Project Progress Documentation

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7.17.2025

- Completed batch1_avg_0719

7.23.2025

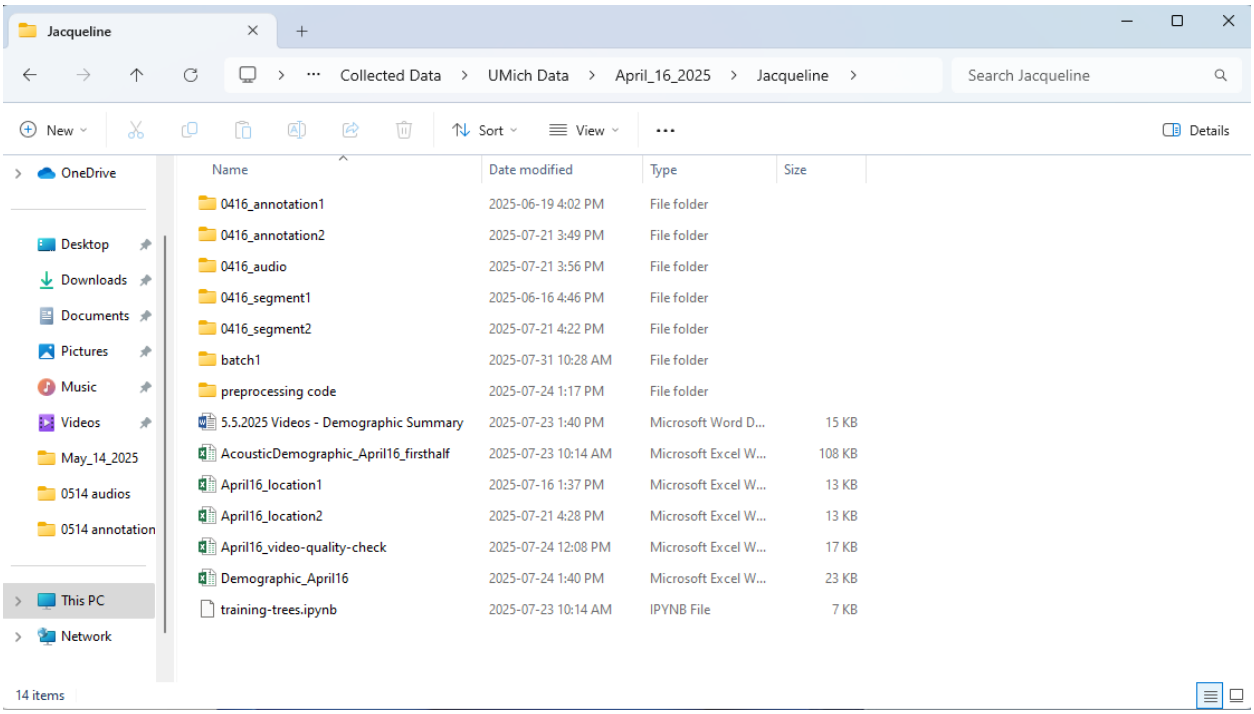
- Brainstormed research update presentation
- Outlined 8 different data split methods:
    - Five vowels together, five vowels separate (see, sahh, so, soo, set), average of five segmented vowels, median of five segmented vowels

