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VOL 19 NO 3 VOLUME EDITORS **LANFRANCO ACETI, STEVE GIBSON & STEFAN MÜLLER ARISONA** EDITOR **ÖZDEN ŞAHİN**

Live visuals have become a pervasive component of our contemporary lives; either as visible interfaces that re-connect citizens and buildings overlaying new contextual meaning or as invisible ubiquitous narratives that are discovered through interactive actions and mediating screens. The contemporary re-design of the environment we live in is in terms of visuals and visualizations, software interfaces and new modes of engagement and consumption. This LEA volume presents a series of seminal papers in the field, offering the reader a new perspective on the future role of Live Visuals.

LIVE VISUALS

LEONARDO ELECTRONIC ALMANAC, VOLUME 19 ISSUE 3

Live Visuals

VOLUME EDITORS
LANFRANCO ACETI, STEVE GIBSON & STEFAN MÜLLER ARISONA

EDITOR
ÖZDEN ŞAHİN

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Volume 19 Issue 3

When Moving Images Become Alive!

"Look! It's moving. It's alive. It's alive... It's alive, it's moving, it's alive, it's alive, it's alive, it's alive, IT'S ALIVE!"
Frankenstein (1931)

Those who still see – and there are many in this camp – visuals as simple 'decorations' are living in a late 19th century understanding of media, with no realization that an immense cultural shift has happened in the late 20th century when big data, sensors, algorithms and visuals merged in order to create 21st century constantly mediated social-visual culture.

Although the visuals are not actually alive, one cannot fail to grasp the fascination or evolution that visuals and visual data have embarked upon. It is no longer possible to see the relationship of the visual as limited to the space of the traditional screens in the film theater or at home in the living room with the TV. The mobility of contemporary visuals and contemporary screens has pushed boundaries – so much so that 'embeddedness' of visuals onto and into things is a daily practice. The viewers have acquired expectations that it is possible, or that it should be possible, to recall the image of an object and to be able to have that same object appear at home at will. The process of downloading should not be limited to 'immaterial' digital data, but should be transferred to 3D physical objects. [1]

Images are projected onto buildings – not as the traditional trompe l'oeil placed to disguise and trick the eye – but as an architectural element of the building itself; so much so that there are arguments, including mine, that we should substitute walls with projected information data, which should also have and be perceived as having material properties (see in this volume "Architectural Projections" by Lukas Treyer, Stefan Müller Arisona & Gerhard Schmitt).

Images appear over the architecture of the buildings as another structural layer, one made of information data that relays more to the viewer either directly or through screens able to read augmented reality information. But live visuals relay more than images, they are also linked to sound and the analysis of this linkage provides us with the opportunity "to think about the different ways in which linkages between vision and audition can be established, and how audio-visual objects can be composed from the specific attributes of auditory and visual perception" (see "Back to the Cross-modal Object" by Atau Tanaka).

iPads and iPhones – followed by a generation of smarter and smarter devices – have brought a radical change in the way reality is experienced, captured, uploaded and shared. These processes allow reality to be experienced with multiple added layers, allowing viewers to re-capture, re-upload and re-share, creating yet further layers over the previous layers that were already placed upon the 'original.' This layering process, this thickening of meanings, adding of interpretations, references and even errors, may be considered as the physical process that leads to the manifestation of the 'aura' as a metaphysical concept. The materiality of the virtual, layered upon the 'real,' becomes an indication of the compositing of the aura, in Walter Benjamin's terms, as a metaphysical experience of the object/image but nevertheless an experience that digital and live visuals are rendering increasingly visible.

