Andrew Sivaprakasam | Final Project - Progress Report 2

Final Project Repo: `https://github.com/sivaprakasaman/BME_511_FinalProject`

Current State of the project:

Starting to get things a little bit more thought through (but have a little bit of a ways to go). I intially thought studying timbral perception might be better aided by using music-noise chimaeras, but I don't think this is necessary to answer my current questions. Ideally, I would have conducted a perceptual study similar to Smith et al. to study whether instrumental & articulation recognition depend primarily on TFS or ENV cues. This would have provided insight on what specifically would be best to study using the spectrally-specific apPSTH measures Satya has developed for neural spikes and ephys data.

However, since the goal of this project is to learn more about spike train analysis, I will carry on with the plan of using the BEZ2018 code and apPSTH measures to look at TFS/ENV specific responses. The chimaera code isn't needed for this case, since apPSTHs give us the ability to study physiological responses to both TFS and ENV characteristics.

I have been able to get the BEZ2018 code working with my stimuli (see below), and am in the process of deriving PSD measures as a function of carrier frequency/fine structure (in this case CF = A4 = 440 Hz) and modulation frequency (nonstationary and variable between instruments/articulation) coding. After getting these PSDs, I can make some observations about how the power spectra in the TFS/ENV compare with the spectrum of the original signal (using cross-correlation?) as a function of CF. Additionally, I can look at measures such as the total power in the harmonics as a function of CF. I will probably have more ideas on what analytics to use once I have derived the PSD measures and can see how the spectra appears to vary.

Figures: