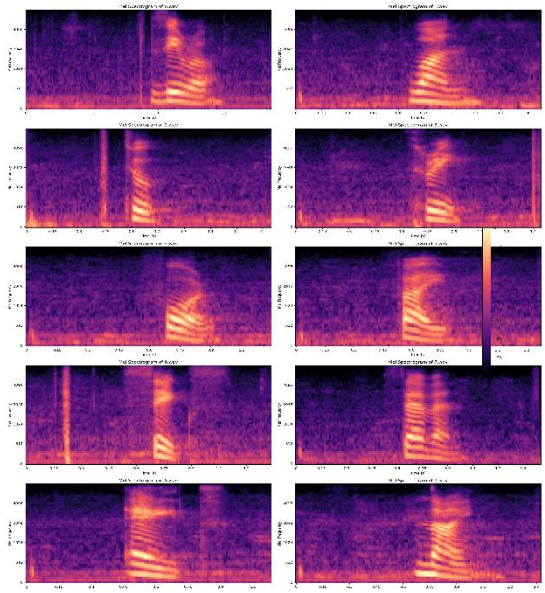
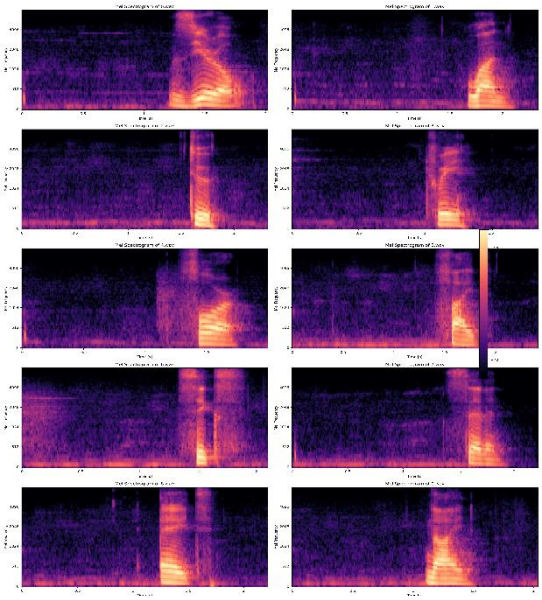
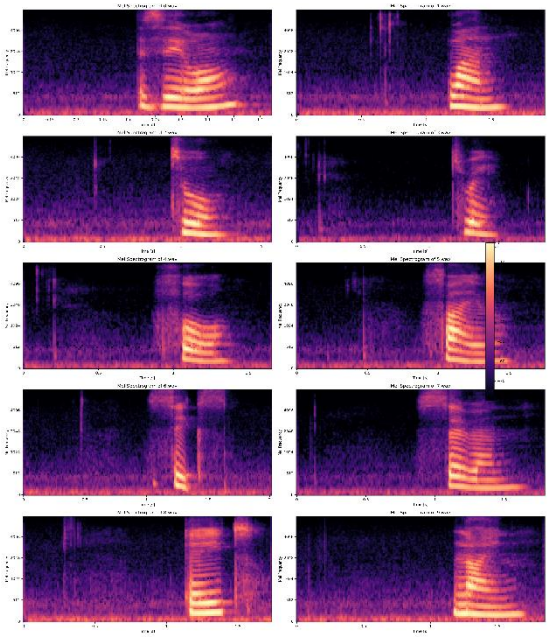
2.d.1



