Interactive Music Science Collaborative Activities

Team Teaching for STEAM Education

Deliverable 5.3
Initial Pen-enabled canvas for music and audio co-creation and interaction

Date:	30/9/2017
Author(s):	Manuel Bouillon (UNIFRI), Marcus Liwicki (UNIFRI), Fotini Simistira (UNIFRI)
Contributor(s):	WIRIS
Quality Assuror(s):	Petros Stergiopoulos (EA), Robert Piechaud (IRCAM)
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Executive Summary

This deliverable reports on the initial implementation of the pen-enabled canvas for music and audio co-creation and interaction. It mainly describes the UNIFRI DrAwME environment allowing to directly draw music and create sound in an innovative way.

UniFri DrAwME is based on JavaScript, so it runs on any modern browser (Chrome, Firefox, Edge, etc.) and operating system (Windows, GNU/Linux, macOS). It is accessible at the following URL: https://imuscica-platform.unifr.ch/drawme/first/

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LIST OF ABBREVIATIONS

Abbreviation	Description
DrAwME	Drawing cAnvas for Music crEation
ATHENA	ATHENA RESEARCH AND INNOVATION CENTER IN INFORMATION COMMUNICATION & KNOWLEDGE TECHNOLOGIES
UCLL	UC LIMBURG
EA	ELLINOGERMANIKI AGOGI SCHOLI PANAGEA SAVVA AE
IRCAM	INSTITUT DE RECHERCHE ET DE COORDINATION ACOUSTIQUE MUSIQUE
LEOPOLY	3D FOR ALL SZAMITASTECHNIKAI FEJLESZTO KFT
CABRI	Cabrilog SAS
WIRIS	MATHS FOR MORE SL
UNIFRI	UNIVERSITE DE FRIBOURG

1. Introduction

In this deliverable we describe the initial implementation of the the UNIFRI drawing canvas for music creation environment which allows to directly draw music and create sound in an innovative way.

2. UNIFRI DrAwME (Drawing cAnvas for Music crEation)

UniFri Dame is a powerful tool that allows composing music and exploring sound properties visually.

Figure 2-1: UniFri DrAwME with the drawing canvas, the control buttons at the bottom and the three visualization views on the right side.

2.1. Installation and technical requirements

UniFri DrAwME is based on JavaScript, so it runs on any modern browser (Chrome, Firefox, Edge, etc.) and operating system (Windows, GNU/Linux, macOS). It is accessible at the following URL: https://imuscica-platform.unifr.ch/drawme/first/. You can insert UniFri Dame in an iframe with the following code:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html lang=en>
<head>
    <meta charset=utf-8>
    <title>UniFri Dame</title>
```

