Surface-EMG Processing & Classification for Muscle Interfaces

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1 Abstract

Hello, this is my abstract...

Hello world!

Hello, here is some text without a meaning...

Glossary

Congential A disease or physical abnormality present from birth. 6

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2 Introduction

The human hand is one of the most important factors of the human identity. The hand allows a person to perform complex muscolatory combinations to interact with the surrounding world, express complex emotions during speech, and aid in defining a person's individuality and personalty [**?**]. The hands are controlled by a complex combination on precise muscles designed to perform gentle, precise control of the fingers. This allows a person to grasp objects in many different ways, perform complex tasks such as writing, playing musical instruments, or even constructing a house. The hand also acts like a sensory device allowing us to perform precise observations through feeling and touch. This allows a person to understand the environment without seeing it, the hand is able to sensor heat/cold, create complex understanding of geometries and texture through touch and manipulation.

Missing limbs, either Congential or through amputation severely reduces a person's ability to interact with- / understand the world, express themselves and perform simple day-to-day tasks. In order to alleviate some of the drawbacks of missing a limb, amputees are often able to receive a prosthetic replacement of their lost limb.

This thesis aims to summarize, and elaborate on current state-of-the-art research in the field of prostetics devices, the control of prosthetics and the existing limitations of these state-of-the-art products.

This thesis aims to contribute to the world of prosthetics control, by researching effective methods of collecting sensory data from the lower-/upper-arm, and by doing so, creating an state-of-the-art Artificial Intelligence (AI) based controller, that is able to imitate the intent and movements or a real hand.

This thesis also explores efficient methods of

3 Problem Specification

There is a large need for new technology that improves the effectiveness and ergonomics of human hand prosthetics. Current state-of-the-art products on the market exhibits a severe reduction of controllable Degree of Freedom (Dof) compared to their biological counterparts. This is a great pitfall in the field of Research and Creation of prosthetics, as unsatisfactory function of prosthetics lead to amputees, that exhibit a great deal of stress douring the rehabilitation process. This can cause the patient to repel the rehabilitation process and the prosthetic all-together. The repelling of the prostetic increase in the cases of the most severe cases of amputation, where the largest amount of control muscles are lost. These amputations are often located further up the limbs, where the loss of mobility and controllability are greatest. The amount of muscles leftover from amputation also dicates the type of prosthetic a patient is able to recieve. Patients of lower-arm amputation has less control over their prosthetic than patients of hand amputation, due to the loss of the muscles in the lower-arm.

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