

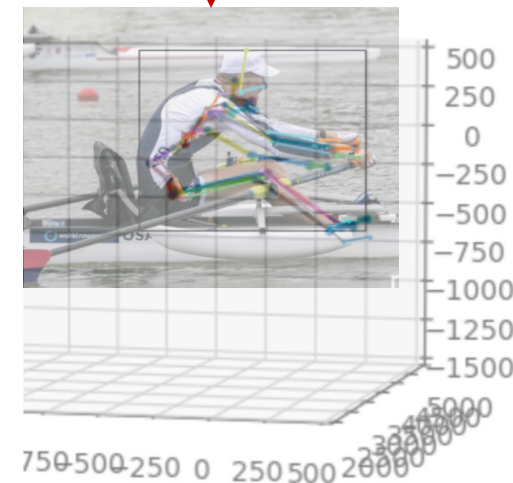
NN for Rowing

Para and non-Para

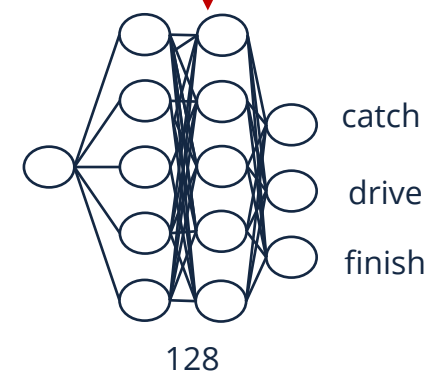
Some machine learning applications exist for rowing, but they neither take Para athletes into account, nor do they have 3D awareness.

Why these three parts of the stroke? These are the main parts of the stroke, and the angles here often reveal how much power a rower can achieve.

If we can isolate these moments, we can eventually provide tips like “raise your hands at the catch.”



keypoint	x	y	z
0	0.0	0.0	0.0
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0
5	0.0	0.0	0.0
6	0.0	0.0	0.0
7	0.0	0.0	0.0
8	0.0	0.0	0.0
9	0.0	0.0	0.0
10	0.0	0.0	0.0
11	0.0	0.0	0.0
12	0.0	0.0	0.0
13	0.0	0.0	0.0
14	0.0	0.0	0.0
15	0.0	0.0	0.0
16	0.0	0.0	0.0
17	0.0	0.0	0.0
18	0.0	0.0	0.0
19	0.0	0.0	0.0
20	0.0	0.0	0.0
21	0.0	0.0	0.0
22	0.0	0.0	0.0
23	0.0	0.0	0.0
24	0.0	0.0	0.0
25	0.0	0.0	0.0
26	0.0	0.0	0.0
27	0.0	0.0	0.0
28	0.0	0.0	0.0
29	0.0	0.0	0.0
30	0.0	0.0	0.0



MeTRAbs 3d Pose Estimation on a single image

Get 3D coordinates for 30 different keypoints

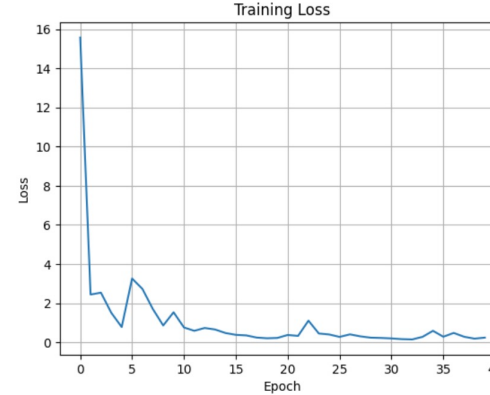
Made own dataset of 3 different classes (catch, drive, finish)
1475 training, 369 testing

Train 2 hidden layer NN (PyTorch) to predict the part of the stroke from keypoint coordinates

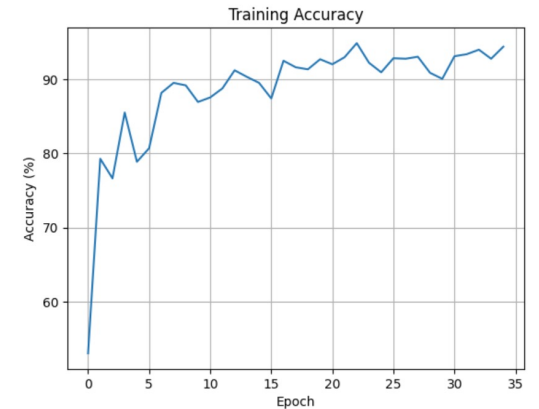
OPTIMIZATION

optimizer: Adam

Extension of SGD with an adaptive learning rate.
Performed significantly better than SGD (SGD got stuck on predicting mid-drive)



94.4 % train accuracy



STORAGE + MEMORY

Model size = $4.8e-05$ MB both quantized and non-quantized

Accuracy loss during quantization = 1%

Conclusion: model is already small, pruning and quantization may be unnecessary

91.6 % test accuracy

