phase voc. / conv. / forb. pl. workshop

As the outcome of seeking to improve the sonic output of a phase vocoding system based on the objects presented in max/msp, the patches presented here show the approach towards realizing this goal. The content of the fft-fun folder inside the examples folder that comes with the max application formed the starting point.

The most important innovation to the process of phase vocoding is the ability to morph between successive frames, and therefor avoid reducing analysis based on fft to a succession of points that are relatively far apart, which in turn introduces a kind of stuttering and freezing effect, moments at which fft is at it's ugliest. A way of seeing it is that the ifft is able to choose from as many synthesis windows as there are samples.

This morphing therefor is performed not on a frame to frame basis, but from bin to bin. This implies that there is (close to?) an infinite number of possible morph frames between one analysis frame and the next, based on movement and it's variation from one analysis frame to another.

This patch (main.mxb) allows for playing a sound file from disk that can be recorded as fft data to a buffer. The data is scanned by moving a pointer through the buffer using the mouse. Reflecting the speed of moving this pointer, the original sound will be resynthesized and will speed up, slow down or move backward.

A logic addition was to include convolution where the amplitude spectrum is used as an envelope on a fft. The spectrum is taken from what is read from the buffer and applied to a cloud of slow moving sine waves. The span of pitches of which this cloud is constructed can be set. The result of convolution can be mixed with the original sound coming from the buffer.

Another addition is to apply a spectral envelope that can be constructed by the user, very much alike what good ol' Forbidden Planet proposes. The intensity of this filter can be controlled. Also can this filter be shifted in the frequency domain, whereby the focus can be toward more higher or lower frequencies. This shift solves partially the problem of lack of definition in the lower frequencies, due to the fft algorithm. Finally frequency and pitch shifting can be applied, with the two dimensional fader.

The amplitude spectrum for convolution can optionally be taken from post the filter or post the frequency and pitch shifting.

When the horizontal mouse movement in the buffer represents location, the vertical position allows to control above mentioned parameters: mix between original and convolved signal; intensity of the spectral filter; pitch shifting; and frequency shifting. There is a menu that gives access to these choices. The last option in this menu is to control them all simultaneously.

The final addition is that the movement can be automated with a switch. Enjoy.

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