FPGzAm

TEAM MEMBERS:

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ABSTRACT:

Our goal is to build FPGzAm that recognizes an audio track being played through a microphone attached to the system and displays the track name and its artist. The functionality of this device relies on fingerprinting music based on the spectrogram of the track and then matching the fingerprints of tracks in a saved database to the fingerprints of the sample. Please note that a similar service called Shazam exists for helping mobile users identify music using their cell phones.

Our plan is to create a spectrogram of the audio track using fast fourier transform (FFT). We will detect intensity peaks in the audio file (about 30 peaks per second) by sampling the data in the spectrogram. The generated peaks will be used to create a hash table, which will be stored in the ZBT memory of the FPGA. This process will be carried out on the audio tracks of both the *database* (the collection of known music) and the *sample* (the unknown music).

In the final step the fingerprints produced by the audio track to be sampled will be used to search for all matching fingerprints in the database. If multiple fingerprints of a specific track match to the fingerprints of the audio sample, then the song will be labeled a match and the name and the artist of the track will we displayed on the screen.

Some of the Modules are:

1. Spectrogram Module
2. Peak Detection Module
3. Hashing Module
4. ZBT Interface Module
5. Search Module

Pranav will work on the spectrogram and the peak detector module of the system whereas Yafim will handle the modules for hashing and the search operation.

This kind of a system has never been built before for a 6.111 project and it is something we desire to learn more about and accomplish.