**Log internship UMCU**

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Decisions to look into/things to try:

* Normalization
* Reintroducing the z-axis
* Different types of padding (or maybe not if normalization works well)
* Dynamic Time Warping
* Different clustering methods
* Try different padding approach since some words consist of more padding than actual data
* Take angles instead of x and y separately

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| **Date** | **Description** |
| 08-02-2022 | * Looked into Git/GitHub by watching a course * Had a look at the dataset * Some practical stuff at the UMCU |
| 10-02-2022 | * Worked on some data visualization. Kind of got it to work for the first five sentences of F1. Need to work on some better ways to visualize it, maybe only plot every 5 points in time? * Also need to find a way to visualize the entire dataset |
| 16-02-2022 | * Git and GitHub fully set up * Made all the data for F1 one file. This doesn’t really work that well though, so I might have to try something else. Since it’s only 92 files I might do it manually.   + Deleted this since it wouldn’t work in GitHub but kept the script in case I needed it. * Now for the first mayor task: need to extract articulatory traces per word. Need to ask Julia about that. Maybe I can extract the timestamps of different words from the .wav files and match those to the articulatory traces? * Searched for a Word Boundary Detection algorithm, but after some research I’m not sure if it is the correct way to go. * CTC segmentation seems promising |
| * [Forced alignment](https://pytorch.org/audio/stable/tutorials/forced_alignment_tutorial.html) * [CTC segmentation](https://colab.research.google.com/github/NVIDIA/NeMo/blob/v1.0.0/tutorials/tools/CTC_Segmentation_Tutorial.ipynb) |
| 18-02-2022 |  |
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| 16-03-2022 | * I’ve done 20 sanity checks to see if the trans files line up with the wav files. For most of them it seems that they line up just fine, although some are a little off. However, there doesn’t seem to be a common trend, and it seems like these slight errors are random. * Looking into dimension reduction. It seems like time series clustering is what I’m looking for. * Also trying to find the best way to do Dynamic Time Warping (DTW), but haven’t been successful yet * Wrote code that returns all the instances of a word, the goal is to apply DTW to these words before doing any dimension reduction |
| * [Time series clustering article](https://towardsdatascience.com/time-series-clustering-and-dimensionality-reduction-5b3b4e84f6a3) * [Dynamic Time Warping article](https://towardsdatascience.com/how-to-apply-k-means-clustering-to-time-series-data-28d04a8f7da3) |
| 18-03-2022 | * Perform dynamic time warping for each articulator separately and for x and y separately. Z can be ignored since it shows very little movement, as is to be expected. * First try at doing dynamic time warping was not very successful. The average line is not representative of the two lines of the word. I might have to warp the EMA data to all be the same length, so that the repetitions of words can already look a bit more similar |
| 23-02-2022 | * Julia wrote me some code that would do the dynamic time warping for me. However, it doesn’t really give me the results I want. It doesn’t seem to give me the average of two (or more) lines, it just gives me a slightly offset copy of one of the lines. My own code does seem to work a little more like I’d hope, but it doesn’t always give me a line that I’m happy with. Need to talk to Julia when she gets here about that. * Turns out I just didn’t really understand Julia’s code, so it does help me but still not getting the results I want |
| 24-03-2022 | * Perform some naïve dtw on words to assess the performance. The dba approach isn’t great, some maybe this is the solution. If not, we could also leave the dtw, and let the clustering solve it for us. |
| 30-03-2022 |  |
| 31-03-2022 |  |
| 06-04-2022 | * I think I’m going to give up on DTW for now, because of some examples like the one above. The lines are very similar, but the line we get from DTW just doesn’t make sense. I’ll leave it to the clustering to put them in the same cluster. * The paper Dimensionality Reduction and Motion Clustering during Activities of Daily Living: 3, 4, and 7 Degree-of-Freedom Arm Movements, they proposed the following: * Take the DBA of the motions, and cluster them using Agglomerative hierarchical clustering. After that, you again cluster them but without the averaging, and see how consistent they are with one another. |
| 08-04-2022 |  |
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| 22-04-2022 | * Working on padding the words that have the same number of syllables. Ran into the problem that some words are very short, even if you correct for the fact that they have the same number of syllables. The number of samples for 3 syllable words ranges from 15 to 93 |
| 02-05-2022 | * Deleted the word interchangeably in M1 because of an inconsistency in the data. Same goes for microorganisms in sentence 149. |

