Real-time Correlation of Electrode Stimuli onto a Movement Model

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When the conscious mind declares a movement in the body, the central nervous system carries a signal to the muscles by way of neurons. This signal causes the muscles to contract in the form that is desired. In electromyography, this signal is measured and recorded for analysis. However, this data can fluctuate greatly therefore complicating typical analysis. In this research project, the investigator intends to utilize machine learning algorithms to successfully identify movements being conducted by the subject. The software utilizes a database of measured nerve stimulus and its respective movement as a training to identify movements. The motion data is collected utilizing the Kinovea software to track points in the arm which can be utilized to calculate characteristics such as distance, angle, and velocity. For the electromyography readings, the investigator utilized the Backyard Brains Heart and Brain Spikershield. The software references the database to be able to accurately predict movement utilizing the measured muscle voltage. To verify the validity of the predictions, the researcher compared the machine generated movement predictions, with the actual recorded movements. In comparing both sets, the predicted information was found to be significantly similar, therefore accepting the hypothesis. Because surface electromyography possesses minimal risk and a cheaper cost, utilizing programs such as these to facilitate a direct nerve interface could allow for more accessible and cost-effective prosthetics for disabled patients. For this, the project could be expanded, and given more training data for the software to analyze and improve the predictions.

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