

KIEM - Sustainability and future recommendations report, SCORE! Project

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Abstract

The purpose of this deliverable is to discuss possibilities for scaling the methodologies and concepts that fuel the SCORE! Application. This will be accomplished by firstly giving an expert overview of the current audiovisual composition and performance landscape, discussing key artistic projects, software and outlets for engaging the sector with such a tool. Furthermore this document will present concepts and ideas for further application scaling that would make it more appealing for the creative sector.

Introduction

The SCORE! Application is a tool that uses deep learning to identify and extract latent factors present within moving image material and map these latent factors to a sound library. The end result is a generative audio-output that is informed solely by the video content itself. Users are to modify these audio outputs and re-sync them to the film thereby allowing the film to manifest a “self generated film score”. Such an application allows for new creative endeavors re-using cultural heritage moving image material as well as opening new avenues for audiovisual performances in creative settings, especially the electronic and experimental arts world where audiovisual performances are becoming more and more integral.

The purpose of this deliverable is to discuss possibilities for scaling the methodologies and concepts that fuel the SCORE! Application. This will be accomplished by firstly giving an expert overview of the current audiovisual composition and performance landscape, discussing key artistic projects, software and outlets for engaging the sector with such a tool. Furthermore this document will present concepts and ideas for further application scaling that would make it more appealing for the creative sector.

In conclusion we seek to show that an application such as SCORE! Is both highly relevant and uniquely adaptable to multiple creative settings and thus would benefit greatly from scaling to test our hypotheses.

Overview of audiovisual creative landscape in electronic music

Audiovisual performances are a pivotal part of contemporary experimental and electronic dance music. They are naturally symbiotic explorations of sound and image that explore new frontiers of music and visual arts technology that allows artists to present deeper concepts to audience, enhance the audience experience and present their music in innovative ways. There are

countless musicians and visual artists that have developed and presented notable works just as there are several tools that are ubiquitously used for such performances. Lastly, there are an increasing amount of music and arts festivals across Europe that proudly seek out and program audiovisual performances. We will present an overview of all these topics to illustrate the relevance of SCORE! Within this community and present which caveats its referential generative nature can fill.

Role of visuals in audiovisual performances

Visuals play a pivotal role in audiovisual performances. For centuries theaterics have been used in performances. They provide imagery that our brains can use to connect to the auditory sensation. It is in our nature to attach sound to a location or item, like the reflex to look around when a siren screams or an alarming sound startles us. Visuals and sounds that have a relation can allow us to better perceive and understand both.

Visuals can be used simply to augment a sonic narrative. Like any traditional performative theater experience, visuals can help express an emotion or support a story. While some would expect this in a cinema, musicians use visuals to demonstrate the concrete narratives that exist in their music. These visuals can be simple, footage of the natural world, faces recorded having emotional responses that correspond to moods palpable in the music or just someone simply walking down the street. They can also be complex, evolving and abstract. The key point however is that the visuals help to carry the narrative in the music allowing the audience to have a more emotional response.

If the above is a more traditional concert or performance then it behooves us to discuss the role of visuals in a nightclub setting. As one of Europe's largest, if not the largest creative economies, dance music and nightlife have fully embraced advanced visuals as a way to amplify the audiences' experience.

Landmark audiovisual performances.

Over the past 20 years audiovisual performances have catapulted to new heights. They are becoming highly symbiotic and incredibly visionary. No longer are concert visuals merely strobe lights or conducted light shows. SCORE! Taps into this ever progressing artistic collaboration between musician and visual artist. Below we highlight critically acclaimed examples that express how visuals and sound can be mutually beneficial to one another in generative and dynamic ways, not just pre-packaged, preconceived and coordinated.

Visual artist Tarik Barri and musician Paul Jebanasm's Continuum project demonstrated how a visual artist and musician can improvise and generate simultaneously like any musical duo. The project is a pristine example of a visual artist and musician working in harmony to amplify both the sound and image creating an end product that is greater the sum of its parts. Tarik Barri

uses Versum to generate the visuals, a custom software of his own design that “invites both the audience and the composer to look at the music and listen to the visuals.”¹

British audiovisual duo, Sculpture conceived a superiorly unique way to present visuals on their music. However, the duo are not using advanced visual software, instead they’re embracing the art of the flipbook animations by print visuals onto the physical vinyl LP itself. Therefore the vinyl when recorded spinning with a camera at 25fps, reveals a series of intertwined looping animations.



Figure 1: Album artwork examples, Sculpture

When it comes to performances, Sculpture are also renowned for their analog visual and audio techniques. Visually, the duo uses an overhead projector and zoetrope projectors to create highly modulated images that pairs perfectly with their musical composition style which makes real time use of tape loops. The duo’s two sides perfectly compliment the other and give an awe inspiring view of how art can still be so tactile.

