LAGU

(15 Sept 2020)

In the midst of a global pandemic, reality is going through profound deformations. While the physical body was forced to stay indoors, the mind was moving at a remarkable speed, creating an unprecedent feeling of diffraction where the self becomes fully detached from its location. The constant stream of news and (mis)information trapped us in a state of disorientation, which is normally sustained by added doses of similar media, and inevitably leads to a never-ending search for fragments of a coherent reality.

LAGU is an endless audio-visual generative system that creates an indoor experience by simulating the feeling of a location, allowing the viewer to halt and synchronize himself back with the physical world. It is designed to run forever without human input, following pre-established rules and being modulated in real-time by weather conditions. This generative nature allows the system to develop itself in unpredictable ways, with simple audio layers overlapping each other to create new patterns and textures every single run.

In the framework of social distancing, LAGU runs on any web browser, to be safely experienced at home.

Technical description

LAGU is a program written in JavaScript, allowing it to run on any computer with an internet connection. It is powered by two open-source libraries: Tone.js (for the audio) and p5.js (for the visuals).

The program is composed of four audio layers that run independently in a step sequencer fashion, all synchronized to the same tempo (BPM) – see Figure 1. Each of the four layers has a randomly selected musical instrument/synth with randomly selected features (note duration, reverb, attack, etc).

Every time a layer loops, its volume is reduced, until it eventually dies (i.e. becomes silent). After death, the layer reborns with a new random instrument and random features.

Within each layer, the volume of individual notes also decays every time they are played. When a note volume reaches zero, a new random note is assigned. To ensure a harmonious composition, the notes selected are picked from the same scale (with possible exceptions).

With a pool of a few instruments/synths, these basic rules already ensure a virtually infinite number of combinations. However, to give the viewer a sense of location, the decisions that the
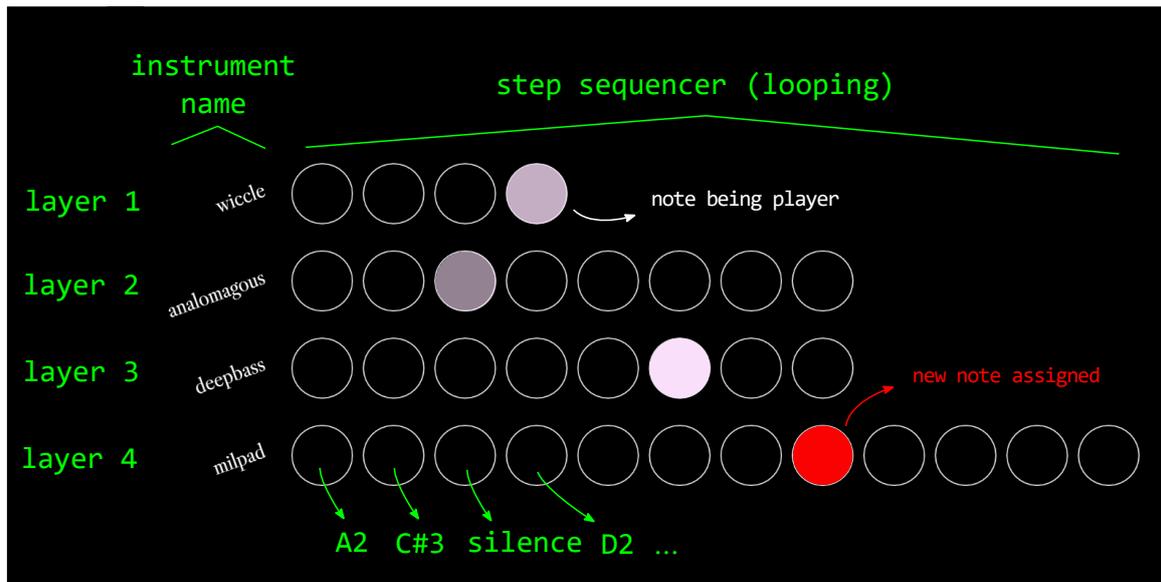
Figure 1 – Display of the four layers, each with an assigned instrument. Each circle contains one note. Each layer plays from left to right (looping after the last note). When a note is played, it "lights up", showing a white area, with a transparency related with the volume of the note. When the volume of a note reaches zero, a new note is assigned, represented by a red "light".

