

# Isolation Of Individual Tracks From Polyphonic Music(Proposal)

Nick Starr

Period 1

The purpose of this project would be for computers to be able to effectively and automatically extract particular tracks from a piece of music that is a mixture of many tracks. For example, one might wish to isolate the vocals from a song, or the guitar, or the drums, etc. This is something that average human beings can do very well and accurately, but that's hard to get a computer to do. There have been a number of papers written on this topic, as it's obviously an important field of study. The one in particular that was the inspiration for this project was "Extraction Of Drum Tracks From Polyphonic Music Using Independent Subspace Analysis" by Uhle, Dittmar, and Sporer. The algorithm it presents is highly modular: one section is dedicated to splitting up the audio signal into a large number of individual source components. In this paper, those components were then filtered to select the ones most likely to be percussion. These components were then recombined to try to reconstruct the original musical signal. Our plan is to implement the first part of this algorithm, but then develop our own methods for classification of individual components. We will be using C to develop this program. As for testing, one possible way to test it would be to get songs for which the individual tracks are readily available in addition to the mixed tracks. Then we could run our program and compare our program's results with the actual independent source track. This would be a good quantitative way of testing results that would otherwise be mostly qualitative. Hopefully this project will ultimately be able to distinguish at least some classes of individual components in music: the authors of the paper we were inspired by obviously had some success with drums, and while it would be a tall order to expect that we could pull out any sort of track, we do hope to have some success. If it works, it would definitely be easy to demonstrate it working: simply play the original track, and play back the isolated track immediately afterwards. However, it's hard to imagine what sort of visuals we could associate with a mostly audial project. One possible approach

would be to show the effect of a Fourier Transform (taking a signal from the time domain to the frequency domain) graphically, since the Fourier Transform is a key component of the separation process.