

GranuSpinu

KRZYSZTOF CYBULSKI, Feliks Nowowiejski Academy of Music in Bydgoszcz

1. PROGRAM NOTES

GranuSpinu is a custom granular looper used for an improvised performance - a device which takes advantage of digital sound-transforming techniques, while retaining physical form of a small, tangible box.

A mechanical spinning disc, representing and controlling the audio loop, makes it possible for both performer and the audience to follow the internal logic of the digital sound transformations, loop playback and manipulations, making GranuSpinu an expressive performance instrument.



Fig. 1. GranuSpinu

2. PROJECT DESCRIPTION

2.1. Introduction

A musical loop is a commonly used tool for creating repetitive musical structures. Currently it's mostly used in a disembodied, digital form, although the physical nature of the tape loop to which the name originally referred, made it much easier to visualize the rhythmic relations in the recorded musical snippet. This was especially true when a magnetic disc or drum was used, rather than tape, as a

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recording medium (as was the case with Binson Echorec [1] or Univox EchoTech [2]).

The circular loop metaphor had been already used in such non-tape based devices as Buchla Arbitrary Function [3] and Polyphonic Rhythm Generator [4] sequencers. The idea behind GranuSpinu was to use a similar metaphor to create a straightforward physical interface for a digital granular looper. The user interface of GranuSpinu consists mainly of a rotating disc which serves as a loop speed/position indicator and controller. Additional faders and buttons control levels of virtual playback heads, metaphorically placed around the circumference of the disc. This arrangement forms a signal flow metaphor which is clear and easy to comprehend, even though the actual internal logic of the software is more complex. Despite the perceived simplicity, GranuSpinu enables a wide spectrum of musical and timbral structures and can be used as a flexible performance tool.

2.2 Technical description

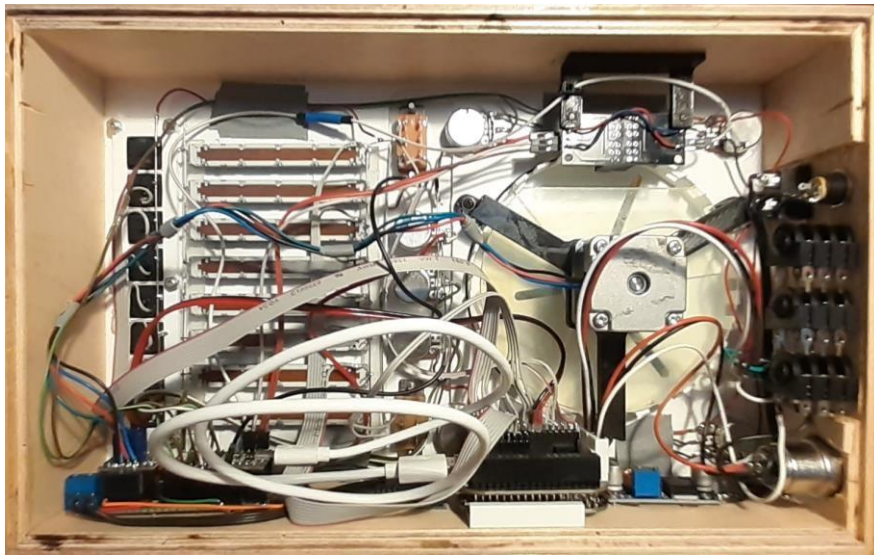


Fig. 2. Inside the GranuSpinu

GranuSpinu electronics consist mainly of a Bela Mini embedded computer and a Teensy 3.2 microcontroller. A stepper motor with a TMC2209 driver, optical encoder, rotary potentiometers and switches are connected to Teensy, which communicates with Bela via midi. The faders are connected directly to Bela's analog inputs.

The 3d-printed disc - a main interface component - is attached to the motor shaft via a simple mechanical clutch, which acts like a slipmat on a turntable - stopping the disc doesn't affect the rotation of the motor. Nevertheless, as the optical encoder is attached to the edge of the disc, it's the disc movement, not the motor movement, that controls the position of the loop in the software.

Bela Mini runs a custom Pure Data patch which stores the recorded audio in a table, easily accessed by [tabread4~] objects for granular playback.

