Incandescence 1.0

We used MAX-MSP software to create a flexible program to musically sonify multiple data sets using many changeable parameters. Here is a summary of what the resulting software does:
- Allows user to choose a data set
- Interpolates over missing data
- Normalizes data bins so values in each bin can be comparable (currently six bins are available)
- Maps the time variable in the data to a shorter or longer time
- Provides three ways to map the six data bins to music using:
    - ➢ a filter
    - ➢ a resonance
    - ➢ a probability-type of "machine"

The filter and resonance interpreters, maps particle energy flux into frequency as it will be explained below.

Probability-type of machine

In this approach we choose a different and less direct mapping shown in resonators and filters, by using algorithmic procedures and maintain the same dramatic expression shown in the other models.
The data is mapped to piano notes where a Gaussian function determines dynamics, an exponential determines the note rate and a Beta function defines the pitches.
SEP data is divided in 45 steps and triggers it every 1.25 seconds.
The duration of each event have a correspondence with bin no. 1 with events that should last from 3 to 9 seconds.
The 2nd bin, triggers the exponential function defining the note rate
Bin no. 3 controls the interval distance between each note produced (beta function).
Bin no. 4 regulates the band-with of a gaussian distribution function defining the intensity of each note produced.
Bins 5 and 6 work together in the following way:
Bin no. 5 defines the register in the piano where the lower note should occur for each event, and bin no. 6 defines the octave range starting in the note defined in bin no. 5.

Quick start

To explore this sound engine with other SEP data, click on the bang object (fig 1a) located in the top left corner and surf in your computer for SEP data files.
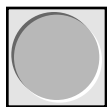
Load data from incandescence

fig 1a.

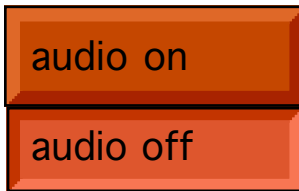1). Turn on the audio in your computer by clicking the start audio button (down center)

audio on

audio off

fig 1b.

2). Drag the mouse in the ubumenu located in Span of sonification (top- right) where it says 30 seconds.

Span of sonification   30 seg ▼
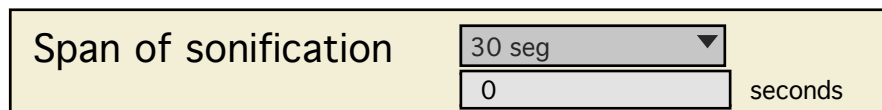   0   seconds

fig 2a

Once released, you will start listening to resonators interpretation for 30 seconds, with fixed frequencies and volume configurations.
For a manual scanning of the data, use the slider in the top left (fig 2b)

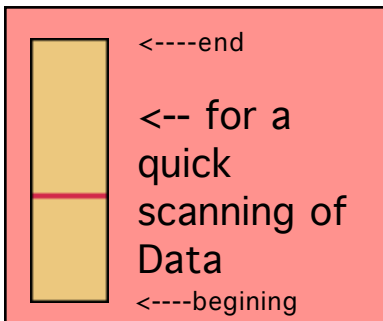<----end

<-- for a quick scanning of Data

<----begining

fig 2b.

3). For listening to the filters, go to the area next to the audio buttons and drag the mouse in the orange ubumenu box low center area and choose wind (fig. 3).
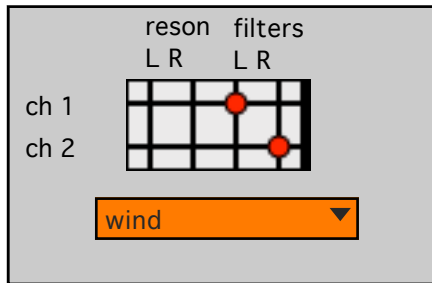Go back to Span of sonification and listen to the wind.

fig 3.

