

Port 6 ML Challenge

Goal: Predict the pose of hand (angle of fingers) based on sensor data.

Go with whatever you want, RNNs, NEATs, or some basic ML algorithms, e.g SVMs.

We're curious to see how you approach the problem just as much as the result, so feel free to interpret this question in your own way as well.

Data

The data consists of synchronised sensor readings and labels from multiple sequences of different gestures and hand movements collected for one hand collected at approx. 50Hz. The sensor data/features consists of 30-dimensional vectors (the number of channels in our current wristband) and 5-dimensional groundtruth/labels vectors (the number of fingers most people have). Thus, each sequence is composed of a feature vector $X_{t \times 30}$ and a label vector $Y_{t \times 5}$.

The sensors readings are collected at 10-bit resolution i.e. $X_i \in [0, 1024] \forall X_i \in X$, but mainly lie within range 100-500. The labels are calculated from the dot product between two (normalized) vectors; The direction of the finger \mathbf{I} and the vector from the wrist towards the knuckles \mathbf{D} , i.e. $Y_i \in [-1, 1] \forall Y_i \in Y$. An exception for that is the thumb where the dot product is calculated between the thumb vector \mathbf{T} and the knuckle vector \mathbf{N} (see figure `handvectors.HEIC`).

Accessing Data

Both the features and groundtruth data are stored in `data.dat` which can be loaded with python's `joblib` module

```
features, labels = joblib.load("data.dat")
```

where both the variables `features` and `labels` are lists of sequences of length ~5000 samples. The feature and labels lists have been aligned such that

corresponding label sequence for `features[i]` is accessed by `labels[i]`.

Good luck!