Ortho Eyes

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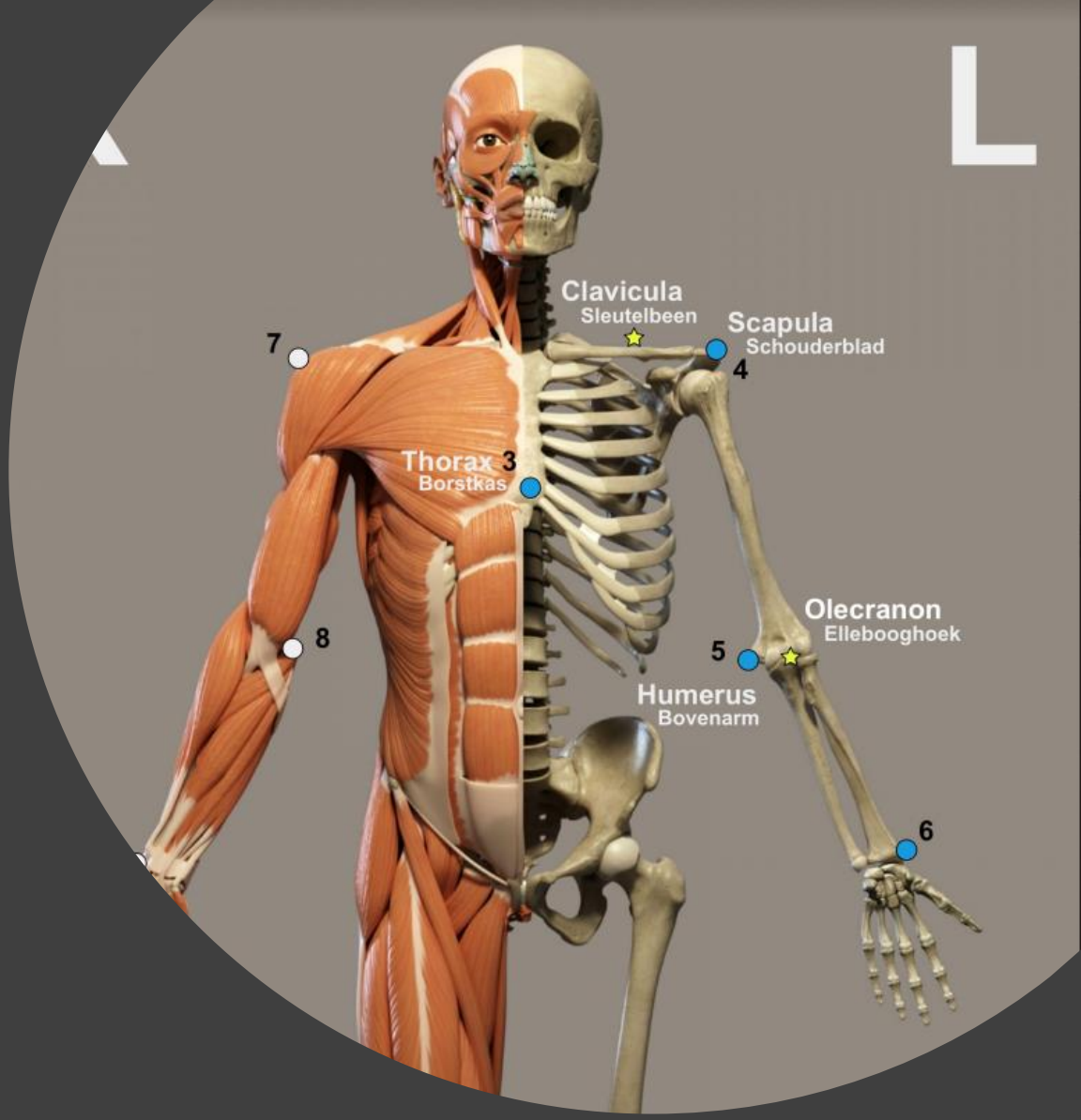
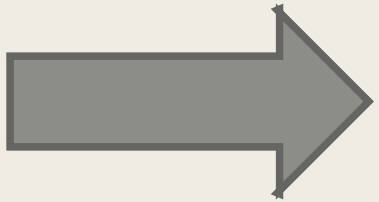


Introduction

Leids Universitair Medisch Centrum

- Laboratorium for Kinematics en Neuromechanics (LK&N)
- Improving treatment and diagnosis of musculoskeletal system issues
- Our research is focused on shoulder issues

From Goniometer to Xbox-Kinect



History of the project

- First iteration (2017)
  - *Research with kinect*
- Second iteration (2018)
  - *Flock of birds – logistic regression*
- Third iteration (2019)
  - *Flock of birds – Verifying the last groups work*

To what extend and in what way, can different data science techniques be used on kinematic recordings to contribute to a more valid and more reliable diagnosis, made by a doctor, on shoulder disability.