algorithm makes are manipulated in real-time by current weather conditions, which are fetched every few minutes/hours from an [open weather API](). The API gives information such as cloud percentage, day state (day/night), weather forecast (cloudy, clear, snow, rain, etc), temperature and wind speed. Each parameter is used to modify the feeling of the audio being played, for example forcing notes from minor scales on rainy days (sad mood), increasing the BPM on windy days, changing the color pallete of the visuals to red tones when the temperature is above 30 ºC, etc.

Vision and objective

With the code all written and tested, LAGU's final version would be composed of an <u>online presentation</u> and a <u>continuous live presentation</u>.

The online version can be accessed from any computer with a browser and an internet connection. It would run locally on each computer, so that the experience is unique for each viewer. The current screen which displays each layer and the notes being played (see Figure 1) would be hidden, and the screen would be split in four, with each panel showing visuals that are connected to one of the layers (see Figure 2 – example).

The live presentation would be composed of a dark room with four projectors, each facing one of the walls (see Figure 3). The main feeling to be transmitted is immersion, an encapsulated space where the self meets its location. LAGU could run for several days/weeks/months, 24 hours a day, while continuously picking up the weather conditions in San Sebastián. The audio-visual output could also be recorded for future publication/usage.
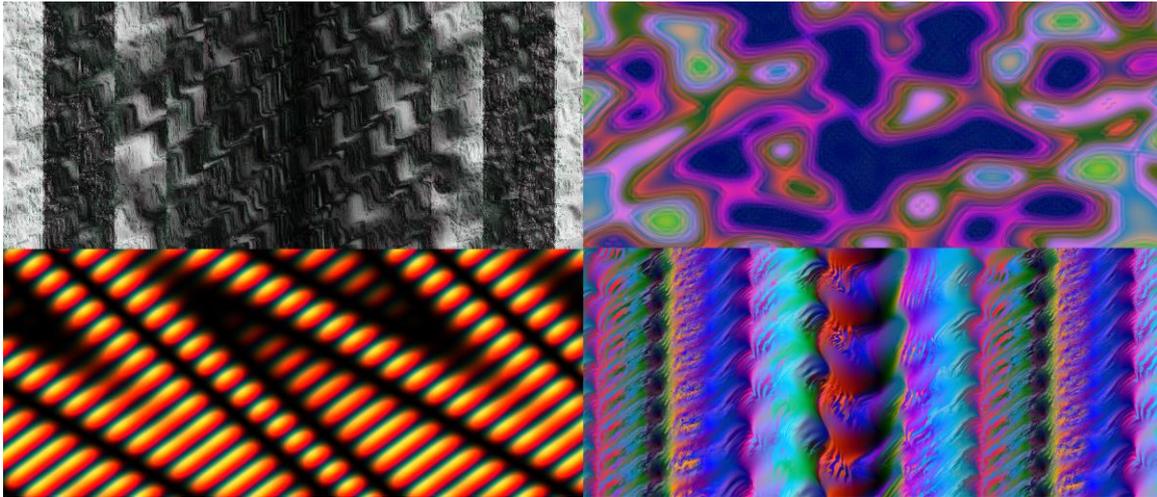
Figure 2 – Example of four panels (screen split in four) to be displayed in the browser. Each sound layer would be connected to a panel. Sample images taken from [Hydra](#).
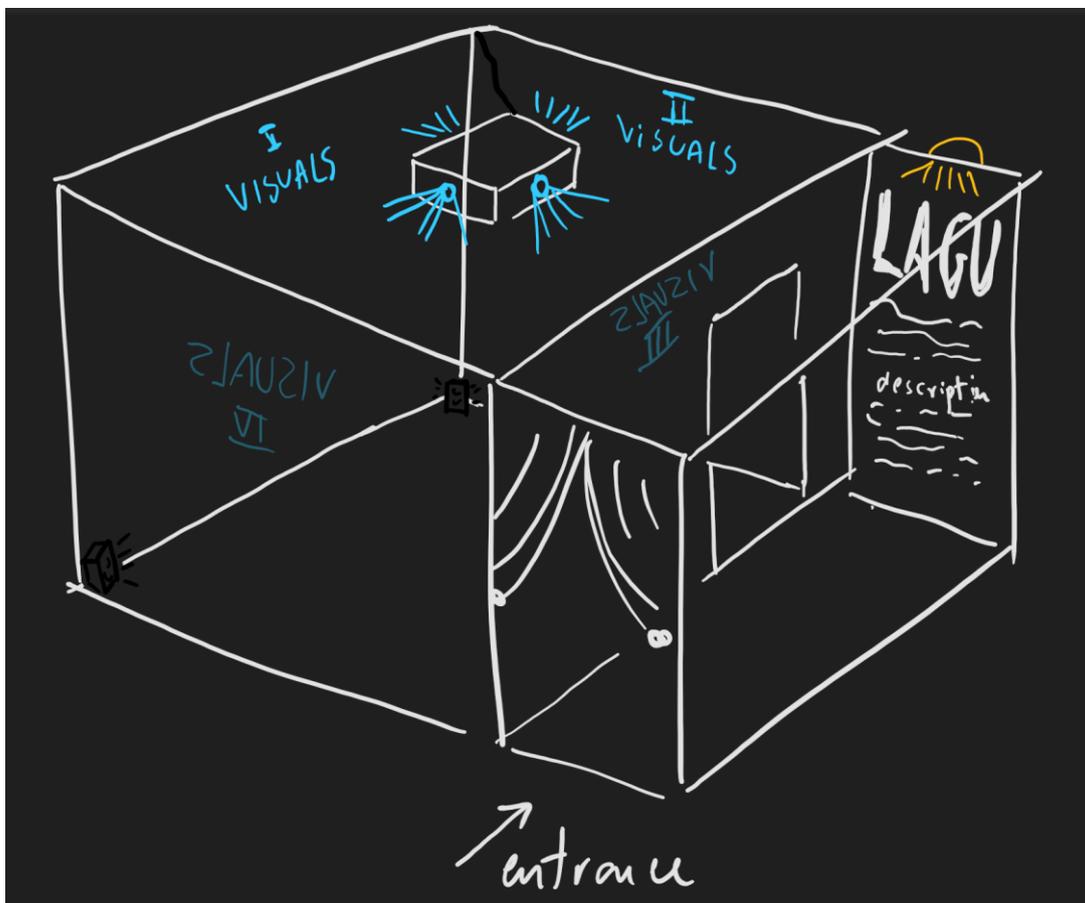
Figure 3 – Sketch of LAGU's live presentation (not to scale). The projectors attached to the ceiling would project a video on each wall, which is modulated by the audio layers. The audio is played from speakers in the corners.

Background and inspiration

LAGU draws inspiration from several scientific and artistic concepts:

- [Generative music](#) – systems that create ever-changing music. Pioneered by artists such as Steve Reich, Robert Fripp and Brian Eno;

- [Moiré patterns](#) - the generation of complex patterns from the controlled overlapping of simple structures;
- [Conway's Game of Life](#) and other zero-player games, where extremely complex patterns can emerge out of an initial state and a set of simple rules set by the creator;
- ["The use of generative music systems for interactive media."](#) Edo Paulus and Student Audio Design, Hogeschool voor de Kunsten Utrecht;
- [JavaScript Systems Music](#) – Web Audio tutorials by Tero Parviainen;
- [Diminished Fifth](#) – a rhythm-based generative musical system created by Ivan Reese.