# Hand Movement Control Using EMG Signals

Group Members Information

1. Mostafa Yehia
   - Mustafayehia4@gmail.com
2. Mariem Ahmed
   - Mariem.ahmed.1608@gmail.com
3. Donia Abd Elslam
   - Donia.199887@gmail.com
4. Ibrahem Elsayed
   - Hemasayed600@gmail.com
5. Renad Taher
   - Renad.taher12@gmail.com

Idea Description

Detecting myoelectric signals from an intact hand and use those signals to control electrically powered prostheses. Myoelectric signals are generated by muscle contractions and carry information pertinent to the prosthetic user intention. The pattern of this repeatable and time varying myoelectric signal is determined by the levels of the motionless muscle contraction or by moving extremity. The employment of these patterns known as myoelectric control system (MCS).
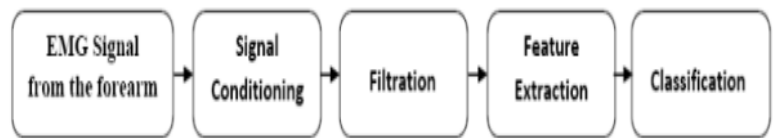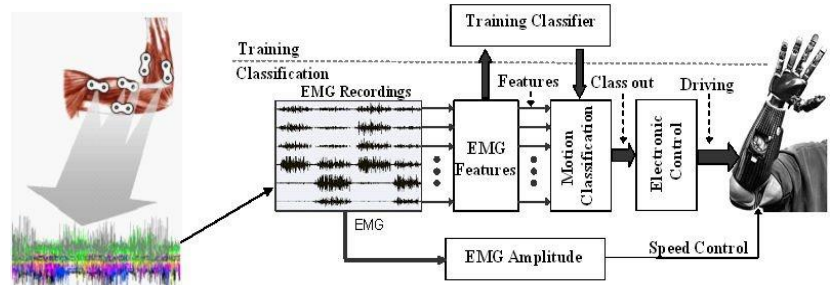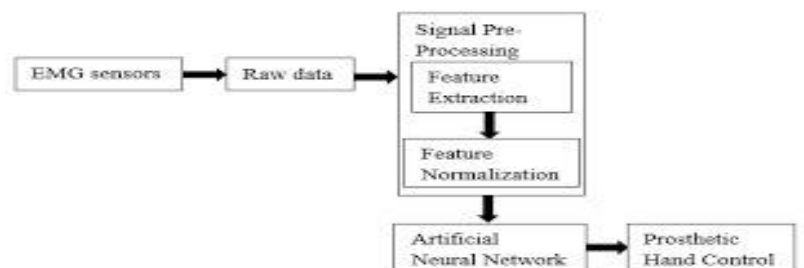

Group Members Courses Taken

- Improving Deep Neural Network (Coursera)
- Neural Network (Coursera)
- Sequence Models (Coursera)
- Introduction to Data Visualization with ggplot2 (Datacamp)
- CNN (Coursera)
- Machine Learning (Andrew - Coursera)
- Computer Vision Basics (Coursera)
- Machine Learning with Python (Coursera)
- Machine Learning Foundations: A Case Study Approach (Coursera)
- Front-End Web UI Frameworks and Tools: Bootstrap 4 (Coursera)
- Embedded Systems

Additional Resources

- EMG Controlled Hand Prosthesis - PDF
- EMG-Controlled Hand Prosthesis Project - Video
- Design and Implementation of an EMG Controlled - PDF
- More Figures and Diagrams - PDF

Figures and Illustration

Machine Learning Based Model

Diagrams

Illustration

Like mentioned above, we seek to develop a full hand control using EMG data that we enter to a neural network model to get finally an output similar to output given for a well-health hand. All this process could be done through machine learning frameworks like tensorflow or pytorch with any type of microcontrollers.

Steps Done after Signal Detection

Data Acquisition
Signal Conditioning
Normalization
Data Segmentation
Feature Extraction
Classification