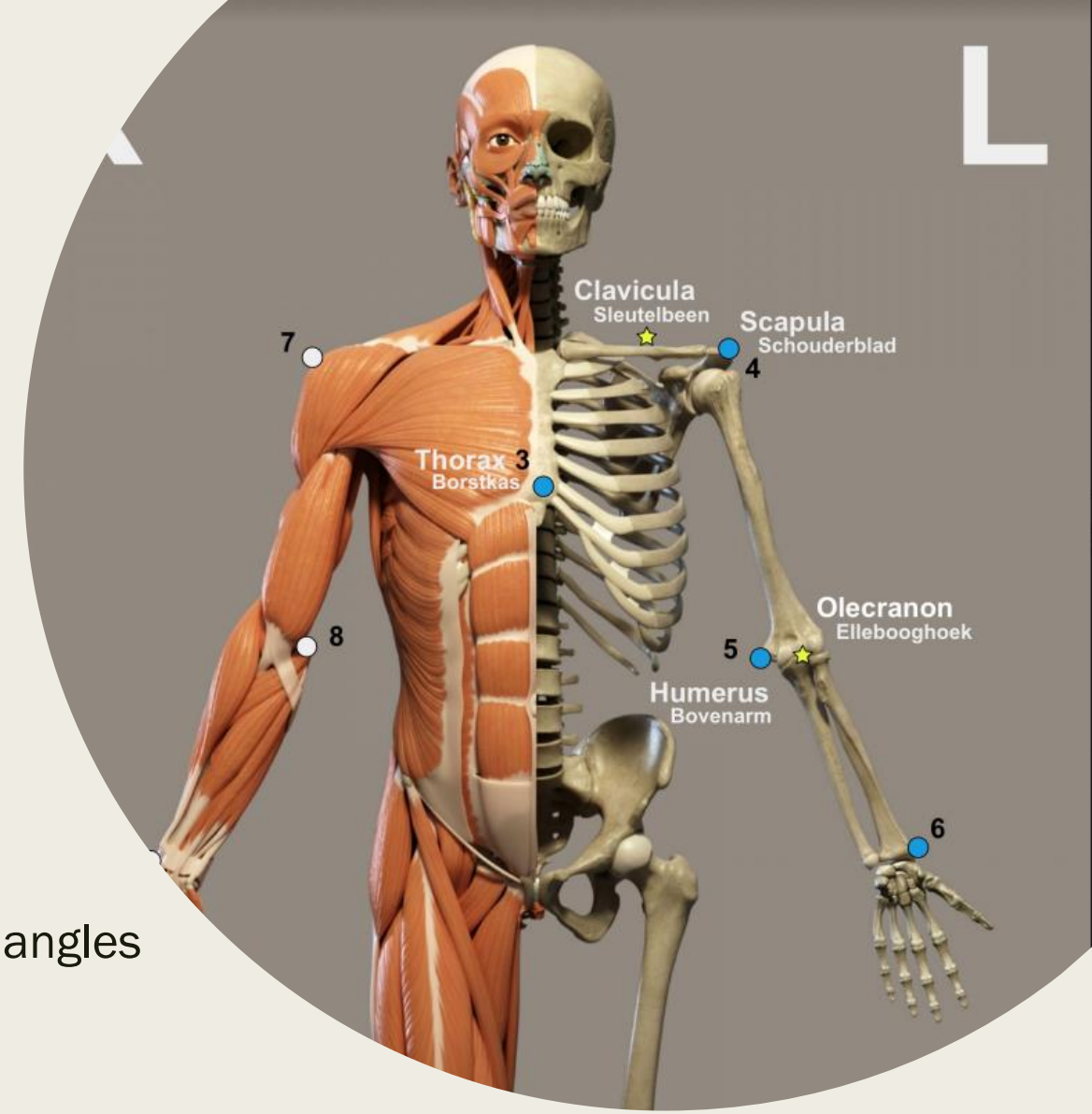
Up to this point

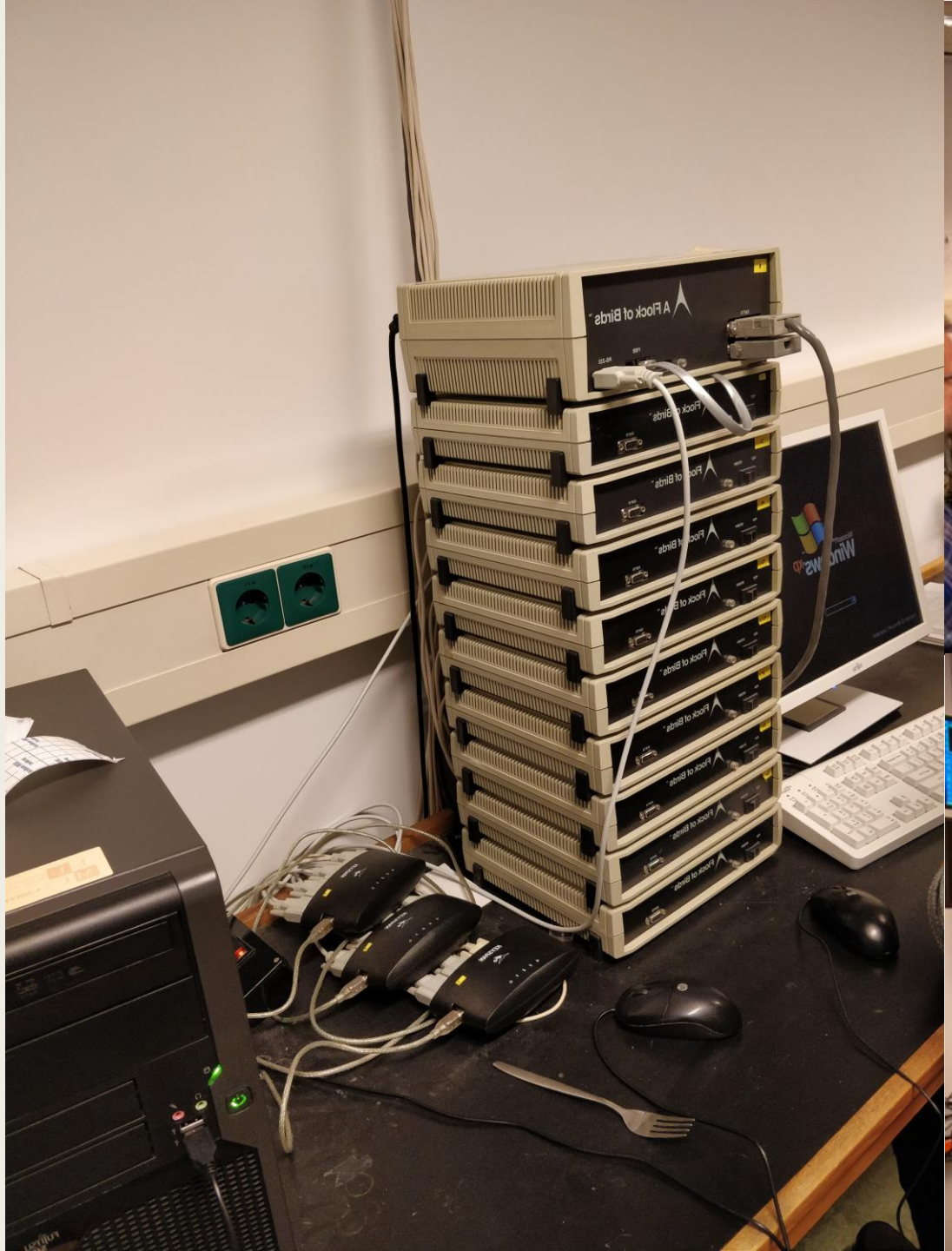
- *Get the best possible data from the LUMC*
- *Clean our data*
- *Enrich our data*
- *Create different configurations for the Logistic Regression*