```
</head>
<body style="margin:0px;padding:0px;overflow:hidden">
        <!-- DAME iframe -->
        <iframe   id="tool"   src="https://imuscica-canvas.herokuapp.com"   frameborder="0"
height="100%" width="100%"></iframe>
</body>
</html>
```

2.2. Description of demonstrator and user manual

UniFri DrAwME is composed of three parts, the drawing canvas in the middle, the control buttons at the bottom and the visualization views on the right.

2.2.1. Drawing canvas

The user can draw on the canvas and hear the corresponding sound at the same time. Multiple colors, corresponding to different pitches, are available for drawing.
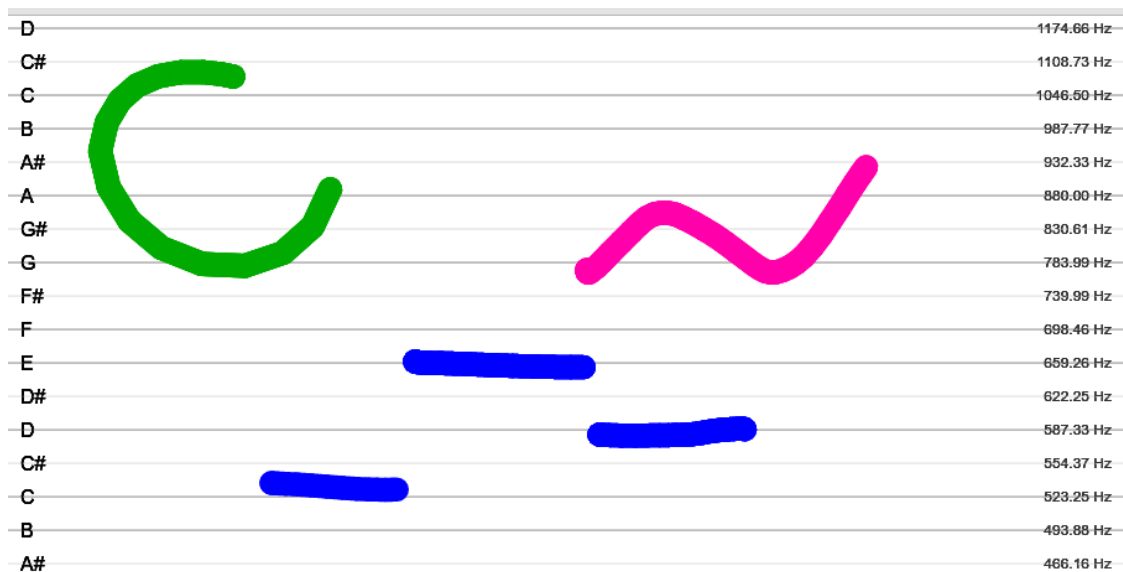
Figure 2-2: The drawing canvas, where the user can pen- or hand-draw with different colors. Pen erase button (and mouse right click otherwise) can be use to delete strokes. Pinch-like gesture (when enabled in option menu, and mouse scrolling button otherwise) can be used to zoom in and out. Two scales are displayed: a note scale on the left and and frequency scale on the right.

2.2.2. Control buttons and settings

Below the drawing canvas, the control buttons enable to play the whole drawing by clicking on the "play" button, and to edit different settings (see Figure 4-4). A color picker enable to change the drawing colors, which correspond to different pitches. The menu button give access to differents options:
- Activate hand gesture interactions
- Activate stick to line option (to force drawing on the note/frequency lines)
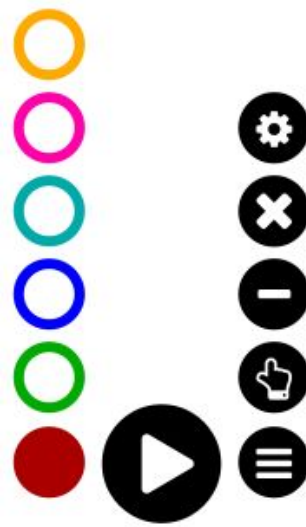
- Clear the canvas
- Open settings window

Figure 2-3: The control buttons with the color picker on the left, the play/stop button in the middle and the option menu on the right. The option menu permits to active the hand gesture interactions (zoom, etc.), to activate the stick to line feature, to clear the canvas and to open the settings window

The settings window enable to:
- Adjust volume
- Adjust playback speed
- Enable/disable loop playback
- Smoothen strokes
- Display debug information
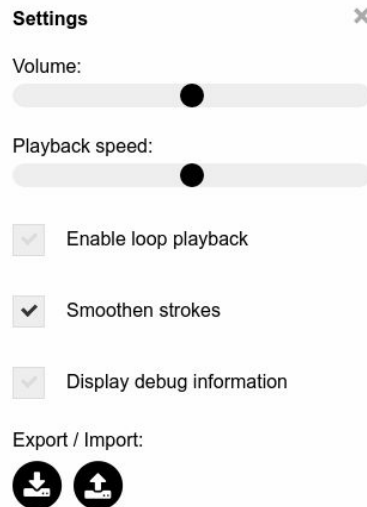- Export/import drawing in JSON format

Figure 2-4: The setting menu permits to adjust the volume and playback speed, to enable/disable loop playback, to (de-)activate stroke smoothing, to display debug information and to import/export the drawing in JSON format

2.2.3. Visualization panel

Anytime sound is produce, it can be visualized in the visualization panel on the right. The visualization panel includes three views:
- A waveform view
- A Fourier transform view
- A spectrogram view

The visualization panel can be hidden by clicking on the arrow at the bottom right, and can be opened in an external window by clicking on them.
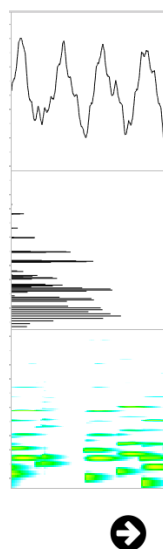

Figure 2-5: The visualization panel include three different views: a waveform, a Fourier transform and a spectrogram. The visualization panel can be hidden by clicking on the arrow on the bottom right, and can be opened in an external window by clicking directly on the view