unpredictable backgrounds. Our application uses images from a low-cost web camera placed in front of the work area, where the recognized gestures act as the input for particular robotic arm motion. Here, webcam is connected with computer or laptop for human machine interface. Webcam precedes several of recognizing values to the computer. Software recognizing the preferred gestures by comparing stored gestures values and gives respective outputs. The output which was generated by comparison has been transmitted wirelessly through RF module. Receiver section accepts the transmitting signals and given to Arduino which check the several values. The output of microcontroller is given to the motor which has been mounted in robotic arm and we will get a respective motion of robotic arm. In this paper we propose a real-time non-invasive hand tracking and gesture recognition system and divide our method in three steps. First step is hand segmentation where the image region that contains the hand has to be located.

Block Diagram:



Conclusion:

By the use of images processing technique, a user is able to control a robotic arm. The use of gesture-based technique is useful in such kind of applications. Here, with the help of hand gestures-based approach, the user will be able to provide multiple usage of the system. These kinds of robotic applications are helpful in many industrial and agricultural usage.