

hand gesture recognition

using a Convolutional Neural Network model on forearm HD-sEMG.

SEEDS Dataset

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13 hand movements
performed by 25 subjects
through 134 HD-sEMG channels
sampled at 2048Hz
for a total of
450 registrations
for each movement.

Data processing

Each channel provided 100 RMS relative activation values, creating a **100*134** matrix representation of sEMG data.

5.9% of the dataset was excluded, based on abnormal mean activation values.

5 times data augmentation was performed by time shifting RMS values, decreasing delay between acquisition start and movement realisation.

75% of the output dataset was used for training purpose, remaining data allowed to evaluate the model performance.

CNN model



Built with TensorFlow & trained through 150 epochs with a 0.001 learning rate

Results

88,2%

accuracy was achieved.

HD-sEMG classification over time

Accurate early patterns recognition is a must-have to use such model in real-time situations.

Actual model needs the entire movement realisation to provide the expected label.

Nonetheless, presented work showed SEEDS dataset could be used for hand gesture recognition purpose.

Output model predictions over time

