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Lexikon-Sonate

algorithmic music generator

infinite realtime composition environment for computer-controlled piano

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<http://www.essl.at/works/Lexikon-Sonate.html>

About

Lexikon-Sonate is a work-in-progress which was started in 1992. Instead of being a composition in which the structure is fixed by notation, it manifests itself as a computer program that composes the piece - or, more precisely: an excerpt of a virtually endless piano piece - in real time. It lacks two characteristics of a traditional piano piece:

there is no pre-composed text to be interpreted,
and there is no need for a pianist or an interpreter.

Instead, the instructions for playing the piano - the indication "which key should be pressed how quickly and held down for how long" - are directly generated by a computer program and transmitted immediately to a player piano (or a MIDI synthesizer) which executes them.

The title **Lexikon-Sonate** refers to the "Lexikon-Roman", written in 1968-70 by the Austrian-Slovakian author Andreas Okopenko. This novel appears to be one of the very first literary HyperTexts, independently of Ted Nelson who introduced this term about the same time. This novel - "*a sentimental journey to a meeting of exporters in Druden*" (subtitle) - consists of several hundred small chapters which were brought into alphabetical order. By reference arrows as in a lexicon the reader could make her own investigations through the multiple nested web structure of the text. Instead of presenting a sequential text with a predefined direction of reading, Okopenko provides a structure of possibilities, which challenges the reader to become a creator of her own version of this novel.

Lexikon-Sonate is built of various music-generation modules (so-called structure generators) which are related in a very complex way as a musical HyperText. Each module generates a specific characteristic musical output as a result of the compositional strategy that has been applied. A module represents an abstract model of a specific musical behaviour. It does not contain any pre-organized musical material, but a formal description of it and the methods how it is being processed.

These modules are structural re-implementations of piano gestures obtained by analysis of piano music from Johann Sebastian Bach, Beethoven, Schönberg, Webern, Boulez, Stockhausen and Cecil Taylor. They will never appear as verbal quotation (because none of this gestures has been "sampled"), but mainly as "allusion". Furthermore, they are open and generic enough so that different modules playing at the same time can intermingle, creating unforeseeable meta-structures.

The idea of autopoiesis - material organizing itself due to certain constraints - plays an important rule. By using a lot of different random generators which are controlling each other (which - according to serial thinking - form a scale between a completely deterministic and a completely chaotic behaviour), always new variants of the same model are generated. Variants that may differ dramatically from each other, though they are always perceptible as "inheritances" of the given structural model. Seen in this light, **Lexikon-Sonate** can be perceived rather as a meta-composition which enables the unfolding of piano music than a fixed work.

The underlying program is written in MAX/MSP (© 1990-2002 IRCAM / Opcode / Cycling74), an interactive graphical programming environment for multimedia, music, and MIDI, running on a Macintosh computer. Having worked with computers for many years - designing my own xLOGO-based software environment for Computer Aided Composition - I felt the challenge to write an interactive computer program which is able to compose in Real Time. For this purpose I took advantage of my Real Time Composition Library, a collection of MAX-objects designed for musical composition which includes a variety of musical functions, compositional techniques, and algorithmic strategies.

10 years after the **Lexikon-Sonate** project has started, the piece is now re-released as a software environment which - for the first time - offers the possibility to record the output to disk as a MIDI file. This allows registered user of the program to create customized musical structures which can be for compositional (or mere recreational) purposes. You can import those MIDI files into notation or sequencer programs and process them there as you like.

Shareware registration

Lexikon-Sonate is released as shareware. If you find it useful, please register your copy to ensure the further development of this program. You can purchase a registration code for \$ 25.00 online from KAGI:

<http://order.kagi.com/?5BM>

Double-clicking on the "Register online..." file in the distribution folder will automatically start your Internet Browser and open this URL.

There is a special goodie to registered users: they - and only they! - can save the output of Lexikon-Sonate as a MIDI file to disk.

System requirements

- Apple Macintosh PPC computer (when using the new PianoSynth, a G3 machine is recommended)
- OS 8.6 or better (OS 9.1 preferred)
- min. 16 MB of free RAM
- min. screen resolution 800*600 pixels
- Quicktime installed (version 5 preferred)

Quick intro

- Start the application by double-clicking on **Lexikon-Sonate_3.0**
- After the program has started, hit the return key which starts the automatic mode.
- Listen and enjoy.

User interface

Lexikon-Sonate consists of a variety of so-called "structure generators" - software modules that are specialized in creating a certain type of musical structures. Those modules are represented on the screen as small rectangular boxes with names such as "Esprit", "Clouds", or "Arpeggio". In order to evoke a desired module, you just have to click on the little button left of the box, or you drag the number box to a desired value which represents the "weight" (= degree of presence) of that very module (see below at the point "Playing Modes"). You can also start or stop those structure generators by typing the numbers or letters that are written in square brackets. For instance, if you type the number "1" on you computer keyboard, the structur generator "Esprit" starts playing. It will only stop doing so when you switch it off by pressing "1" again. Structure generators which are accompanied by a letter in square brackets - like "Arpeggio" [s] - will only play one phrase and then stop. With this means, you can actually perform highly complex piano music by hitting keys of your computer keyboard!

The piano keyboard below does not work as an input device (it does not response to the mouse); it display which notes are actually played by the program, and visualizes this on the screen.

