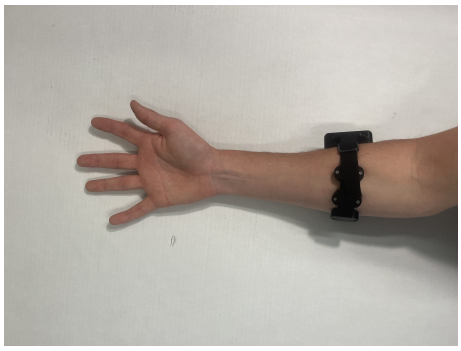
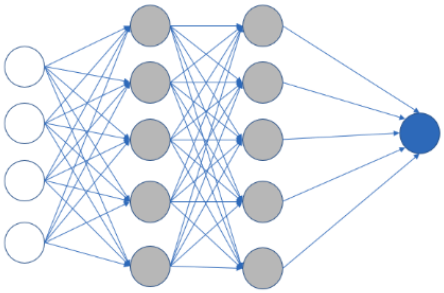
USING MUSCLE ACTIVATION DATA AND DEEP LEARNING TO MONITOR POST-STROKE INDIVIDUALS

Presented By: Nathan Dodd

Committee Members: Dr. Eric Espinoza-Wade (chair), Dr. Stephen Klisch, Dr. Jonathan Ventura





Stroke is a one of the most prevlaent chronic illnesses. It can leave survivors impaired in both cognitive and motor capabilities. The ability to perform daily activities following a stroke is indicative of motor recovery. As it currently stands, post-stroke individuals are not monitored in the home setting, where a large proportion of rehabilitation occurs. This work aims to improve at-home stroke care through the use of wearable sensors.

In our first contribution, we examine the relationship between muscle activation, measured using electromyography (EMG), and grip aperture, an indicator of a post-stroke individual's distal motor function. We utilize a novel wearable armband capable of measuring both muscle activation and acceleration data. In our second contribution, we adopt a modern deep learning algorithm to classify arm movements from armband data, achieving a classification accuracy of 94%. This work will be used as a framework for further research, with the eventual goal of implementing this technology into the home setting.

A Thesis Defense in Mechanical Engineering
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Tuesday, May 21 , 2024, 12:00 PM to 1:30 PM
Building 13-124B

Zoom Meeting: https://calpoly.zoom.us/j/4930292147
Zoom Meeting ID: 493 029 2147