

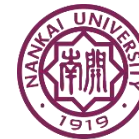
A Tutorial for GR-sEMG

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CONTENTS

- 1.Data Inputting
- 2.Pre-processing
- 3.Feature Extraction
- 4.Classification
- 5.Table and Bar Chart

The interface of GR-sEMG

Input

Input File

Number of Channels

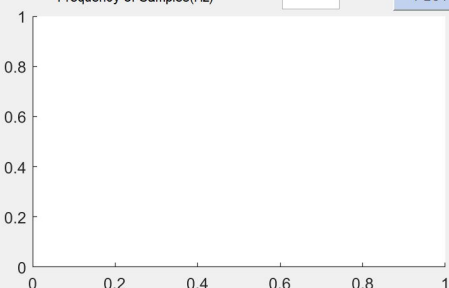
Number of Gestures

Repeat Times

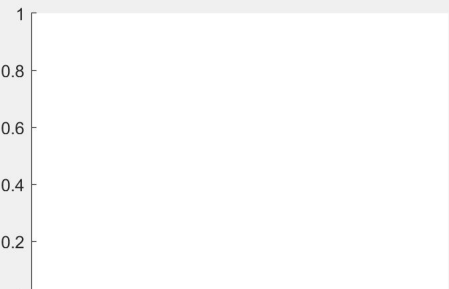
Action Time(s)

Rest Time(s)

Frequency of Samples(Hz) PLOT



Pre-processing



Filter Cut Nor SAVE

Based on Machine Learning

Feature Extraction

TD ☐ 1-RMS ☐ 2-WL ☐ 3-MAV

☐ 4-VAR ☐ 5-ZC ☐ 6-SSC

FD ☐ 7-MNF ☐ 8-MDF

TFD ☐ 9-Haar Wavelet ☐ 10-CoifN Wavelet N=

☐ 11-DbN Wavelet ☐ 12-SymN Wavelet N=

Classifier

choose one

☒ 1-SVM ☐ 2-k-NN k=

☐ 3-LDA ☐ 4-ANN

☐ 5-Random Forest

RUN SAVE

Based on Deep Learning

Classifier

choose one

☒ 6-CNN ☐ 7-RNN

RUN

Table for Comparison

	Feature Extraction	Classifier	Accuracy
1			
2			
3			
4			

DELETE row PLOT

Bar Chart of Accuracy



1.Data Inputting

Input

Input File

Number of Channels

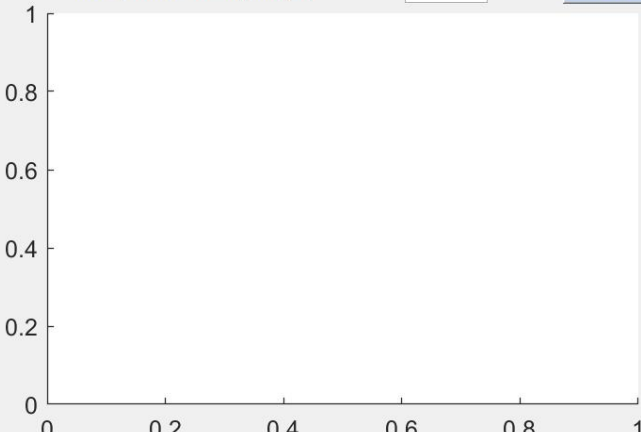
Number of Gestures

Repeat Times

Action Time(s)

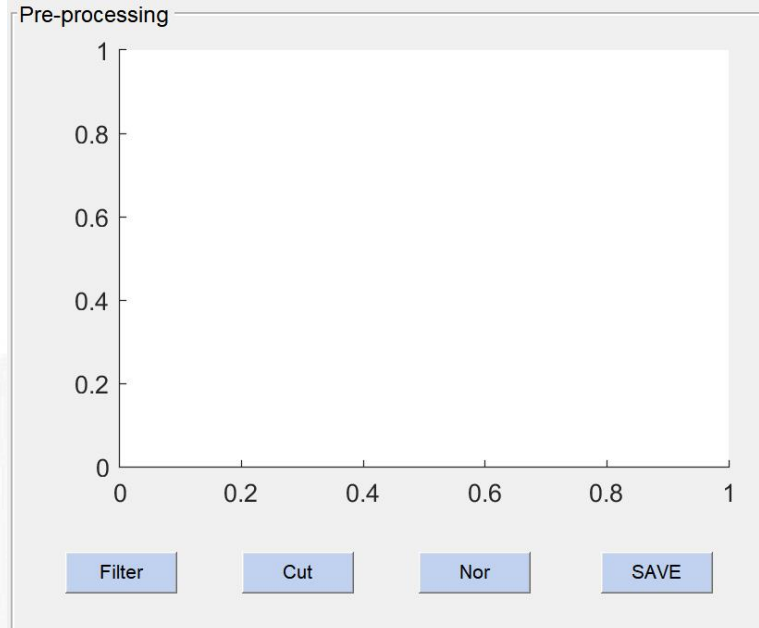
Rest Time(s)

Frequency of Samples(Hz)



- 1.Click the button “Input File” to input your data which must be a .mat file.
- 2.Fill in the blanks with the basic information of the data.
- 3.Click the button “PLOT” if you want to plot the data.