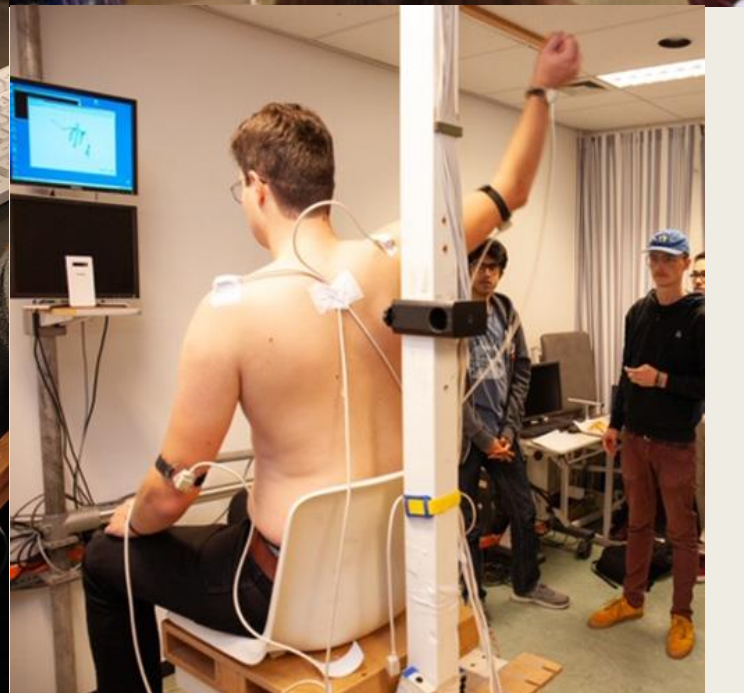
The Dataset

The Data

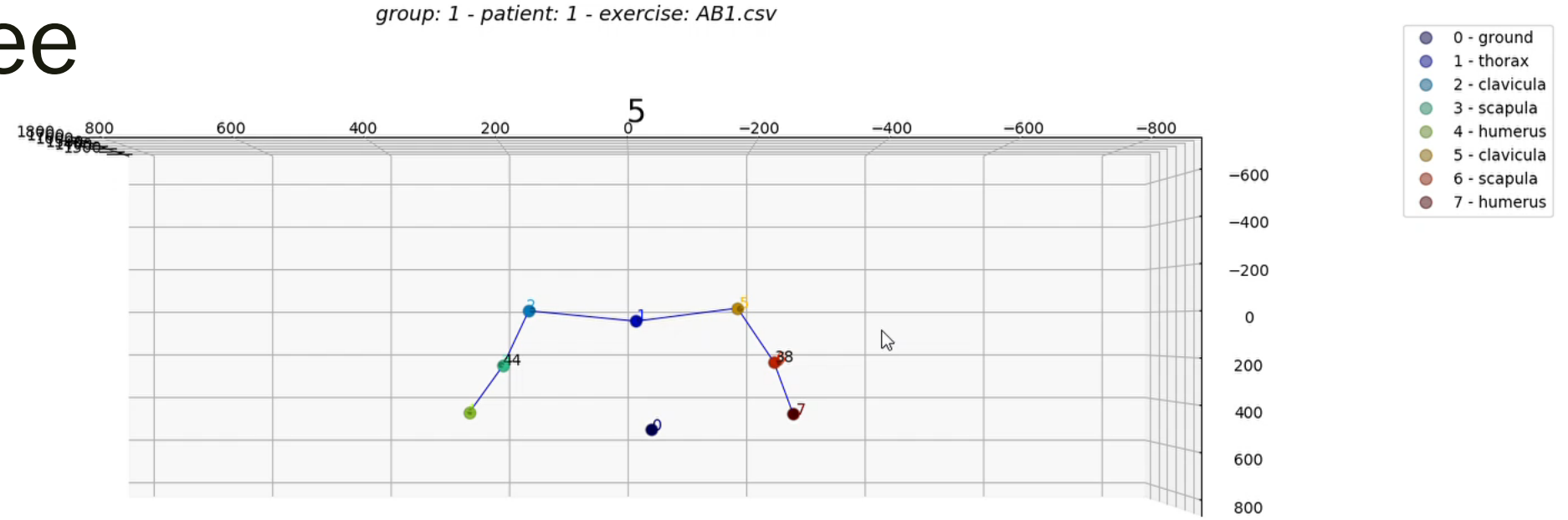
- FoB system
  - *Giant Electro-Magnetic field generator*
- Consists of multiple Hall Sensors
  - Reads Magnetic Field
  - Returns them as XYZ coordinates of bone structures
  - This Data is translated to relational XYZ angles

