Main Screen Text(Spectrogram)

Above is a spectrogram capturing real time audio! The content of the graph moves left to right with the newest content appearing on the right side of the screen. The spectrogram has the Y-Axis representing frequency ranging from 0 Hz to 20 kHz. There is also 4 different numbers representing **FRAME SIZE**. **FRAME SIZE** in a simple aspect, changes the spectrogram resolution. The bigger the frame size, the less clear the graph becomes.

Main Screen Text(Frequency View)

Above is a representation of real time audio frequency response! The graph has the X-Axis representing frequency ranging from 0 Hz to 20 kHz. Try making some noise or sing into your microphone to see the frequency range of your voice!

Spectrogram Example Text

Snare

This is a spectrogram of 8 hits on a snare drum. Each hit has a strong attack, shown by the start of each graph content, and then a quick decay, following a negative exponential model. If you look closely, there are not lines stacked on top of each other(referred to HARMONICS) after the initial hit. This means that this is a NON-HARMONIC unpitched instrument. The start of each hit also has high energy which is indicated by the high peak.

Bass Drum

This is a spectrogram of 8 hits on a bass drum. Each hit has a strong attack, shown by the start of each graph content, and then a quick decay, following a negative exponential model. The difference between this graph and the snare graph is that the bass drum carries much lower frequencies and they are centered towards the bottom of the graph.

C scale on Piano

This is a spectrogram for the C scale played on a piano. As the scale accends you can see how the spectrogram creates a "staircase-like" shape as the scale ascends and descends with each partial. You can also see that there are lines that are stacked on top of each other at each frequency. These are called harmonics. Harmonics are integer multiples of the bottom frequency and the color of the harmonics on the graph is brighter towards the bottom because the lower frequencies have higher energy. There is also a fundamental frequency which is the main frequency/tone that is heard when a note is played. All of these componets make this a pitched instrument.

Square wave

This is a spectrogram of a square wave generated by an online tone generator. This example is awesome in displaying the harmonics on the spectrogram. The bottom harmonic is the fundamental frequecny. The fundamental frequency is the main frequency/tone that is heard when a note is played. It also shows how equidistant the harmonics are as the square wave is played. This occurs because harmonics are integer multiples of the bottom frequency. Even though not all harmonics will be as equally spaced as this one, you can find that each harmonic is an integer multiple of the fundamental frequency

Song File

This is a spectrogram of a 1 minute and 20 second audio file. As the song progresses, the spectrogram picks up each element of the song. The main melody can be seen as the higher frequencies. Mainly shown in groupings of three. You can also see towards the bottom of the graph that there is some harmonic content playing in the file. We can assume this to be some type of harmonic instrument playing behind everything else going on.

Noise

This is a spectrogram of noise emitted from a JBL 308p Mk II studio monitor. As you can see, there is no set shape on the graph. There is also no harmonic content. Noise is simply just noise.

Freq Response Example Text

Bass Drum

While viewing the frequency response of 8 bass drum hits, you can see the concentration of low frequencies. This should be expected as a bass drum is a low frequency producing intstrument. It is also easy to still see the inital attack of each hit like in the spectrogram example.

Sine Wave

While viewing the frequency response of a sine wave, you can see that it is concentrated below 5 kHz. This makes sense due to the sine wave being a 440 Hz signal.