Proposal Talk

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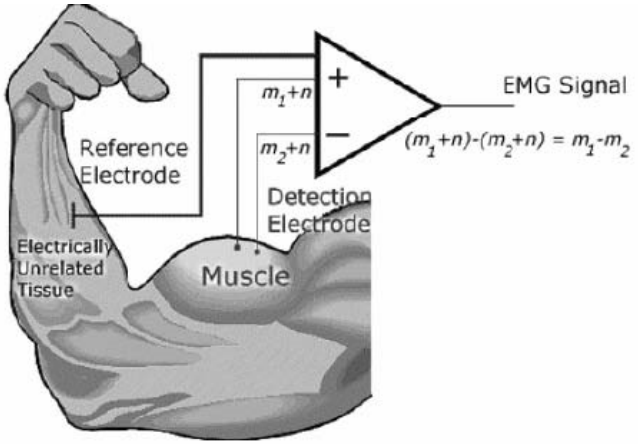
mhealth

Motivation

- MediWeCo: Contribution to learning and teaching physiotherapy through feedback.

MediWeCo Physio

- First to use combination of Myo & EMG signals.

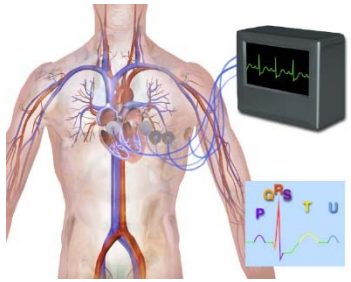


Gesture recognition?

- Image analysis requires ...
- Motion capture requires ...
- Sensing gloves are expensive.

Why electromyography?

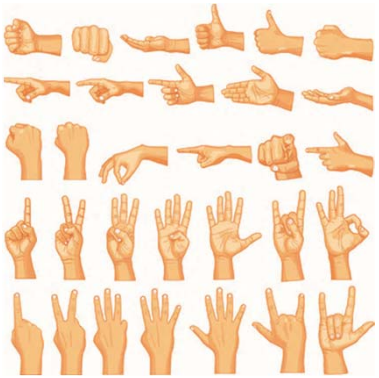
- Measuring muscle activity



- Thalmic Myo
  - Safe, easy, cheap, non-invasive
  - No gel to facilitate conductivity
  - Wireless

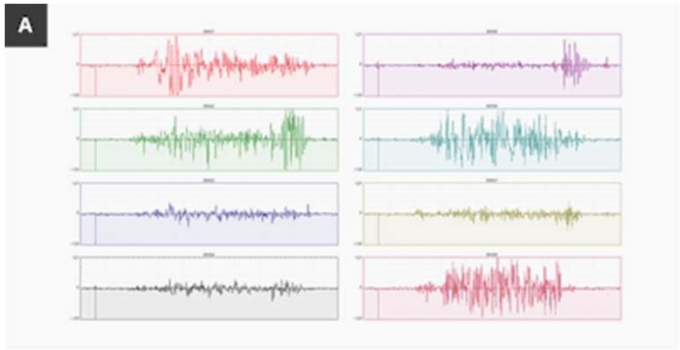
Goal: finger gesture recognition with Myo

- For different finger gestures → find best detection accuracy.



- Signals acquired with Myo.

- Focus solely on EMG signals.