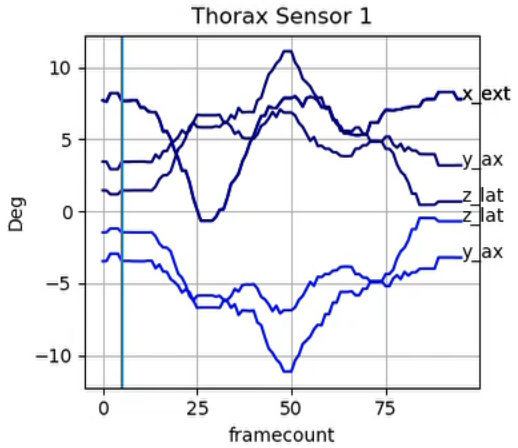


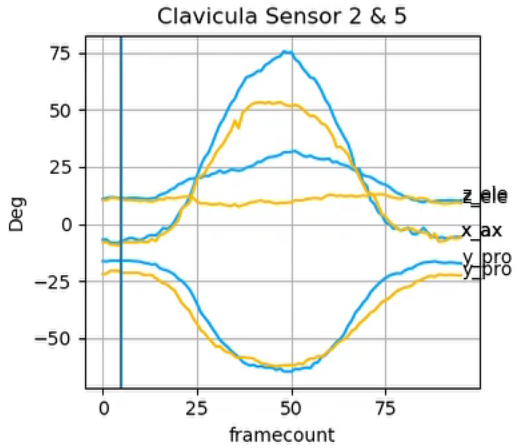

A Flock of Birds

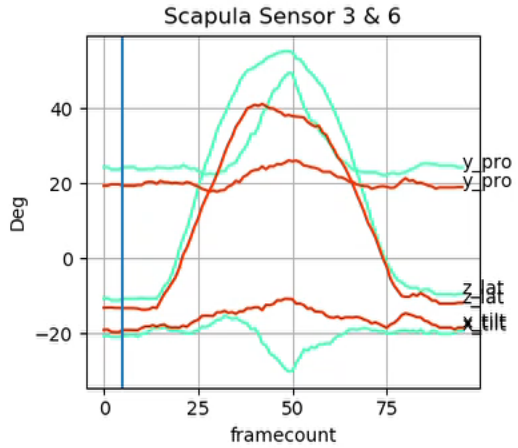


