

# DESIGN ROBOTIC ARM/HAND THAT FOLLOWS THE ARM/HAND MOVEMENT OF THE USER

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## ABSTRACT

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The aim and objective of this project is to build a robotic arm that is capable of replicating or to mimic the user's hand movement. In this case, there must be at least 19 joints to the robotic arm at which 12 is the joint on the finger and 2 on the thumb as well as 2 on the wrist and one each on the elbow and shoulder for it to properly replicate the movement of the user.

Before doing the structure of this project, the types of material needed in terms of strength to weight ratio is considered as well as the price for the material and also the availability in the nearby shop.

From the mechanical side of this robotic arm structure, all the joints of this arm is driven by a servo motor independently to enable it to move and turn like a human arm. Each servo motor is carefully chosen so that the weight of the servo motor will be lightest at its fingertip and the strongest and heaviest at the end of the arm so that the final servo motor at the end of the arm will be able to lift up the whole structure without any difficulty.

The controller use to control the robotic arm in this project will be designed to be mounted on the user's arm to allow the user to control the robotic arm just by moving his or her higher arm the way he or she wants the robotic arm to move. When the user moves his or her arm in any direction and angle, the robotic arm will replicate it by adjusting each servo motor on the robotic arm that represents each joint on the human arm.

The potentiometer for the servo motor controller is tested with various values to obtain the needed value so that the user arm movement will be in sync with the robotic arm movement.

This robotic arm draws power from a desktop power supply unit which supplies a maximum direct current of +5V 2A.

To summarize it, this project worked successfully with every servo motor works independently to represent each joint on the human arm.

**Keywords:** Potentiometer, Servo Motor, Robotic Arm, Servo Motor controller, Sync.