2.3 Interaction

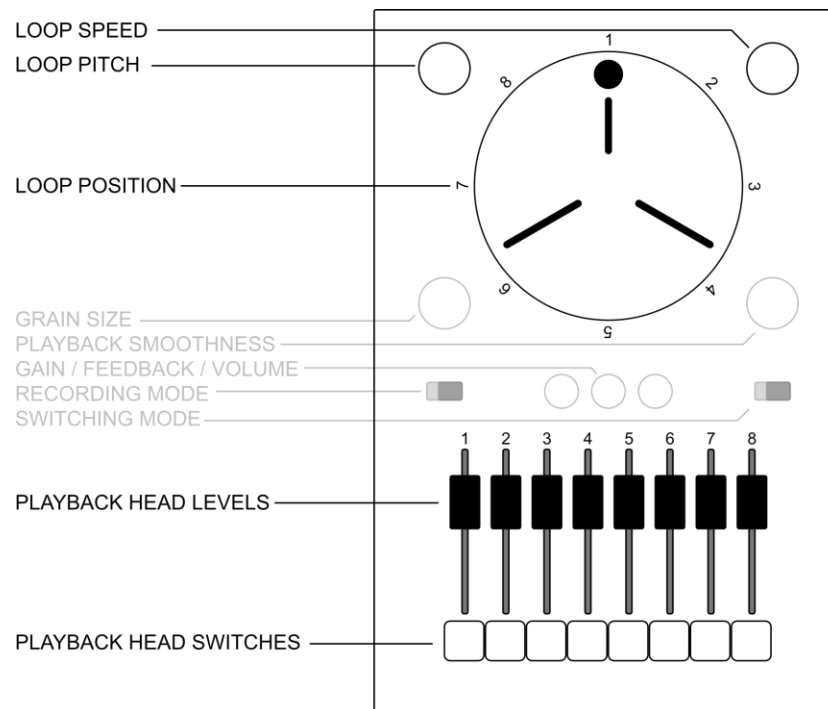


Fig. 3. Primary and secondary controls of GranuSpinu

Apart from the aforementioned main spinning disc, primary elements of the user interface include:

- “playback head levels” - 8 faders controlling the level of audio signal from the virtual playback heads;
- corresponding “playback head switches” buttons, allowing for a more rhythmical manner of head switching;
- “loop speed” knob;
- “loop pitch” knob, enabling transposition by +/- 12 semitones.

Secondary elements include grain size, playback smoothness, feedback, gain and volume knobs. “Recording mode” switch enables choice of two modes:

- in mode 1, new loop is recorded when an input sound exceeds certain threshold;
- in mode 2, new loop is captured each time the disc passes the first playback head.

Sequences created by pushing the “Playback head switches” can be recorded and played back; rec/play mode is controlled with the “switching mode” switch.

A typical performance scenario involves external sound source (human voice with consonants creates especially rich timbres), which could be recorded in one of the two modes. In mode 2, with descending fader arrangement, moderate disc speed and feedback settings, it’s possible to create quite conventional echo effect. Things start to get more interesting in slower disk speeds - playing back the loop in the granular manner has the advantage of independent control of speed and pitch, thus, when the disc stops, the playback heads still provide a “snapshot” sound of a current loop position. This allows for creating static drone/pad sounds, with the character largely dependent on the sonic contents of the recorded loop. For instance, an 8-note melody would create a chord, as each virtual playback head would reproduce one of the recorded notes; a more abstract or noisy recording would create a selection of noises/glitches. The “playback smoothness” knob (controlling the uniformity of the grains) and “grains size” knob allow for further sonic transformations, especially in extreme settings.

3. PERFORMANCE NOTES

Basic technical requirements for the performance:

- GranuSpinu outputs a line level stereo signal through a pair of mono 6,35 mm jack sockets;
- dynamic microphone on a stand for voice/wind instrument used alongside GranuSpinu;
- stereo monitoring through wedge monitors or in-ear monitor bodypack (headphones provided by me);
- small standard-height table;
- 1 x 230 v electrical socket;
- ideally there would be possibility to display the live video from a GoPro camera (provided by me - mini Hdmi output) on a screen on/next to the stage; GoPro can be mounted on a microphone stand (I’d provide a suitable mechanical adapter);

GranuSpinu

The setup and soundcheck shouldn't take more than 1 hour and would most likely take well below.

The GranuSpinu performance would be best suited for a small-to-medium sized venue. Regarding the venues proposed by the conference organizers, it would most likely fit the Nijverheid or local Utrecht club stages atmosphere. It must be noted, though, that the performance doesn't fit a typical "club music" criteria (not a beat-based music).

The ideal performance duration for the NIME performance would be 5-10 minutes.

4. MEDIA LINK

- Video: <https://vimeo.com/943704694/97f1000c76>

ETHICAL STANDARDS

This research didn't involve any human or animal participants.

REFERENCES

- [1] https://en.wikipedia.org/wiki/Binson_Echorec
- [2] <https://www.effectsdatabase.com/model/univox/em200>
- [3] <https://buchla.com/product/250e/>
- [4] <https://buchla.com/product/252e/>