State of the art

Robotic arm control

Surgery interface control

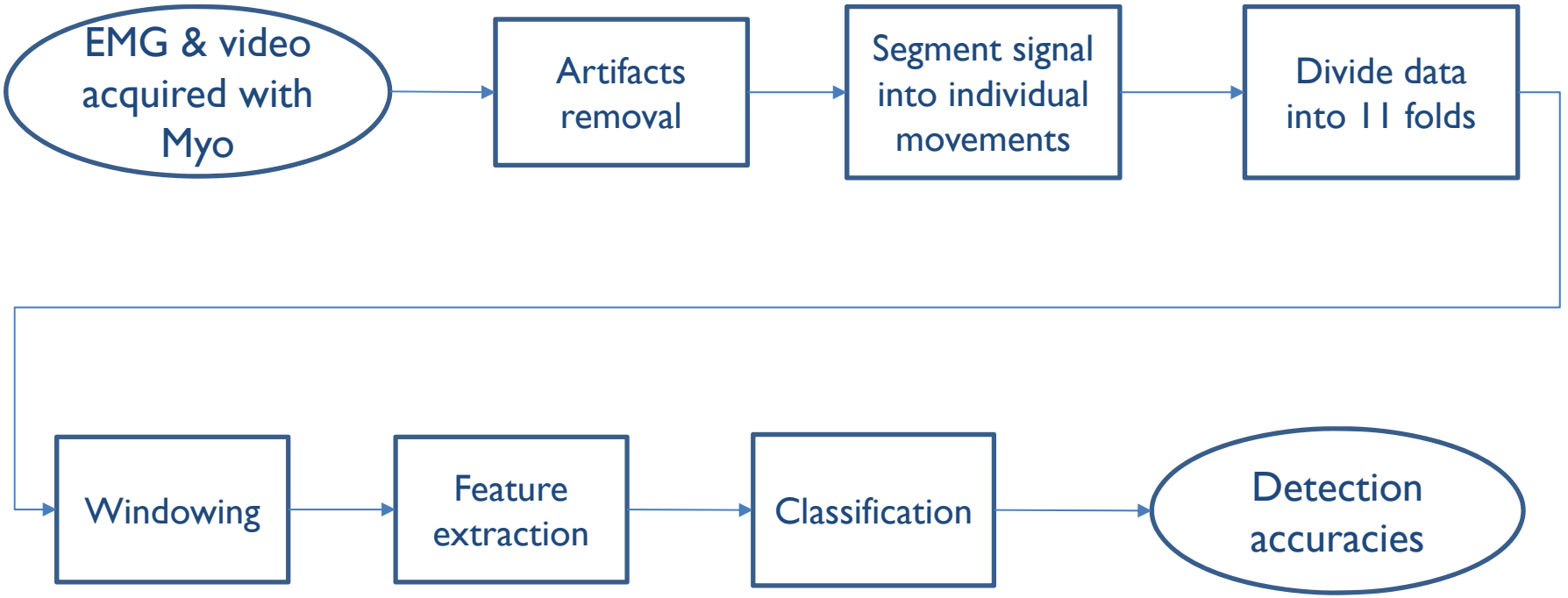
Control of stage effects

Remote vehicle control

Methods

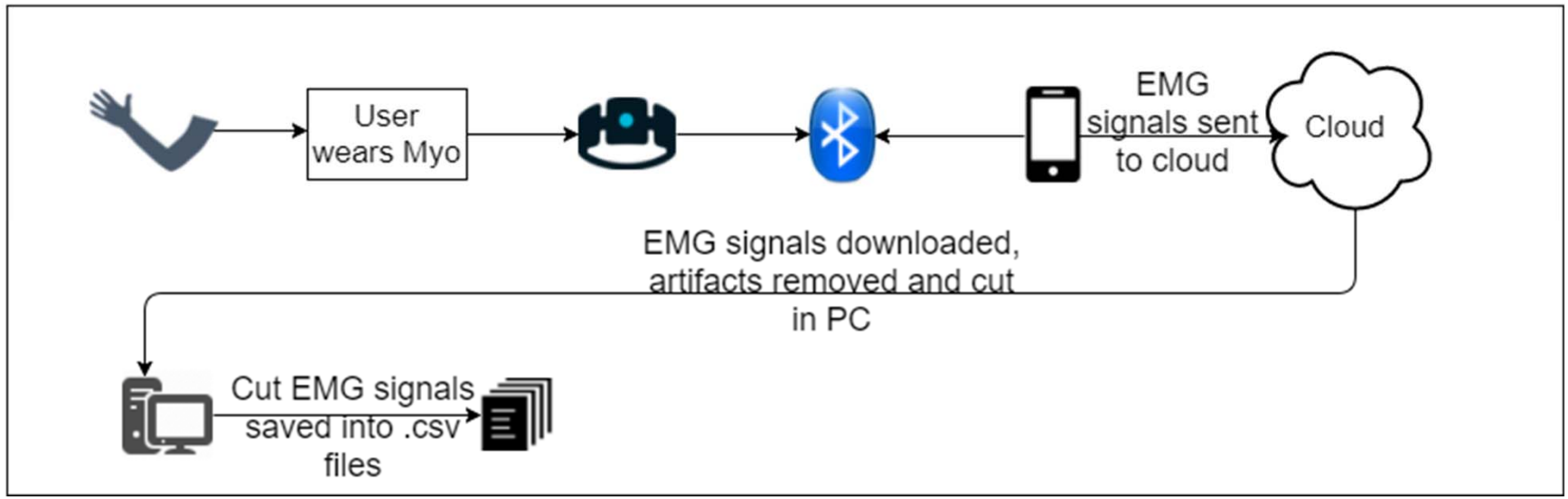
1. EMG signals and video (thumb flexion/extension) acquired with Myo
2. Removal of artifacts
3. Segment the signal into individual movements
4. Division of data into train, test and evaluation folds
5. Windowing
6. Extracted features:
   - RMS
   - STFT
   - Moving average
   - Wavelet transforms
7. Classifiers:
   - kNN
   - SVM
   - ANN

