Piksels and Lines Orchestra residency proposal: Multimodal tools & artworks

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Call for proposals: http://www.piksel.no/2012/07/call-piksels-lines-orchestra-residency-plo

Note: This proposal is written from the viewpoint of a developer. As a consequence there is intentionally left room for an artistic vision, especially what concerns the audiovisual performance.

Motivation & Personal Background

My primary motivation for participating in this residency is to explore, develop and evaluate some of the ideas I have around the combination of graphical and musical artworks, and the tools that enable and encourage artworks that join these two domains.

As a passionate developer of libre graphics software tools and music enthusiast this is a very exciting prospect. I look forward to collaborating closely with an artist because I am a strong believer in cross-pollination and dissemination of ideas and practices across different fields.

The last 2 years of my work on libre graphics applications like GIMP and MyPaint has been focused on interoperability, resource sharing and cross-application workflows through the OpenRaster and GEGL projects.

Solid experience with the C, C++ and Python programming languages, knowledge of both the GTK+ and Qt toolkits, and good connections to the upstream developers will let me work efficiently also on applications I have not previously written code for.

Concept & Perspectives

Multimodal interaction is an important concept in human-computer interaction, where multiple interaction modes are used to improve the efficiency of an interface.

We propose that the *understanding* of a digital tool can be enhanced by bridging different modalities, because it allows the user to apply their understanding in one domain to another.

Many concepts and metaphors are used both in the context of graphics and music:

• Spatiality and dimensions • Composition • Perspective • Focus (foreground / background) • Emphasis • Motion • Patterns and repetition • Randomness / predictability • Time	• Transformation / processing / filtering • Modulation • Contrast and similarity • Harmony and dissonance • Objects and atomicity • Intensity • Texture and color • Parameterization

Table 1: Examples of concepts used both in a musical and a visual context.

We propose to map concepts found in existing libre graphics software tools to those in the musical world, and to use this as the foundation for using the tools as musical instruments.

We further propose that a performative artwork can make use of the same concept by letting the audience experience both the (visual) usage of the tool/instrument and the musical result:

A frequency modulation may be made more obvious by the visual cue of a modulated vector path, a beat more clearly defined by a periodic raster blob. Use of visual cues for subtle musical effects can be used to direct or subvert attention to or from different pieces of the music. Contrast or surprises can also be created by inverting or violating the mental model. For example high (visual) intensity can be mapped to low (musical) intensity and vica versa.

Scope & Examples

The finished work is intended to consist of two parts: A small set of libre graphics applications converted to instruments, designed to work together as an orchestra and a performative audiovisual artwork where these instruments are the centerpiece.

Development of the audio effects and filters needed for the instruments is considered to be out-of-scope. Instead existing free and open source software will be integrated to fulfill this role.

The instrument ideas listed below should be seen as examples, not a specification or strict definition of scope.

Audiovisual performance

The commissioned audio-visual performance will either be a recording of a performance, a live performance, or a mix. This depends on the artistic vision, and will be decided jointly during the residency.

Instrument idea #1: Typographic vocals

Principle operation: A text is read in and recorded to a sound file. A video subtitle file is used to indicate the position of different phrases in the sound file. Then one can manipulate the playback of this sound using traditional text manipulation features: As the text cursor advances through the text during playback, the text markup would specify the audio processing done on the sound clip.

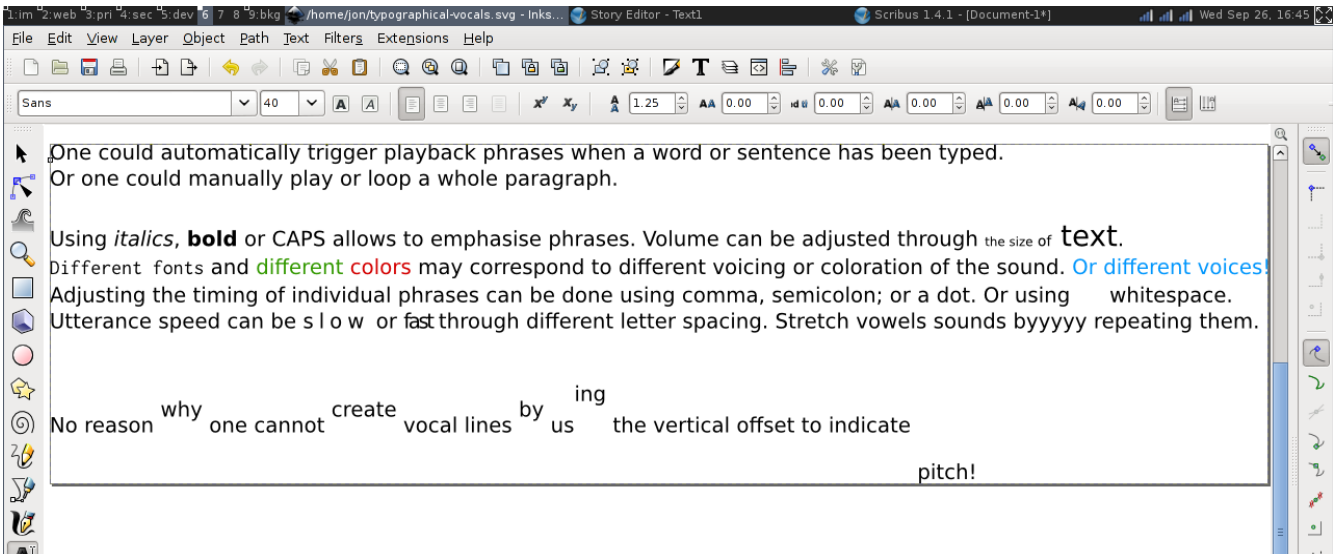

Illustration 1: Example of "typographic vocals" in Inkscape.