Robert Henke is regarded as one of music’s greatest technicians. His Lumière² series is a dance of lasers that splash in harmony with the music. Lumière is a an ever evolving series of concerts that present the artistic conversation between high precision lasers and percussive sounds. The performance is based on a unique vector graphics software developed by Henke himself that allows him to generate rapid successions of visual shapes and associated sonic events, and to manipulate them in real time. Lumière is a pristine example of an artist manipulating visuals and sonics simultaneously in real time so that the audience receives visual cues that directly correspond to the sounds they’re hearing accentuating both.

¹ <http://tarikbarri.nl/projects/versum>

² <http://www.roberthenke.com/concerts/lumiere.html>

Software applications for audiovisual performance .

The growing ubiquity of audiovisual musical releases, performances and installations can owe a lot of its success to the rapid growth and performance enhancement of software that facilitate the creation of such performances. Should SCORE! Be scaled it would need to be interoperable with many of these tools for visual art as well as music production digital audio workstations.

Touchdesigner

Touch designer is one of the leading softwares and programming languages for visual graphics. Touchdesigner allows for real time graphic generation making it highly applicable for performances and installations. It is also Node based which means it can be used by non-coders. It's also able to change any type of data into a responsive format, i.e. spreadsheet values can be used to run a servo.

Max msp jitter

The other leading software for visuals and graphics used by visual artists is Max. Max has existed for over 30 years and has a large community around it making the software very robust for a wide array of practices. One of the biggest advances for Max is Max for Live. Max for Live allows musicians and visual artists to work with Max in Ableton Live (a digital audio workstation). Doing so not only opens them up to new opportunities for music production but also allows them to make use of Max's visual capacities. Therefore they can program visuals that respond to the music they are composing and vice versa all in one application.

Vvvv

vvvv³ is a hybrid visual/textual live-programming environment for easy prototyping and development. It is designed to facilitate the handling of large media environments with physical interfaces, real-time motion graphics, audio and video that can interact with many users simultaneously. The application has hundreds of users around the globe and is free for non-commercial purposes. It's extremely powerful yet incredibly versatile allowing for a wide array of implementations and room for experiment.

openFrameworks

openFrameworks⁴ is designed to work as a general purpose binder that wraps together several commonly used libraries for audiovisual art. It is massively cross-compatible and the API is

³ <https://vvvv.org/>

⁴ <https://openframeworks.cc/>

minimal and easy to grasp. It is open source giving all users the freedoms to use openFrameworks in any context.

As demonstrated in the above section, audiovisual performances are becoming more dynamic and more advanced. This is in no short thanks to the ever increasing suite of software and tools becoming more easily accessible and more powerful. The following section will highlight a few of these tools that SCORE! Can potentially be interoperable with or supplement.

Outlets for audiovisual performance.

Furthermore, both with the influx in tools and performances that make use of them, more and more outlets for hosting these performances are appearing. From the web to art galleries to 50.000 person festivals, audiovisual performances are becoming the norm in places where music and art are presented.

Festivals

Perhaps the most ubiquitous outlet for audiovisual performances and installations are music festivals. Electronic music and arts festivals in Europe are world renowned for their adventurous programming and artistic focus. The freedom that these festivals allow opens the doors for musicians and visual artists to explore new technologies and push the limits of performative art. Some of these landmark festivals include:

Ars Electronica: the longstanding Austrian tech and arts festival that continues to be a platform for technologists, researchers, musicians, developers, and visual artists to convene and share that future of arts and technology.

Rewire: The Hague based arts and music festival is in its 9th year and continues to commission and program cutting edge performances from around the world.

Mutek: The Montreal festival has been in existence since 2000 making it one of the forefront festivals that celebrates future technologies and electronic music. The festival model became so successful it has been replicated on 4 different continents.

Atonal: Perhaps the most loved experimental audiovisual festival, Atonal which has its roots back in 1983 ended its first run in 1990 only to be resurrected in 2013. It's legacy and continued reputation as being a breeding ground for cutting edge performances remains.

CTM: Similar to Atonal, also occurs in Berlin but while Atonal is a barrage of sound and visuals CTM additionally has a strong social and awareness program that discusses music and visual arts and technology's role in addressing societal issues. The performances they commission and program reflect these questions.

Additionally, these festivals have strong crossovers with nightclub culture and venues. The ubiquity of nightclubs and their increasingly experimental programming offers countless outlets for demonstration and performance of engaging audiovisual performances.

Galleries and Museums

Art galleries and museums have always been a venue of the presentation of visual arts and sounds. This reputation has changed very little and it only continues to grow. Contemporary modern art galleries such as Tate in London, Stedelijk in Amsterdam and MOMA in New York City as well as classic galleries like the Art Institute in Chicago are programming and exhibiting audiovisual performances and installations.