Methods


EMG & video acquired with Myo
Artifacts removal
Segment signal into individual movements
Divide data into 11 folds
Windowing
Feature extraction
Classification
Detection accuracies

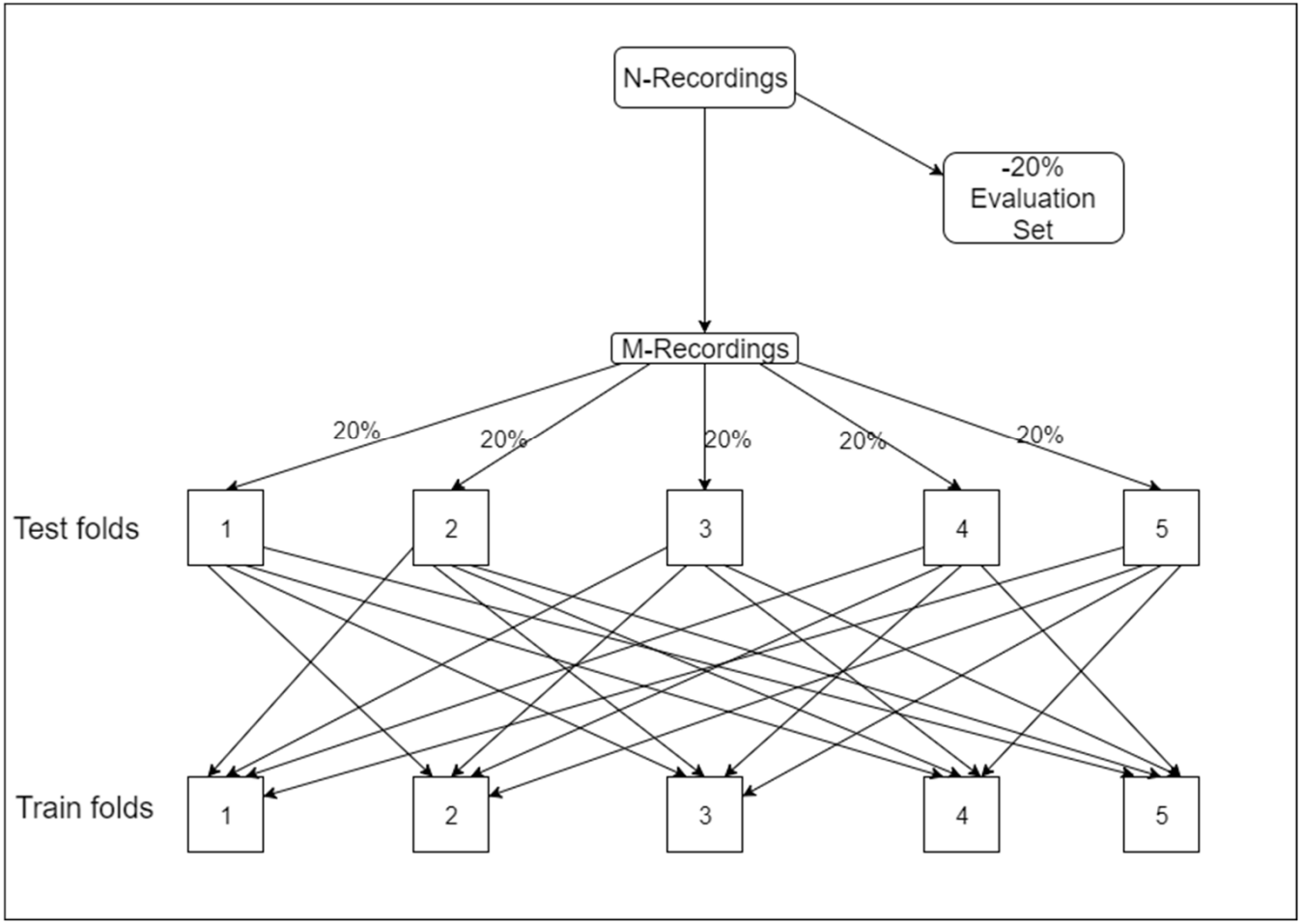
Tasks

Data collection



