Project Scriabin v.3

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ABSTRACT

Project Scriabin is an interactive implementation of Alexander Scriabin's experimentation with "opposite mapping direction", that is, mapping from hue (colour) to pitch (sound). Main colour to sound coding was implemented by Scriabin's colour scale.

Keywords

Synaesthesia, Sonification, Touch Screen.

1. HISTORIC BACKGROUND

Alexander Scriabin (1872-1915) was a Russian composer whose music bridged the Romantic era and the twentieth century. Although he lived only into his forties, he managed to write ten sonatas for piano, a piano concerto, three symphonies, two orchestral poems, and large number of short piano solo pieces. What made him even more popular was that a Scriabin's multi-sensory experiences, known as synaesthesia. Synaesthesia is defined as the interchange of sensory images from one sensory organ to another. Sensory organs are also referred to as modalities, and so synaesthesia is also known as the cross-modality, or crossing of the senses. There are many different types of synaesthesia and most common form of synaesthesia is known as "coloured hearing," which is a visual representation in some form of colour of what the person is hearing. He wanted to see what the psychological effects of experiencing colour and music simultaneously would be for a non-synaesthetic individual. At the same time, colour organs were being experimented with, and composers were beginning to implement them into their musical performances. Colour organs - clavier á lumiéres - were designed to be played alongside regular organs especially for his fifth symphony, "Prometheus – The Poem of Fire (1910)", and would produce coloured lights to correspond with a musical note played on the organ. The first performance of "Luce" - Note for Colour Organ - had occurred at the last days of composer's life, on spring 1915, in New York Carnegie Hall. The light was projected onto multilayer screen, made of thin fabric. After Scriabin's sudden death, many people have tried to continue his sound-colour experimentation with advanced technologies.

2. PROJECT SCRIABIN

Project Scriabin is an interactive implementation of Alexander Scriabin's experimentation with "opposite mapping direction", that is, mapping from hue (colour) to pitch (sound). Main colour to sound coding was implemented by Scriabin's colour scale. Scriabin's works are often considered to be influenced by synaesthetic experience. Nonetheless, it is most likely that Alexander Scriabin did not fully experience the physiological condition of synaesthesia. His colour system, unlike most synaesthetic experience, lines up with the Circle of Fifths, indicating that it was a thought-out system influenced by his theosophical readings and based on Sir Isaac Newton's Optics – Colour Circle.

3. CREATING COLOUR TO PITCH FORMULA

Table 1. Pitch, Colour and Value in HSL

Note	Colour by Scriabin	Colour for Project	HSL Space		
			H	**S**	**L**
			0-360	0-255	0-255
C	Red	Red	0	255	127
G	Orange	Orange	38	255	127
D	Yellow	Yellow	60	255	127
A	Green	Green	120	255	127
E	Sky Blue	Sky Blue	160	255	127
B	Blue	Blue	240	255	127
F#	Bright Blue	In Between	256	255	127
C#	Violet	Violet	273	255	127
G#	Purple	Purple	280	255	127
D#	Gray	In Between	300	255	127
A#	Gray	In Between	320	255	127
F	Deep Red	In Between	340	255	127

As I was developing Colour-to-Pitch generating formula, I found some problematic definitions in Scriabin's Pitch-to-Colour system, especially in the pitch D#, F, F# and A#. Although Scriabin's synaesthetic approach was mainly based on the Circle of Fifth and the Colour Circle as explained above, I found that these four pitches had uncertain corresponding position on the Colour Circle. Even worse, colour for A# and D# were described as "Gray," - achromatic colour, Since colour is underlying element for my project, I decided to modify these problematic pitches by positioning them on corresponding position on the Colour Circle. Table 1 shows my final Colour-to-Pitch coding system with some modifications.

For variation of octave of sound, I utilised lightness value of HSL colour system and divided it into 8 different levels from octave

1st to octave 8th. The level 8 represents 8bit RGB colour system we are mainly using for computing colour. If saturation value of HSL colour is zero, it will generate no sound because it is achromatic.