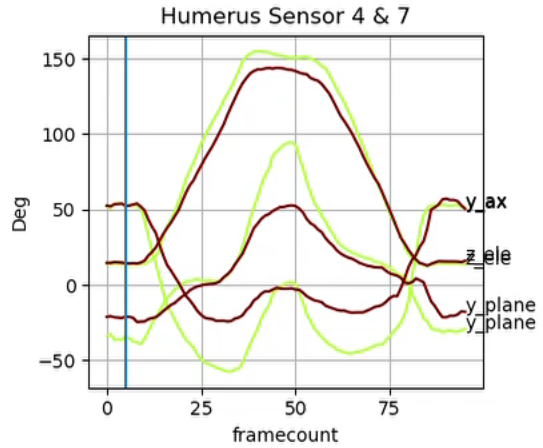
How we see the data





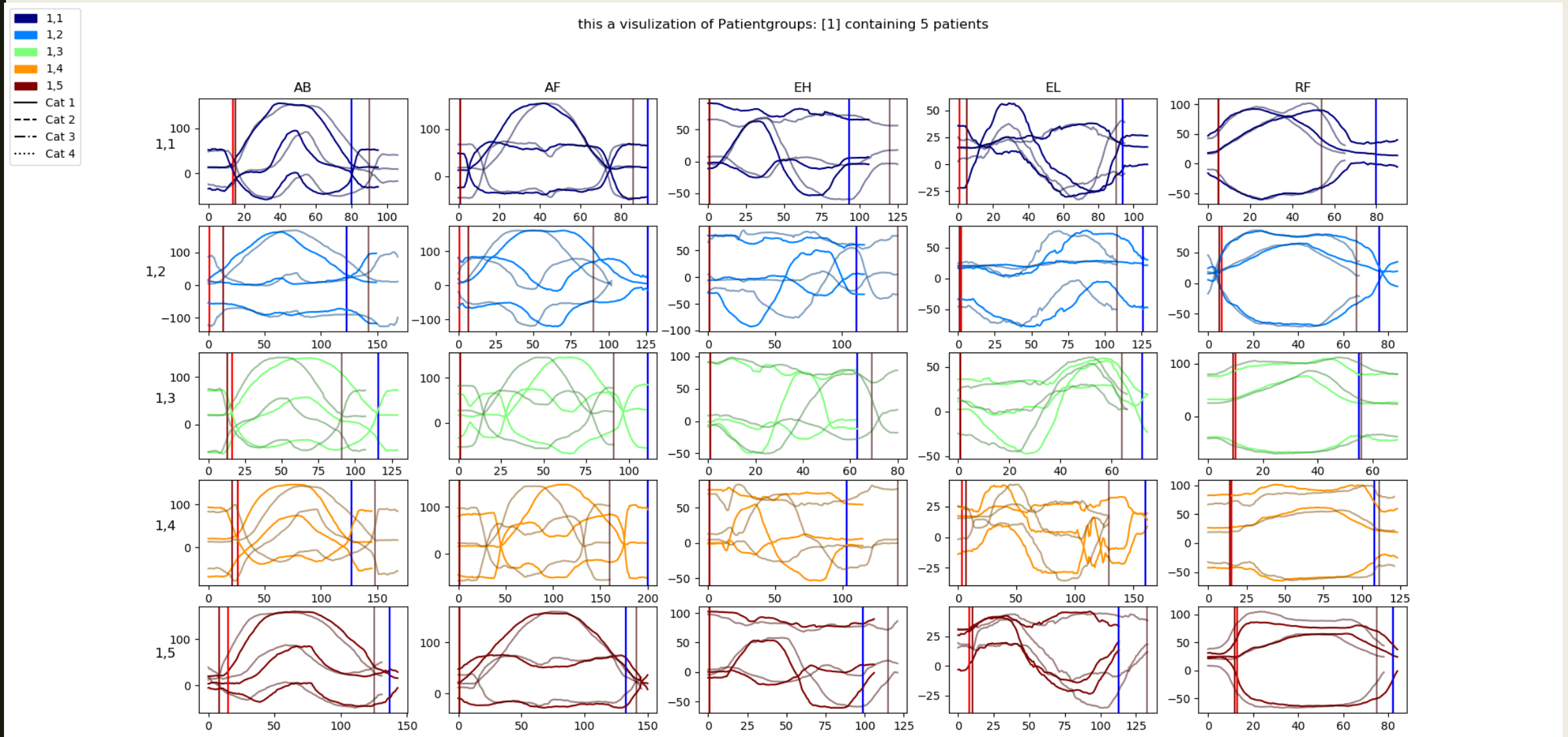






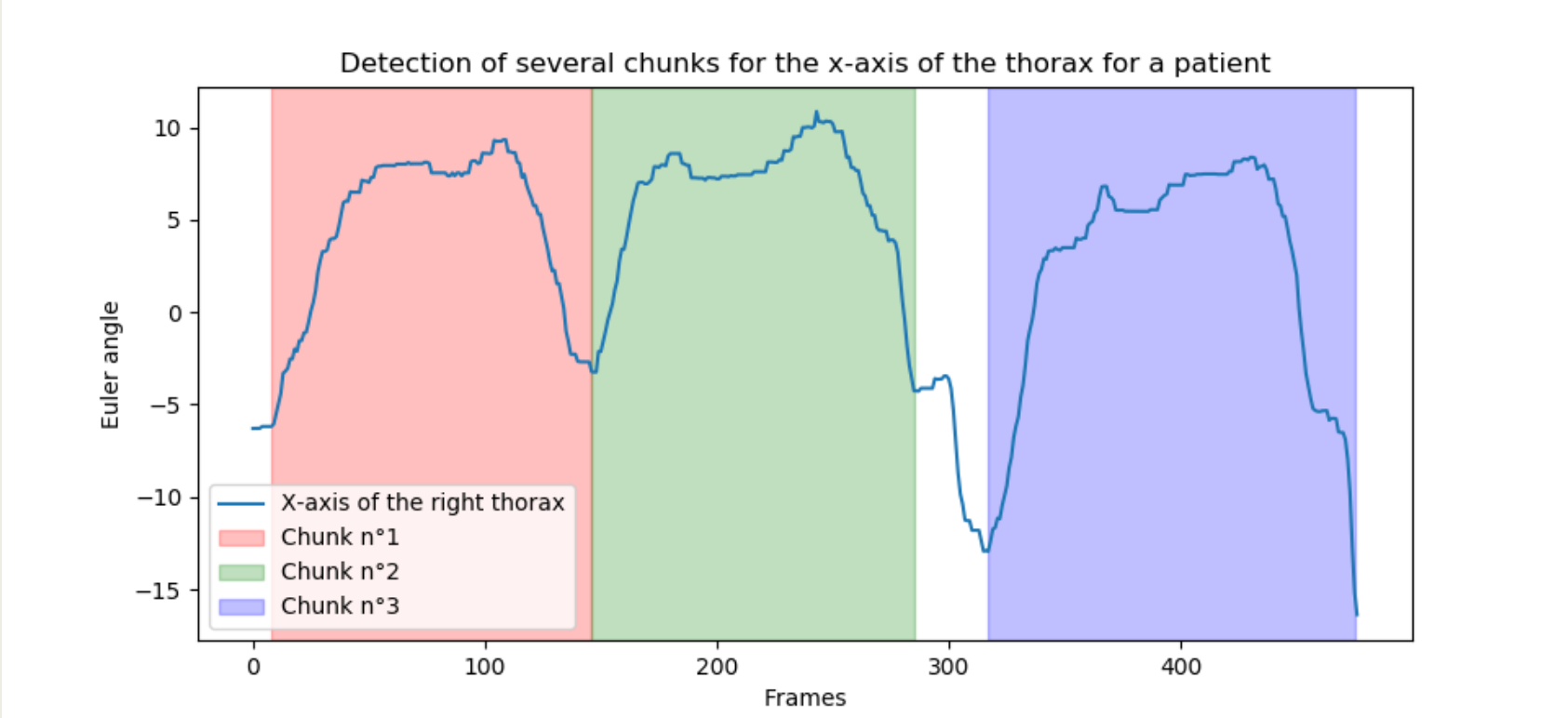
Data Cleaning