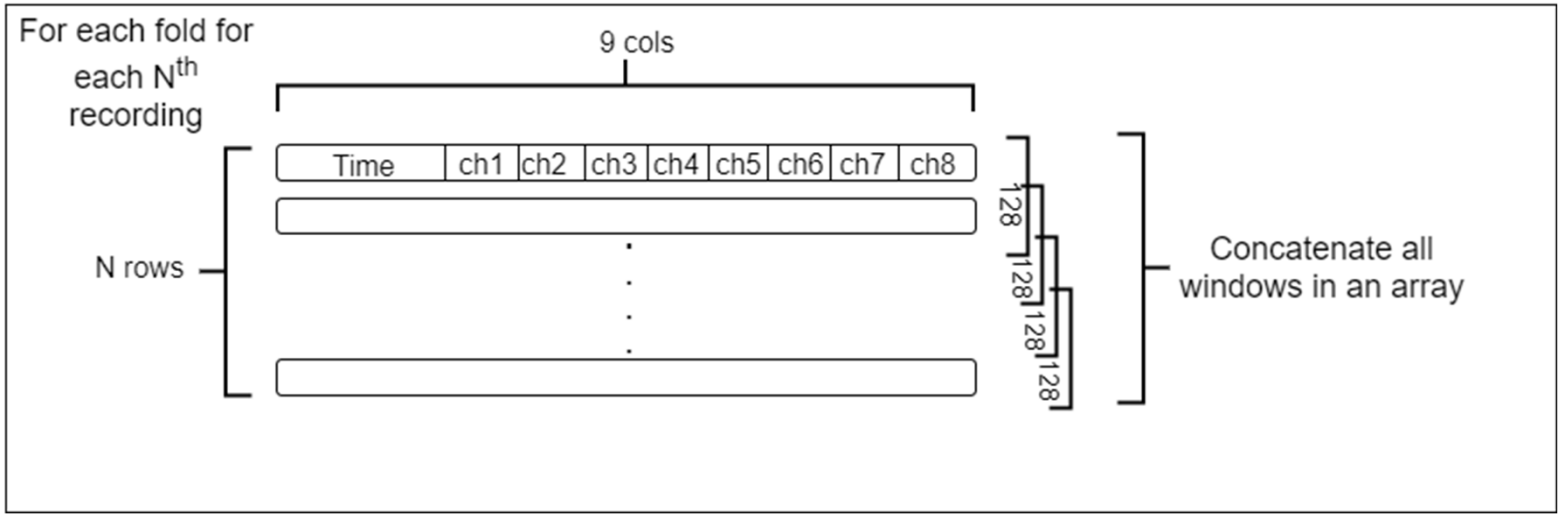
Tasks

Division of recordings into 5 folds



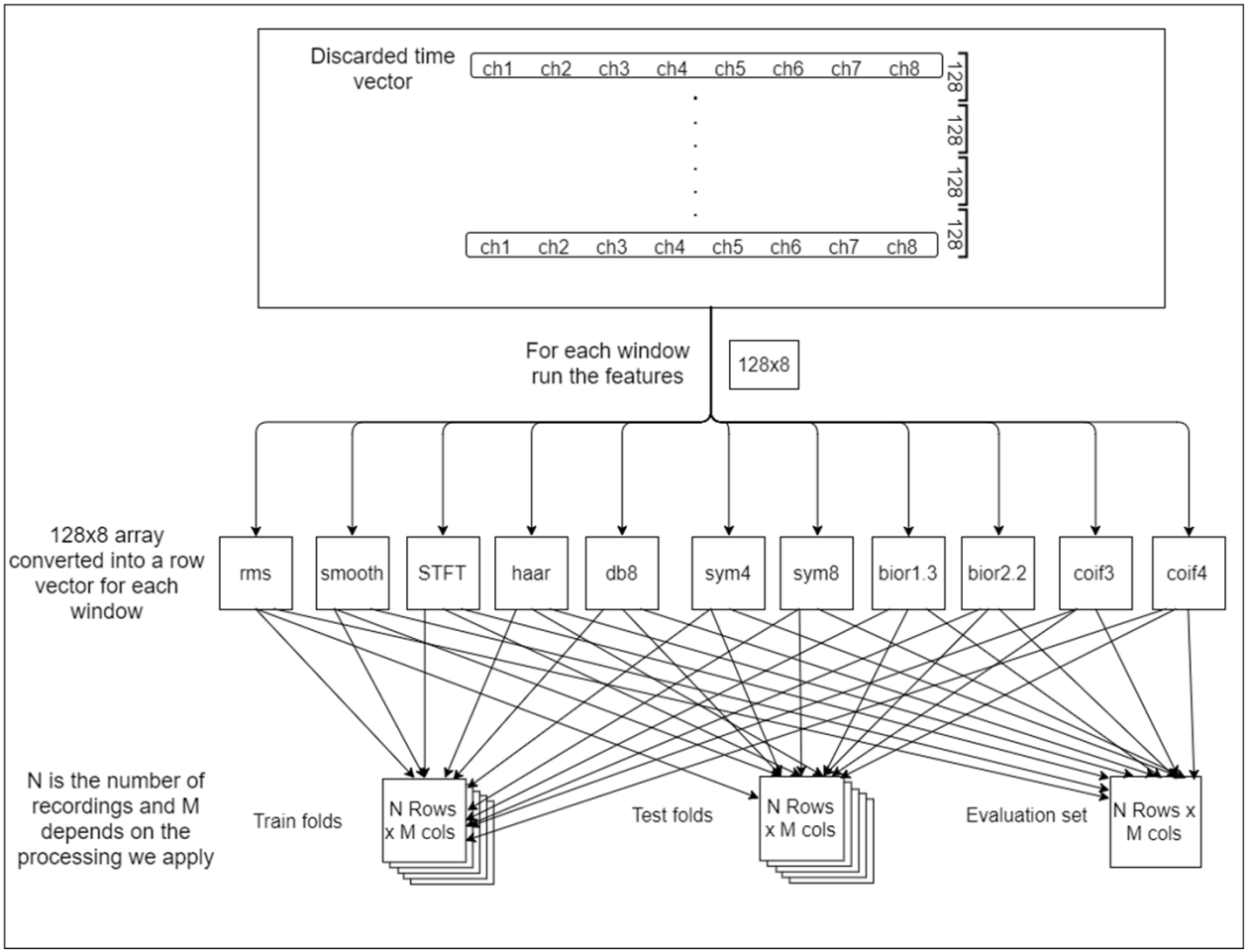
Tasks

Windowing



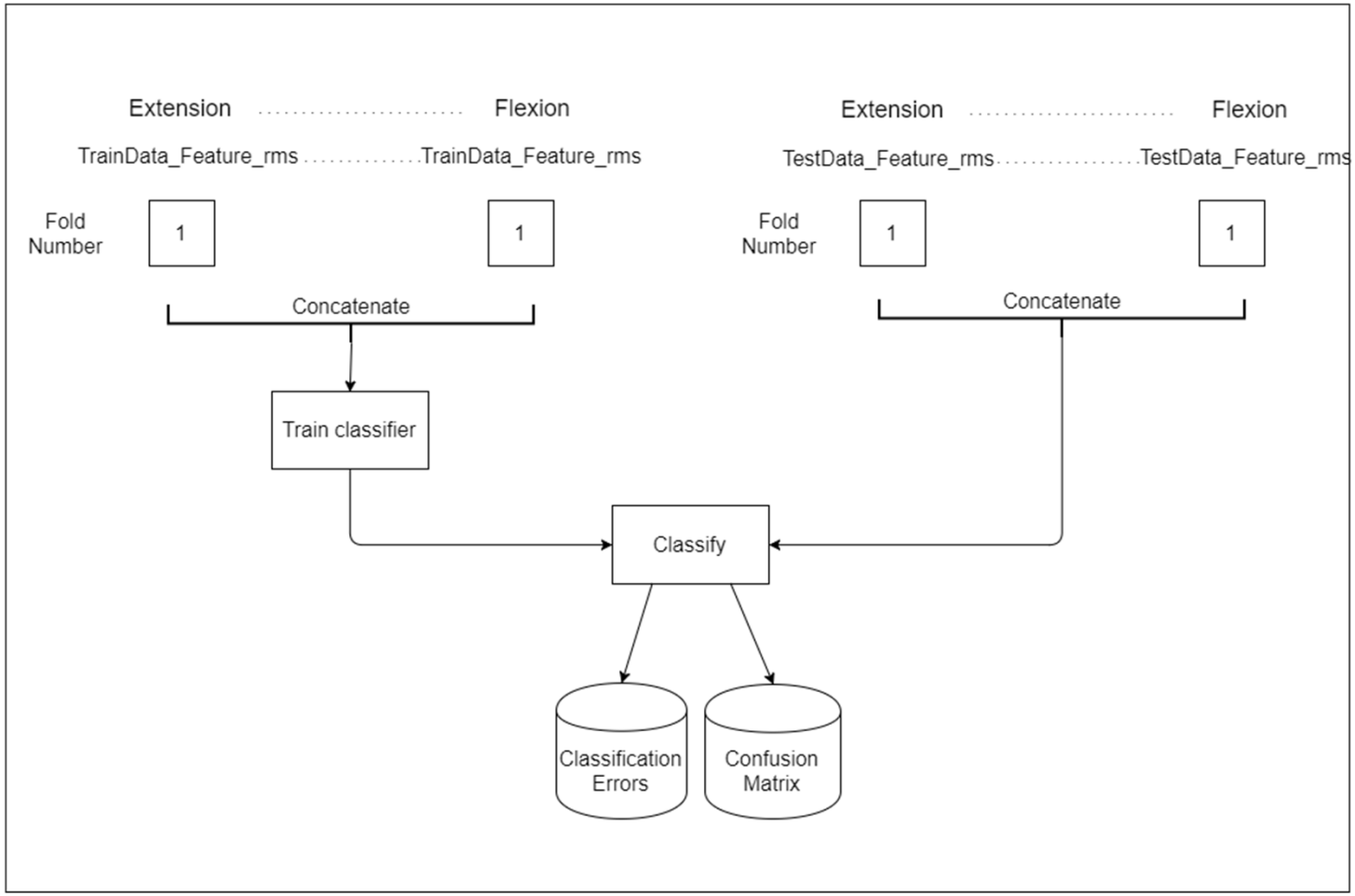
Tasks

Feature extraction



Tasks

Train & classification