Some examples include, Richie Hawtin's audiovisual performance at the Guggenheim⁵, Tate Modern, London who hosted a Warp Records night with eclectic audiovisual performances⁶. Also recently at Tate Modern was, Fatima Al Qadiri (Ayshay) performing "Shaytan"⁷. Stedelijk in Amsterdam regularly collaborates with experimental festival Sonic Acts by hosting performances and installations. This past February they hosted a performance by HANNAH⁸ and interactive installations in collaboration with STEIM⁹. Also locally, EYE Filmmuseum recently had an entire installation by Japanese visual and sound artist Ryoji Ikeda.¹⁰

There are numerous examples of the every growing presence of audiovisual installations and performances in museum and gallery settings. As these institutions work to attract younger and more creative visitors it's expected for these programming choices to increase.

Web

Panther Modern

¹¹Panther Modern is a file-based exhibition space that encourages artists to create site-specific installations for the Web. The projects shown at Panther Modern are provided a unique structure in the format of a 3D model file. This is built to engage the artist and their making process. Artists are given freedom to be able to choose the format around which they will shape their installation. The completed installation rooms are added to the existing architecture of the site. This allows the site to change with each new project.

⁵ <https://www.youtube.com/watch?v=WPJvkJHK22w>

⁶ <https://www.youtube.com/watch?v=MJOpSCom59o>

⁷ <https://www.youtube.com/watch?v=sfUsRikQsS8>

⁸ <https://2019.sonicacts.com/programme/hannah-3>

⁹ <https://2019.sonicacts.com/programme/exhibition-at-stedelijk-museum-ii>

¹⁰ <https://www.eyefilm.nl/en/exhibition/ryojiikeda>

¹¹ <http://panthermodern.org/about.html>

Recommendations for scaling SCORE!

The simple concept that fuels SCORE! Lends itself to scaleable options which will allow for more detailed mappings both on the musical and visual side and more functionalities for modulation. This capacity for customization is what will make SCORE! A viable product for the creative sector. SCORE! Would lower the threshold for any musician wishing to incorporate visuals into their performance in a way that responds and interacts with the music as opposed to juxtaposing two unconnected creative elements.

One clear option is creating an open source plugin based on SCORE! for DAWs (Digital Audio Workstations). This would allow developers and producers to customize SCORE! For their own needs and make it interoperable with their preferred working method. SCORE! Is already available on GitHub under an open source license¹².

It's pivotal that users be able to export and save the MIDI or audio generated by the SCORE! Application. This functionality is already available in the current version of the software. Equally the visual input should be export and saveable synced with the music that had been generated. It's equally advantageous to have the audio output in a graphical format i.e. traditional sheet music.

In terms of the functionality of the recognition and identification of latent factors in the visual input, giving the end users the potential to variate which latent factors get the most attention and which can potentially be ignored. For example, focusing on setting but not on people or focusing on color but not on specific items.

Expanding on this aspect of user control, a level of automated features could be added that would variate the outputs and their "accuracy". For instance, the baseline feature called "auto-score" would generate simple 1-1 connections between the identified latent factors and map it to corresponding audio libraries. However, a "random" or "shuffle" function could allow for the mapping to audio libraries to jumble, disrupting the original output allowing artists to explore new potentials like inverting properties or reversing their order.

While the above recommendations are in relation to controlling and modifying the audio output, another unique feature could be allowing real time editing and processing of the video material thereby changing its characteristics and augmenting its generated audio output. This would be a VST feature.

¹² <https://github.com/pbloem/score>

In order for SCORE! To be hyper relevant for performing artists and visual artists the visuals would need to be simultaneously displayed through a projector system and also workable / augmentable on the localized computer being used.

Furthermore, in an effort to engage more artists and acquire more interpretations of the film material, it's recommended the the sound libraries that are employed by future editions of SCORE! Be composed and curated by different professional sound artists. This would then give users different options for styles, allowing them to emulate their favorite artists and explore new possibilities for sounds.

Users will also be able to upload all their own sounds and create their own sound libraries with varying semantic tags. In essence they'll be able to customize their whole SCORE! Application to meet their needs and be free to change things when desired.

Conclusion

SCORE! Is a tool that will provide artists, researchers and developers new opportunities to explore how latent factor identification in moving images can be used to inform a multitude of use cases. For the purpose of this report the focus is on how audiovisual artists could implement SCORE! In their creative and performative workflow. The ecosystem that support audiovisual performance is thriving and continuously investigating new technologies and methodologies. Machine learning and deep learning are very intriguing to artists and a product like SCORE! provides ample possibilities for creating and experimenting. For the heritage sector SCORE! can provide a direct way for archival films that might otherwise not be relevant to be put into creative use.