ELEC 484 Project Phase 2

2. Experiment with audio compression using the phase vocoder

a. Set all frequency components below a threshold to zero. The higher the threshold, the fewer frequency components will be retained. Describe the sound quality as a function of threshold. Try with voice and instrumental sounds.
b. Choose the strongest N frequency components, and set all others to zero. Describe the sound as a function of N. If N=1, the sound is represented by a single sine wave. Try with voice and instrumental sounds.
c. (not expected to be done, for information only) . Choose the strongest N frequency components, quantize them to 16 bits, and quantize all other frequency components with fewer bits (thus adding quantization noise). In an MP3-type perceptual audio coder, the number of bits to use for each frequency component is determined using a perceptual model based on psychoacoustic principles. The model determines the maximum allowable quantization noise energy in each critical band such that the quantization noise is "masked", i.e. remains inaudible.

Timeline

Presentations/demonstrations on July 20, 23, 27
Final report due July 30

Documentation

Follow the format of the paper "Traditional (?) Implementations
Of A Phase-Vocoder: The Tricks Of The Trade" posted on the course website. Include all plots requested in the project outline in the paper.

As an appendix, add all Matlab code with detailed documentation, and clear reference to the math in the text. Quality and clarity of documentation will be considered in the marking. A good way to check the quality and clarity is to have another student read and try to understand your code. Where the code is not clear, the documentation will need to be improved. Put the code in a zip or compressed file, so that it can be unzipped and run.

As a second appendix, add sound files that illustrate the PV effects.

Post the document and appendices on your 484 website.

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Document all Matlab code in detail, with clear reference to the math in the text. Quality and clarity of documentation will be considered in the marking. A good way to check is to have another student read and try to understand your code.

Phase 2 to be announced