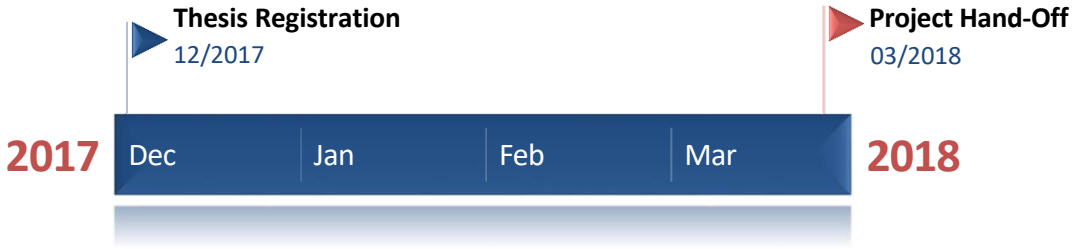
Timeline

Combine most accurate Features - > Results — 11/2017 – 12/2017

Test forward selection & backward elimination, creation of new gesture database — 12/2017 - 01/2018

Acquire new EMG signals — 01/2017 - 03/2018

Discussion & Conclusion — 03/2018 - 04/2018



Summary

- What I will do
  - Test new finger gestures.
  - Find the optimal parameters for SVM, ANN for the best detection accuracies.
  - Combine the best feature sets to increase the detection accuracies.