

A Survey of Upper Limb Prosthetic Devices with a Focus on the Elbow Joint

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Abstract:

In today's world more returning war heroes are surviving what earlier would have been fatal injuries. The protective equipment that soldiers are equipped with today has greatly improved the ability for soldiers to survive these injuries. However, the injuries that these soldiers are sustaining are requiring their limbs to be amputated. This rise in the number of returning amputees has spawned the Department of Advanced Research Project Agency to fund a program to develop prosthetic devices that yield higher degrees of freedom and more human like response. Currently there are multiple ways to actuate a prosthetic arm. A sample of these methods for operating an upper limb prosthetic arm is presented. The scope of this paper will be restricted to the elbow joint of an upper arm prosthetic. These methods include, traditional DC motor with gears, linear actuators, both single and multiple actuator design, series elastic actuators, control moment gyroscopes, pneumatic artificial muscles, and mini hydrogen peroxide powered rockets.