4. TECHNICAL REALISATION

On the basis of the sound generating formula, I programmed a basic patch cords with Max/MSP in which generative sound would be generated. The patch program analyses average hue value of an entire image area for main sound stream and supplements it with minimum and maximum hue value for additional sound effects. After having finished the basic generative sound programming, I went about an application to which I could apply this sound engine. It was the first application making the generative sound from an imported "Quicktime" movie clip in real time. Movie clips consist of 24fps (PAL) or 29.97fps (NTSC) according to signal format. That is, 24 discrete single images, in case of PAL, are to be shown on screen in one second. Therefore it signifies that it is likely to generate very annoying or confusing sound by making 24 different pitches in one second at the greatest. To solve this problem out, I confined generating sound to only when hue goes out of its corresponding range. This tweak made an effect which synchronizes tempo of the image and rhythm of the sound.

5. MAKING PATTERNS

Human loves patterns. We automatically look for patterns in everything from clouds to tea leaves to cracks in the sidewalk. In interactive systems, we look for patterns in the connections between the inputs and the outputs. It is understood by Gestalt theory which explains our visual system as "Perceptual Whole." I didn't want to simply focus on the fact that colour makes sound. For stronger impact on audience, I wanted to create more specific link that colour can make "this melody" – pattern of the sound -, not just random generative sound. Thereby I can possibly sustain the curiosity about my project from audience. For this reason, the subsequent development - the second application - was making a musical or "logical" sound with deliberately composed – rendered – image sequences. For this, I analysed more than 2,000 still images and categorised them according to their hue and lightness value. By having done this, I could have a database for "Colour Note," the most essential part of my project. Scientists have shown that the biggest responses always come with the least expected event. The purpose of this colour note was to make this "least expected event." With these 1st and 2nd applications, I completed the first version of project scriabin.

6. EXHIBITION LEVEL DEVELOPMENT

In Newton's Colour Circle, there are 7 distinctive colours – Red, Orange, Yellow, Green, Blue, Indigo, and Violet. For the exhibition-level development of my project, I therefore extended the scale of sound from stereo to 7 multi-channel sound with 7 speakers along the circle. Each speaker has its hue degree position on the circle evenly, about 51.42 degree – 360 divided by 7. Each speaker emits sound in different volume according to the hue degree. If the image has an average hue of orange - 38 degree -,

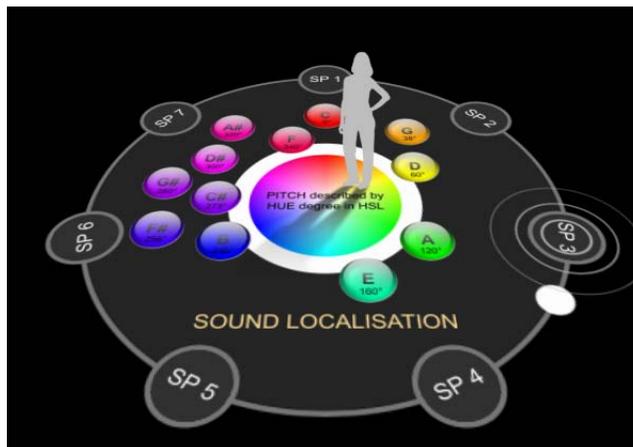the speaker 1 will emit 73% of volume and speaker 2 will do 27% for pitch G.

Figure 1. Sound Localisation – 7 channels.

7. PROJECT SCRIABIN V.3

What I realised from v.1 & v.2 of Project Scriabin was that there was only demonstration on this experimentation with no direct participation of audience. For this reason, I developed v.3 – touch screen based interaction in the shape of turntable mainly with application 1 - hoping that it will allow more engagement by audience. In this version, audience can experiment colour to pitch sound with their own colour images in person. Currently I'm working on how to apply the application 2 in this touch screen based interaction and it will be Project Scriabin v.4.

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