Removing the idle



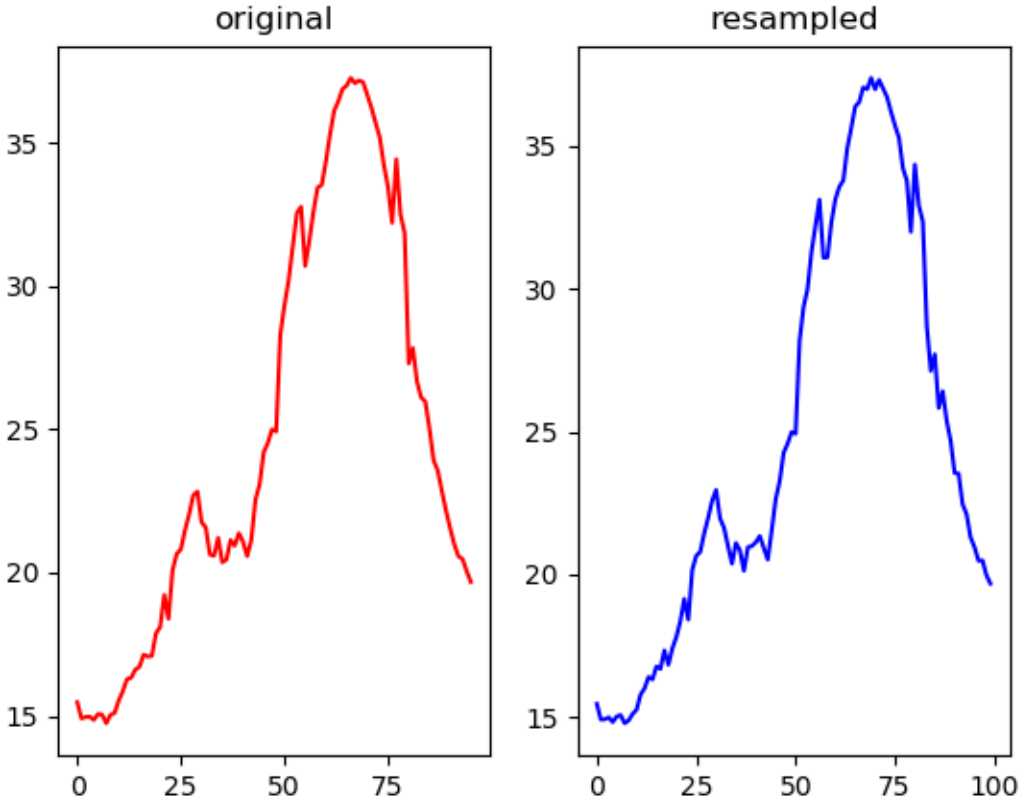
Splitting double exercises

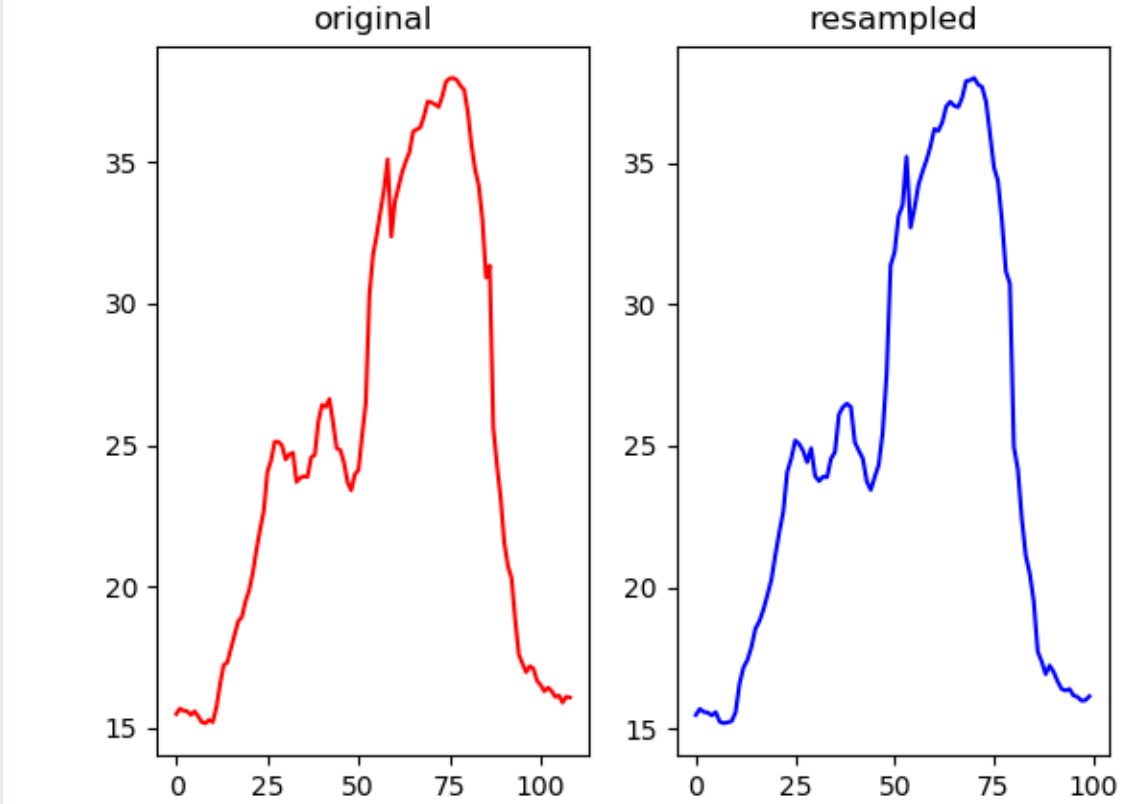
- Detect “double exercises”