Woman 1



Man 1



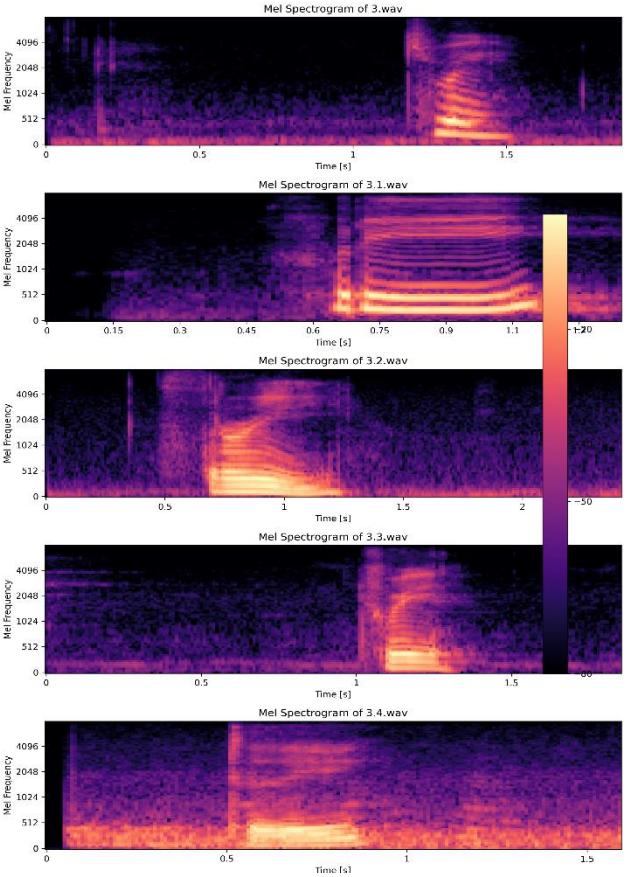
Woman 2

The spectrograms display two women and a man, counting from zero to nine, with each number exhibiting unique visual patterns that correspond to its distinct phonetic characteristics.

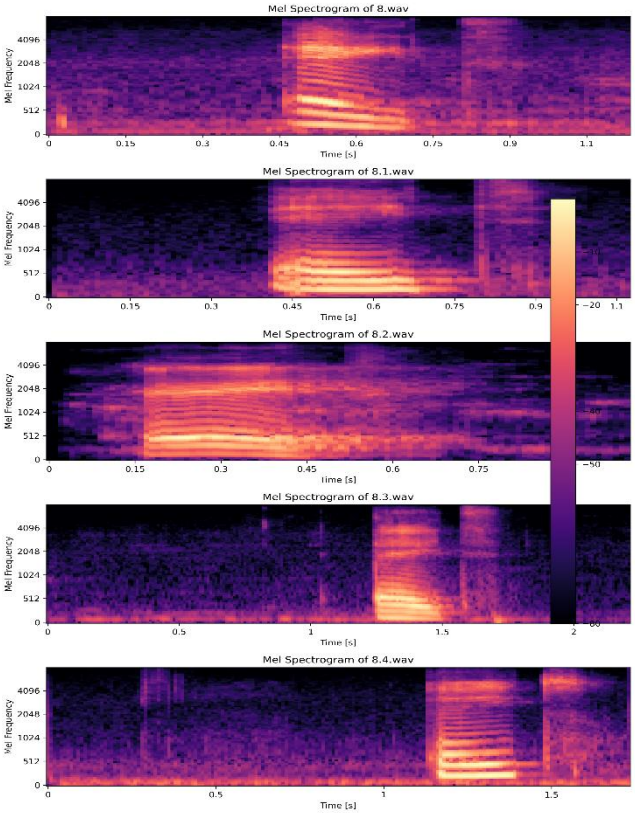
In the analysis of Mel spectrograms depicting two women and one man, we observed distinct vocal characteristics that underscore both gender-based tendencies and individual variances. While the male voice predominantly exhibited lower frequency patterns and denser harmonic structures, indicative of a deeper pitch, the female voices displayed higher frequency concentrations, aligning with the typically higher pitch of female speech. However, within the female voice spectrograms, we noted subtle differences in the distribution of energy and formant frequencies, reflecting each individual's unique vocal tract resonances and articulation styles. These variations manifest as differences in the intensity, spectral richness, and dynamic pronunciation of numbers, highlighting the personal nuances that contribute to the diversity of vocal expressions. This comparative analysis not only illuminates the expected contrasts between male and female speech patterns but also reveals the intricate spectrum of individuality present within gender categories.

2.d.2

Analysing the Mel spectrograms for five different speakers pronouncing the digit "three" and “eight” revealed distinct differences linked to both gender and individual speech characteristics. Female speakers exhibited higher frequency concentrations, indicative of a generally higher pitch, and their spectrograms showed more defined harmonic structures. In contrast, male speakers' spectrograms were characterized by energy concentrated in lower frequencies, reflecting the deeper tones of male voices, with denser harmonic spacing. Variations within each gender group highlighted individual articulation styles, where some speakers demonstrated sharper, more pronounced pronunciations, and others showed softer, more diffuse patterns. The analysis also uncovered differences in the duration of pronunciation across speakers, with male speakers tending to elongate the digit slightly. Overall, this comparative study not only underscored expected gender-based vocal differences but also illuminated the rich diversity in how individuals express the same spoken digit.



2 women first, 3 men after



2 women first, 2 men after and 1 woman in the end