Project Proposal

A spectrum analyzer is a basic measurement tool for real-time frequency analysis, giving great insight into the audio by deconstructing frequency spectrum. The output spectrum is also the basis for further music visualization. The project aims at building an audio spectrum analyzer program with Python, with a spectrum display and a real-time waveform display.

The main thinking issue of this project includes the accurate labeling of the x and y axis, the length of audio samples I capture to run the FFT, etc. The y axis, as the magnitude axis, should be labeled in decibel instead of original magnitude. Since the typical human hearing range is 20 Hz to 20,000 kHz and most of the energy of an audio signal gathers at the low frequency part of the spectrum, like less then 2kHz, I need to use an unevenly labeled frequency axis, to give a better display resolution on the low frequency band while displaying the whole spectrum.