Data Enrichment

Resample exercises

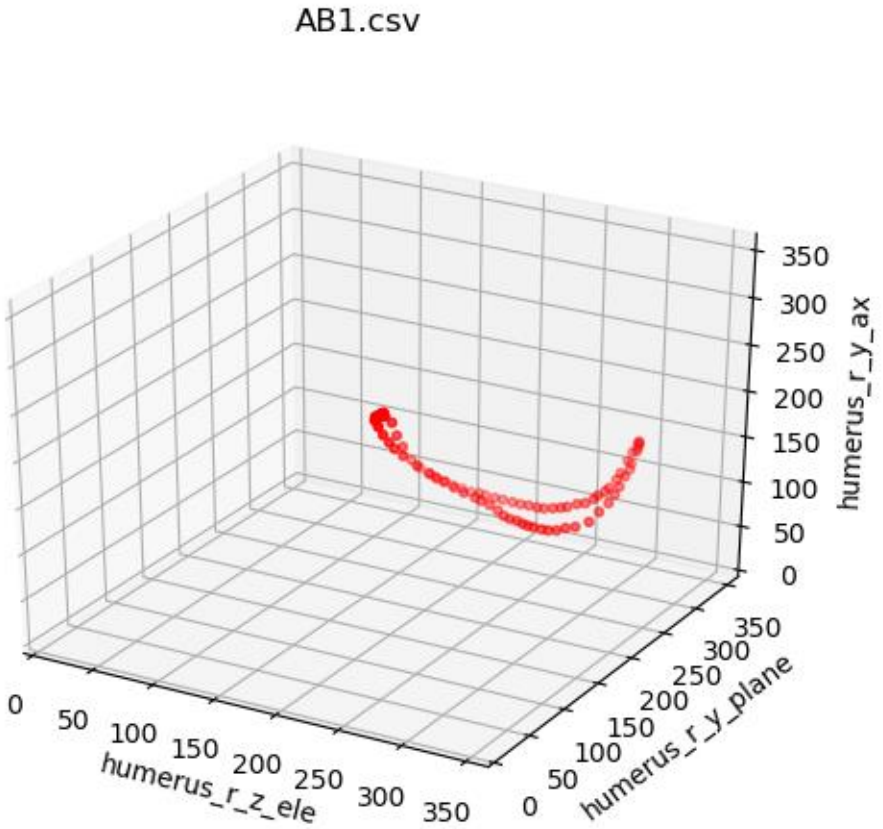




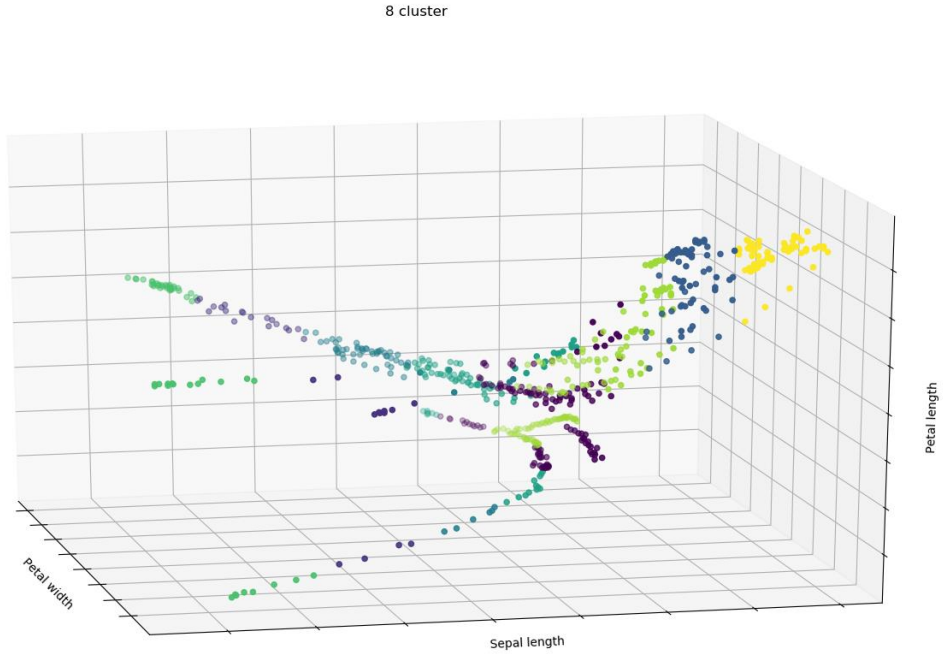
Frame Generator

					↓					↓
Frame index:	1	2	3	4	**5**	6	7	8	9	**10**

				↓	↓				↓	↓
Frame index:	1	2	3	**4**	*5*	6	7	8	**9**	*10*



Space description



State of the Project

We're training Logistic Regression Model

- *Evaluate the model based on the different configurations*
- *Write our research paper on the findings*

Latest Result

Accuracy	MCC	LogLoss	RSME	RMSLE	remove_idle	frame_generator	frame_generator_count	column_index	frames_counts	normalise	remove_idle_splitt_count	resample_exercise	default
0.695954	0.5923	1.39075	0.551404	0.160698	False	False	7	0	5	True	3	False	False
0.695954	0.5923	1.39075	0.551404	0.160698	False	False	7	0	5	True	5	False	False
0.695954	0.5923	1.39075	0.551404	0.160698	False	False	7	0	5	True	5	False	True

Questions?

Thank you for listening!