What is SpectMorph?

SpectMorph is a collection of algorithms capable of creating new sounds from existing sounds. To do this, SpectMorph allows transforming sounds into a general model. Harmonic sounds such as the sound of one note of a piano or one note of a flute are good input data for the „encoder“ which builds a parametric model of the sound.

Right now (possibly this will change in future versions), the model consists of many successive frames (also called AudioBlocks in the source code), which contain two components:

- a weighted sum of sines of different frequencies – this models the harmonic part of the sound
- an envelope describing the rest of the frame (after subtraction of the sines) as noise

Once a model has been built, algorithms can use the models as a base for creating new sounds. Right now only the encoder and player are implemented, effectively limiting SpectMorph to recreating sounds that were already provided as input; so nothing additional is gained this way. However, using smenc and smplay can help debugging the encoder/decoder, this is one of the goals of SpectMorph development right now.

Building a model with smenc

Assuming that you have a wave file of a piano called piano.wav

```
$ smenc piano.wav piano.sm
```

will build a model from the sample. Please refer to the smenc manual page for details about the options that can be used. Commonly -O *level* and -m *midi-note* can be used, for instance like this:

```
$ smenc -O1 -m 24 piano.wav piano.sm
```

Resynthesis from a model

```
$ smplay piano.sm
```

will play the model. The options are documented in the smplay manual page.

Visualizing a model

```
$ smvisualize piano.sm piano.png db
```

will produce a png in which the original fft analysis data (black/white) will be drawn, as well as the partials used by the model (red). Some more information is available in the smvisualize manual page.

Comments/Questions:

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