Below you'll find a representation of the two pedals that comes with every piano. You can switch on/off the sustain pedal by hitting the spacebar, and you can do the same with the soft pedal by pressing the [#] key on your computer keyboard. Those pedals are only working when the playing device (see below) supports them. They work with most MIDI piano synthesizers, the Yamaha Disklavier and also the VST piano synthesizer of the mda people.

Menus

Apple Menu

- About Lexikon-Sonate...: general information about the program and its author.

Settings

Setup...

Here you can control (mostly) the audio part of Lexikon-Sonate:

- "select playing device..." allows you to choose between several playing devices:
 - "Quicktime" (the default setting) outputs the Lexikon-Sonate sounds via Quicktime. Its sound quality is not terrific, but it does not require any additional external hardware or software synthesizers.
 - "MIDI" outputs the result to a MIDI interface which has to be attached to your computer. This requires a MIDI interface, a MIDI driver (such as OMS) and an external MIDI device such as a synthesizer, a piano module or a player piano (such as the Yamaha Disklavier).
 - "PianoSynth" is a new feature that takes advantage of a software synthesizer called "mda Piano" which sound quality is much better than Quicktime's piano sound. In order to use it, you have to download this free VST plugin from:

<http://www.mda-vst.com>

After unpacking, you have to rename it to "mda_Piano" (exactly written like this, but with no quotes) and put it into the "VstPlugIns" folder of your "LexSon 3.0" folder. Note that using this VST software synthesizer only makes sense on G3 computers or better.

Selecting "Configure PianoSynth..." gives you direct access to the VST control window of the mda Piano Synthesizer where you can customize its sound. Please refer to the documentation of the mda Piano Synthesizer.

- "select GM instrument of Quicktime..." allows you to select other Quicktime sounds than the default Grand Piano.
- "performance mode.." gives you the possibility to influence the "structural density" of Lexikon-Sonate when it is played in "auto" mode. "Concert mode" will result in quite dense musical structures, whereas "installation mode" and "ambient mode" will contain a larger amount of pauses and silences.

In the grey box below, you can set the MIDI channel and determine the dynamics by setting the minimum and maximum velocity. This is very important when you happen to work with a Yamaha Disklavier, for it is less sensitive for lower velocities and it tends to "distort" when the maximum velocity is set to the maximum.

Finally, you have some additional controls:

- "sleep mode": even when Lexikon-Sonate is not running, it will wake up from time to time playing a little phrase, and then falling asleep again (default = off).
- "log mode": prints the name of the selected structure generators into the status window which you can bring to foreground by pressing <command-M> (default = on).
- "keyboard display": if on, the generated music is visualized on the piano keyboard of the user interface (default = on).

Controls...

Here you can control the global generation process of Lexikon-Sonate:

- "auto": starts or stops the automatic playing mode. Either you click into the check-box, or you press the [return] key.
- "change": tells the program to make a random selection of a new structure generator. Either you click into the square field, or you press the [+] key.
- "pause": when checked, the generation process is halted. You can toggle between "pause" and "resume" also by hitting the [tab] key.
- "stop": stops the generation process - this can also be achieved by hitting the [esc] key.

The "Sequence of weights" menu lets you choose between different combinations of "weights" (see below).

In the last box, you can see which structure generators have been selected. The number (1, 2, 3) in the number field shows the so-called "weight": the degree of presence. The higher the number, the higher the presence of the respective structure generator. For instance, a weight of 3 will result in long phrases that are separated by short pauses, whereas a weight of 1 would play short musical phrases which are separated by longer pauses.

Record This is a goodie for registered users only!

When you have registered your copy of the program, you are entitled to record the output of Lexikon-Sonate as a MIDI file to disk.

- "start": starts the recording.
- "stop": stops the recording and saves it to disk. A dialog box will appear where you have to specify the name of the MIDI file that you have just recorded. This file can be imported into a sequencer (like Logic or Protools) or a notation program (like Finale).

Playing Modes

- 1) auto play: pressing the [return] key of your computer keyboard will start the automatic playing mode.
 - 2) simple interactive: hitting the [+] key of your computer keyboard a randomly chosen structure generator will start playing. To stop playing hit the [escape] key of your computer keyboard.
 - 3) advanced interactive: by clicking on the button besides a module, this very module will be start playing.
 - 4) fully interactive: by playing on certain keys of your computer keyboard (so-called "hotkeys" which are written in square brackets) you can directly evoke the different modules of LEXIKON-SONATE - it allows you to perform the piece on your computer keyboard.
 - 5) complex: by directly typing a value into a number box of a module its "weight" can be determined. The weight can range between 0 and 3 and determines the degree of presence of a module:
 - 0 - switches off the module
 - 1 - background
 - 2 - middle ground
 - 3 - foreground
 - 4 - eternal (not applicable in all modules)
- If you use this playing mode the "bucket chain" won't be active - you determine the modules and their weights yourself.

6) highly advanced: open a module by double-clicking on it. When you click on the object box "parameter" a window will open that allows you to change the parameters of a module. By this you can customize a specific musical behaviour of a module at will.

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Records

Live performances of Lexikon-Sonate have been released on several records. Please refer to:

<http://www.essl.at/records.html>

for more information.

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