7.26.2025

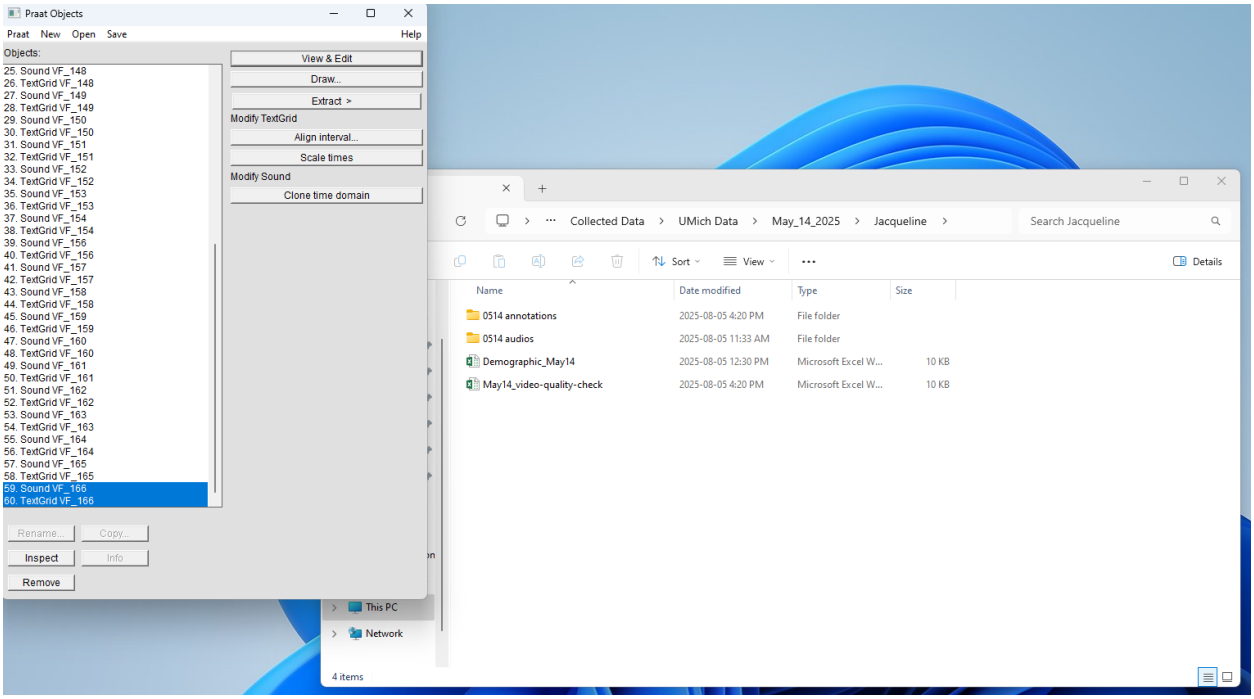
- Started batch2_all1_0729

7.29.2025

- Completed batch2_all1_0729
- Prepared research update presentation



8.5.2025



- Started and finished annotating all the vowels from the May_14_2025 folder
- Wrote comments on all the videos and audios in “May14_video-quality-check.xlsx”

8.6.2025

- Extracted all the features and AHI information from 5.14.2025 dataset

8.11.2025

- Reorganize the April16_May14 datasets – combined all three batches to train on vowels
  - Need to extract the filename + vowels from April 16 _ batch 2
- Train models on individual vowels
- Split control vs cases for model training

Table 1: count of the number of samples available per each five vowels

see	so	soo	sahh	set
99 01_DSCF0148.wav	100	100	100	100

- Not all recording samples contain all five vowels | reasons:
  - instructor’s confusion between pronunciation of /so/ vs /soo/ and /see/ vs /set
  - participant’s confusion between pronunciation of /so/ and /soo/

Table 2: count of the total number of samples available per control and case

control	case
295	204

8.12.2025

- pearson/spearman coefficients, and mutual information on original data
- same statistical significiance methods applied for soo vowel
    - mutual importance high for var
    - need to try other four vowels
- is lost on what to do next because random forest also looks pretty bad lol

8.13.2025

- MFCC_0 → Overall log-energy of the frame (roughly total power).
    - MFCC_0 (-200 to 50): log-energy can vary a lot depending on loudness of the frame. Big negative values correspond to very quiet frames.
- MFCC_1, MFCC_2 → Shape of the spectral envelope, low-frequency variations.
    - MFCC_1 (120 to 260) and MFCC_2 (-100 to 60): capture large-scale spectral slope differences. The scale depends on how DCT was applied.
- MFCC_3–MFCC_12 → Finer spectral details, higher-frequency variations.
    - MFCC_3–MFCC_12 (-60 to 40): represent higher-frequency envelope details. These are usually more stable because they capture subtle spectral shape differences rather than overall energy.

Meeting with Shiva:

- Should try MLP (smaller models, less layers)
- Try my method of not log scaling all the features
- Redo batch 2 code to generate similar graphs and get correlation coefficient (R) instead of R_squared, or fit multiple correlation coefficients onto the graph

8.14.2025

If the simple, transparent models aren't capturing the relationships, try a neural net (MLP) with minimal complexity, then increase depth/width as needed.

- Read and learned about MLPs
- 04162025_05142025
    - Soo_scaled = only specific features were applied log
    - Soo = no features were transformed / scaled
- 04162025_05142025 / soo
    - Soo in all features were applied yeo johnson