Instrument idea #2: Wacom soloist

Principle operation: A Wacom tablet is used with a drawing application like MyPaint to achieve dynamic playing of individual notes or chords.

By using different brushes on the canvas, notes or chords can be laid down. Brush parameters like radius, hardness and opacity can be mapped to audio parameters like volume, attack and sustain.

These brush parameters can be influenced by the pressure and motion of the stylus over the Wacom tablet.

Instrument idea #3: 3D sound positioning

Principle operation: The position of objects in a 3d scene represent the apparent position of the sound source wrt. to the listener.

Distance from the listener is done using delay and/or reverberation, and direction/position by panning in a stereo or surround sound field. There are also several psychoaucoustical models that can be applied to emulate surround sound even with just 2 speakers.

Using the Blender animation capabilities or game engine one can make these parameters change over time, allowing sounds to “move in space”.

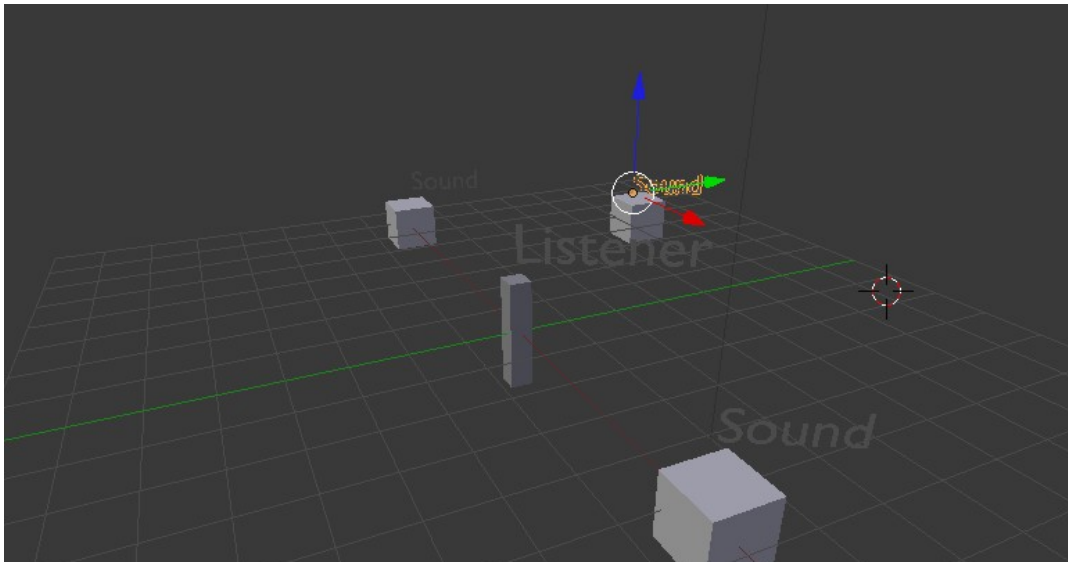

Illustration 2: Example of 3D sound positioning in Blender.

Orchestration

For multiple people to play together it should be possible to route audio streams between different instruments. That way someone can for instance position the vocal track and individual instruments in 3d space, or filter/process them. This can be achieved by having a single process (on one computer) do all the audio processing, and let the individual instruments just send control signals to this process.

It should also be possible to use recorded/saved material from other players. This is most easily done by all players using a shared network resource as a working directory for the applications.

Plan & Execution

The project has a proposed duration of at least 4 weeks. Three weeks are planned as a joint residency for the commissioned artist and developer, and 1 week for the preparation and execution of the Piksel X performance.

Time	**Focus**	**Milestone**
Residency week 1	Research, solidifying artistic direction/vision, prototyping of ideas, feasibility study for existing ideas.	Artistic vision and development plan agreed on and documented.
Residency week 2	Development of individual instruments.	3-5 distinct playable instruments developed.
Residency week 3	Development of orchestration system.	The developed instruments can be used together by multiple players to create a joint artwork.
(potential time gap)	Further development instruments and system.	
November 19-21: Pixel X Preparation	- Documentation of project status and further ideas. - Rehearsal of live performance and/or recording of recorded performance.	- Project documented. - Artwork ready to be presented.
November 22-25: Pixel X	Presentation of commission and completed artwork.	Applause.

Table 2: Overview of activities and milestones.

Key research items include:

- Existing methods, principles and implementations of audio-visual correspondence.
- Software to use for audio processing, and methods for connecting this to the libre graphics applications.

The development will follow a lean and iterative model: For each of the areas to explore a minimum viable prototype will be developed in a short iteration. From the lessons learned from this the next iteration is planned.

It is proposed that bi-weekly meetings are held the with all stakeholders (artist, developer and representatives from LGRU/Piksel) during development. Here progress towards the milestones are to be evaluated and corrective actions decided on, if appropriate.

It is suggested that this meeting can be filmed and recorded as part of the documentation process.