2.Pre-processing



1.Click the buttons “Filter”, “Cut” and “Nor” in turn to finish the function of this part.

*P.S.*After doing that, you click them at will.

2.Click the button “SAVE” if you want to save the data plotted currently as a .mat file.

3.Feature Extraction

- 1.Choose one or more feature extraction methods.
- 2.Input the parameter if you choose the methods with a blank.

Based on Machine Learning

Feature Extraction

TD

☐ 1-RMS ☐ 2-WL ☐ 3-MAV

☐ 4-VAR ☐ 5-ZC ☐ 6-SSC

FD

☐ 7-MNF ☐ 8-MDF

TFD

☐ 9-Haar Wavelet ☐ 10-CoifN Wavelet
N=

☐ 11-DbN Wavelet ☐ 12-SymN Wavelet
N= N=

Classifier

choose one

Classifier

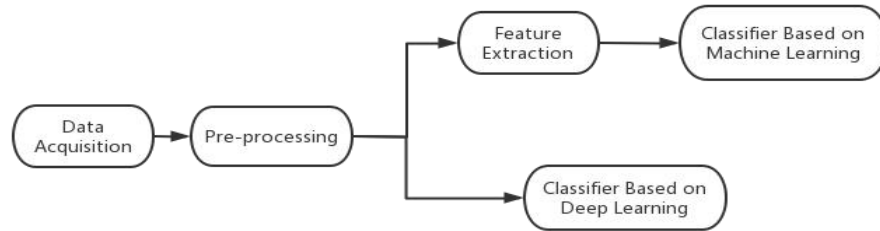
☒ 1-SVM ☐ 2-k-NN k=

☐ 3-LDA ☐ 4-ANN

☐ 5-Random Forest

RUN SAVE

4. Classification



No matter you choose which way, classifier is necessary.

Based on Machine Learning

Feature Extraction

TD ☐ 1-RMS ☐ 2-WL ☐ 3-MAV

☐ 4-VAR ☐ 5-ZC ☐ 6-SSC

FD ☐ 7-MNF ☐ 8-MDF

TFD ☐ 9-Haar Wavelet ☐ 10-CoifN Wavelet N=

☐ 11-DbN Wavelet ☐ 12-SymN Wavelet N=

Classifier

choose one

☒ 1-SVM ☐ 2-k-NN k=

☐ 3-LDA ☐ 4-ANN

☐ 5-Random Forest

RUN SAVE

For the first way, after feature extraction:

1. Choose one classifier and input the value of k if you choose k-NN.
2. Click the button "RUN" for gesture recognition.
3. Click the button "SAVE" if you want to save the features as a .mat file.

Based on Deep Learning

Classifier

choose one

☒ 6-CNN ☐ 7-RNN

RUN

For the second way:

1. Choose one classifier.
2. Click the button "RUN" for gesture recognition.

5. Table and Bar Chart

Table for Comparison

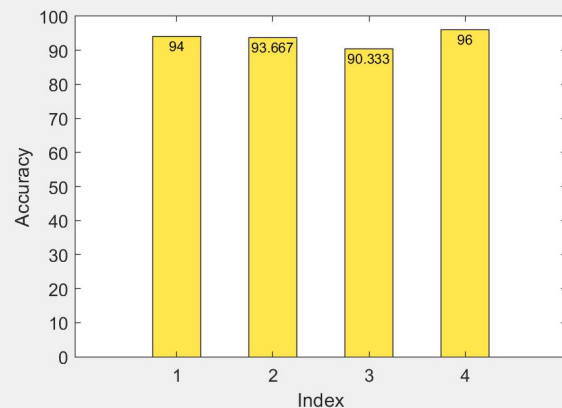
	Feature Extraction	Classifier	Accuracy
1	2	2(1)	94
2	5	2(1)	93.667
3	5+6	5	90.333
4	blank	6	96

DELETE

☐ row

PLOT

Bar Chart of Accuracy



After clicking the button “RUN”, the accuracy and the corresponding methods will be shown in the table using the numbers before them.

1. Input the row number if you want to delete the row, then click the button “DELETE”.
2. Click the button “PLOT” to plot the data in the table as a bar chart.