

Project summary

**“New creative possibilities
through improvisational use of compositional techniques
- a new computer instrument for performing musician.”**

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Academic focus

The starting point for this scholarship project is a desire to work with issues in the intersection between composition and improvisation. The focus is on the aspects of performance.

The scholarship work consists of three main elements:

1. To explore the artistic potential that is to be found in the intersection between real time composition and improvisation.
2. To develop a new instrument that facilitates improvisational use of composition techniques.
3. Performance of works of music that make use of the tool, alone or in interplay with various other performers.

The intention of the scholarship work is to create music with new approaches to the fields of composition, improvisation and ensemble playing and with the use of an extended tonal palette. The new instrument is implemented as a computer program for audio processing in which the composition routines are built in as an integral part of the instrument.

Central issues

The project is characterized by an inter-disciplinary approach, in which issues from several fields of special knowledge interact and influence upon each other. In the following, some of the central issues are exemplified.

Composition technical issues

Several composition techniques are difficult to exploit in an improvised setting as they, to a considerable extent, build on intellectual constructions that are hard to incorporate in direct playing on traditional instruments. As an example, I may mention serial techniques. In a computer based instrument, such techniques will be more adapted for use intuitively in improvisation. One has a greater measure of freedom to automate the constructed elements to a certain extent.

The use of live sampling is an important technique in order to generate and select material. This has been an important method for me to use during the work because it makes the basis for a spontaneous approach. It is also reflected in an additional dimension of experience of the music, for the performer, the composer and the audience alike.

Audio processing:

It is a desire to exploit the sound source material from live sampling to the maximum. Audio processing techniques known from electro acoustic music are used as forms of variation for the sound material, in addition to the structural composition techniques.

The preparation of a general architecture for audio processing has been an important aspect of the project. The architecture may be set, whereas the tonal variations are obtained by means of dynamic changes of the parameter settings. In this context, a general architecture is defined as a setting for sound synthesis and audio processing adapted to the concrete artistic requirements that the task involves. It seems natural to focus on granular sound synthesis techniques as a starting point to implement such a general architecture. Granular techniques provide flexibility to process fragmentation and time progression for a sound source and appear, as I see it, as one of the most flexible sound synthesis techniques we know at this point of time.

Improvisational issues:

In order to be able to improvise on an instrument, it is necessary to have in-depth knowledge of the functionality of the instrument, to have a fair instrumental technique, and to have the ability to imagine how a musical phrase on the instrument will sound before having played it. In-depth knowledge of the functionality of the instrument follows as a result of the work involved in constructing the instrument and an expert instrumental technique is built through practical testing of the instrument. Auditory imagination traditionally falls within the subject of ear training, and is often based on the ability to hear melodic, rhythmical and harmonic progressions. The subject should also contain the formation of timbral imagination. This is particularly important within electronic audio processing as the potential timbral register is broad. One could also envisage another form of ear training by work within algorithmic composition: How does a specific algorithm sound? Or, how can it potentially be transformed into music?

These questions have been central in the work related to testing the instrument. As an extension of the project, it would also be natural to try to develop a methodology for the training of such skills.

Interface:

A good instrumental technique is decisive for intuitive playing on an instrument. In order to facilitate good instrumental technique, this requires the design of a control surface on which the musician gives commands to the instrument. A traditional example is the keyboard of the piano. For an electronic instrument that contains substantial opportunities for timbral variations and integrated composition methods, immediate access to a number of parameters is required. The project is also involved in the preparation of an intuitive control surface for the instrument, but the main focus is on the development of the instrument's audio processing properties and composition methods.

Programming technical issues:

Several programming technical challenges arise during the construction of a computer based musical instrument for improvisation.

In order to be able to use the computer to automate musical events in an improvised context, it is necessary to make room for the computer program to analyse the musical situation and calculate parameters for new events in real time. This is not straightforward as any calculation requires time. The time it takes to calculate all parameters for an event may lead to unwanted rhythmical deviations in the performance. The project includes empirical testing of some potential solutions to this problem.

In commercial software production, it is customary that the specifications for a computer program exist before the programming work starts, and the specifications are not allowed to change materially during the course of the programming work. In an artistic project in which software is developed, this is different. In this context, the "specifications" exist as an artistic idea, and this idea may, to a great extent, change as a result of the practical tests during the course of the process. This leads to a method of working with software development which is not particularly efficient as the specifications for the software are constantly changing. The project also tries to develop an architecture for the software which makes such changes feasible.

References to the discursive field:

The project relates to several separate fields of expertise and thus several discursive fields: In the following, a short presentation of a few concrete examples is provided.

- At the jazz department, NTNU, a discourse that deals with the relationship between tradition and innovation within improvisation is going on. The pedagogical method for improvisation methodology is based on going deeply into the Afro-American tradition of improvisation within jazz with the intent to develop personal innovative improvising musicians. An important aspect is the question: "How do you liberate yourself from a tradition?" The scholarship project forms a natural part of this discourse in that it tries to find new ways of improvising.

- The specialist space that exists in the e-mail list for csound contains a discourse related to csound as a language for audio processing and synthesis. The environment has great diversity and has thus several specialist points of focus. The project work is a tangent to several of the fields that are dealt with, amongst these the comparison with other tools for sound synthesis, the use of csound in algorithmic composition, the use of csound in real time audio processing, programming of host applications that exploits csound through an API (application programming interface).
- Open Source Software, a global decentralized movement that is based on the point of view that the source code to computer programs should be available to the end user. This has implications both for ownership, intellectual property rights and the use of the values that are inherent in the software. The fact that the software that is developed as a part of the project is publicised as open source code contributes to the discourse around open source code.
- Art and Software at NTNU/IDI. Here, we find an academic discourse relating to how software for artistic purposes differs from other types of software. The scholarship project has been used in studies of programming processes for artistic software.