4). To listen to the piano, click on the blue right low button (fig 4a). The application will pop up a window (fig 4b) illustrating the graphic evolution of the functions used to generate rhythm, pitch and loudness for each of the notes generated while you are listening.
When the sequence in over, this window will disappear a few seconds later.
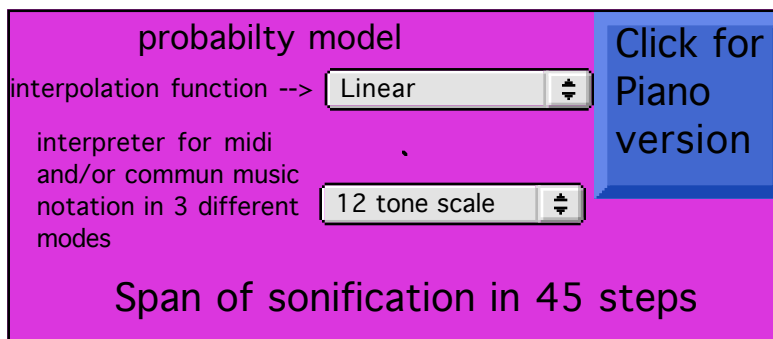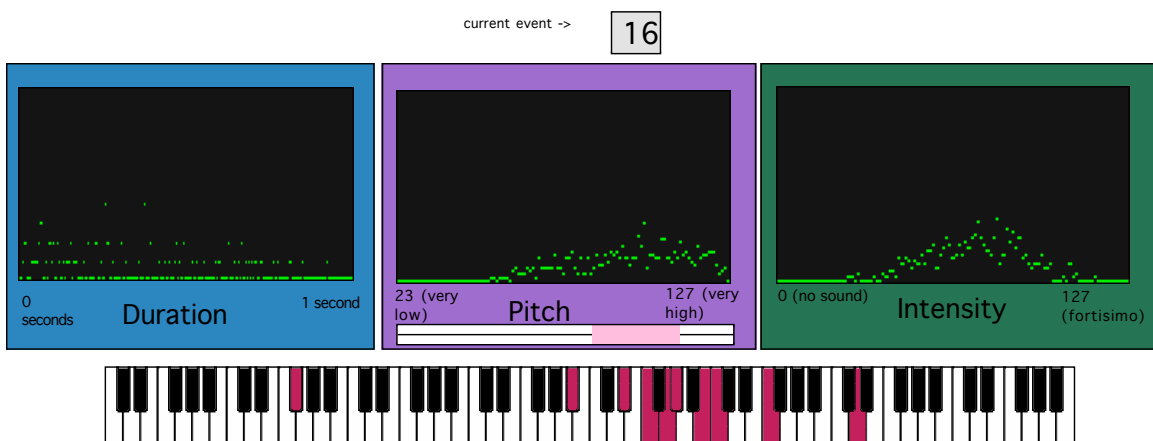

fig 4a.

fig 4b.

The probability model has an option for choosing 3 types of scales: chromatic (12 tone scale), diatonic (white keys of the piano) and pentatonic (black keys of the piano). Contained in the lowest ubumenu in the purple area.

Exploring new sounds with the same data

Incandescence permits to configure the correspondence in bins and frequency range in resonators and filters while listening via the range-sliders (fig. 5).
The minimum and maximum values can be set, by dragging with the mouse across a range in the range-slider.

fig 5.

The volume for each bin is controlled manually through the multi-slider objects situated in the center of the window, also by dragging and navigating with the mouse inside the object (fig 6).

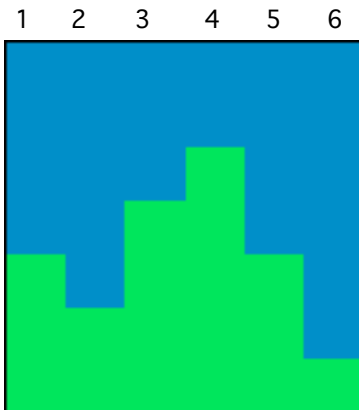## resonators volume for each bin

fig 6.

To experiment with new durations, go to the Span of sonification (fig. 2a) area, and type in the number box any amount in seconds.

The program is able to interpolate or not the data coming from SEP.
The purpose in interpolating the data is to make smoother the transitions between abrupt changes caused by absent data.
The 3 interpolation modes used for this purpose are: linear, lagrange 2 and lagrange 3.

Each sonification process can have its own interpolation mode. Contained in the brown, blue and purple areas.
Dragging the mouse in the grey ubumenu box will pop up the menu with the interpolation functions. The (fig 7) choose then, the correspondence interpolation function for each process .
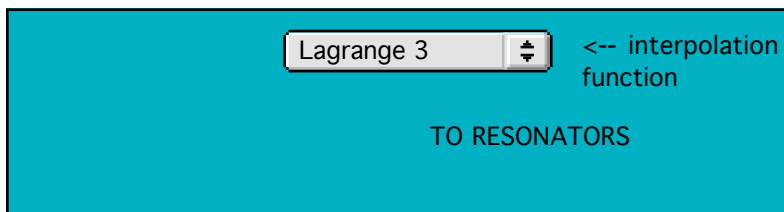

fig 7.

For additional graphic illustration of data, the user can pop up two additional windows by clicking any of the two low buttons situated in the left low corner of the application (fig. 8).

fig 8.

Listening to 2 or more processes simultaneously

To hear resonators and filters simultaneously, drag the mouse in the orange ubumenu box low center area and choose resonators-wind.
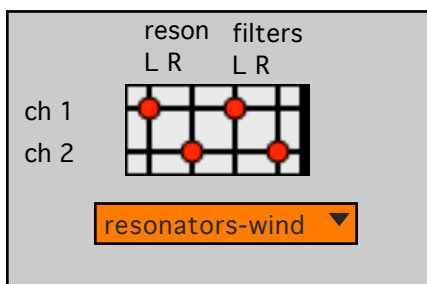

fig 9.

You are also able to combine manually the channel assignments of the outputs by clicking in the red buttons.
To hear the piano too, click into the blue button while the process is going on in resonators and filters.