"Everything I said on the subject [the nature of aura] was directed polemically against the theosophists, whose inexperience and ignorance I find highly repugnant. . . . First, genuine aura appears in all things, not just in certain kinds of things, as people imagine." [2]

The importance of digital media is undeniably evident. Within this media context of multiple screens and surfaces the digitized image, in a culture profoundly visual, has extended its dominion through 'disruptive forms' of sharing and 'illegal' consumption. The reproducibility of the image (or the live visuals) – pushed to its very limit – has an anarchistic and revolutionary element when considered from the neocapitalistic perspective imbued in corporative and hierarchical forms of the construction of values. On the contrary, the reproducibility of the image when analyzed from a Marxist point of view possesses a community and social component for egalitarian participation within the richness of contemporary and historical cultural forms.

The digital live visuals – with their continuous potential of integration within the blurring boundaries of public and private environments – will continue to be the conflicting territory of divergent interests and cultural assumptions that will shape the future of societal engagements. Reproducibility will increasingly become the territory of control generating conflicts between *original* and *copy*, and between the layering of *copy* and *copies*, in the attempt to contain ideal participatory models of democracy. The elitist interpretation of the aura will continue to be juxtaposed with models of Marxist participation and appropriation. [3]

Live visuals projected on public buildings and private areas do not escape this conflict, but present interpretations and forms of engagements that are reflections of social ideals. The conflict is, therefore, not solely in the elitist or participatory forms of consumption but also in the ideologies that surround the cultural behaviors of visual consumption.

Object in themselves, not just buildings, can and may soon carry live visuals. There is the expectation that one no longer has to read a label – but the object can and should project the label and its textured images to the viewer. People increasingly expect the object to engage with their needs by providing the necessary information that would convince them to look into it, play with it, engage with it, talk to it, like it and ultimately buy it.

Ultimately there will be no need to engage in this process but the environment will have objects that, by reading previous experiences of likes and dislikes, present a personalized visual texture of reality.

Live visuals will provide an environment within which purchasing does not mean to solely acquire an object but rather to 'buy' into an idea, a history, an ideology or a socio-political lifestyle. It is a process of increased visualization of large data (Big Data) that defines and re-defines one's experience of the real based on previously expressed likes and dislikes.

In this context of multiple object and environmental experiences it is also possible to forge multiple individualized experiences of the real; as much as there are multiple personalized experiences of the internet and social media through multiple avatar identities (see "Avatar Actors" by Elif Ayter). The 'real' will become a visual timeline of what the algorithm has decided should be offered based on individualized settings of likes and dislikes. This approach raises an infinite set of possibilities but of problems as well.

The life of our representation and of our visuals is our 'real' life – disjointed and increasingly distant from what we continue to perceive as the 'real real,' delusively hanging on to outdated but comfortable modes of perception.

The cinematic visions of live visuals from the 19th century have become true and have re-designed society unexpectedly, altering dramatically the social structures and speeding up the pace of our physical existence that constantly tries to catch up and play up to the visual virtual realities that we spend time constructing.

If we still hold to this dualistic and dichotomist approach of real versus virtual (although the virtual has been real for some time and has become one of the multiple facets of the 'real' experience), then the real is increasingly slowing down while the virtual representation of visuals is accelerating the creation of a world of instantaneous connectivity, desires and aspirations. A visuality of hyper-mediated images that, as pollution, pervades and conditions our vision without giving the option of switching off increasingly 'alive' live visuals. [4]

The lack of 'real' in Jean Baudrillard's understanding is speeding up the disappearance of the 'real' self in favor of multiple personal existential narratives that are embedded in a series of multiple possible worlds. It is not just the map that is disappearing in the precession of simulacra – but the body as well – as the body is conceived in terms of visual representation: as a map. These multiple worlds of representations contribute to create reality as the 'fantasy' we really wish to experience, reshaping in turn the 'real' identity that continuously attempts to live up to its 'virtual and fantastic' expectations. Stephen Gibson presents the reader with a description of one of these worlds with live audio-visual simulations that create a synesthetic

experience (see "Simulating Synesthesia in Spatially-Based Real-time Audio-Visual Performance" by Stephen Gibson).

If this fantasy of the images of society is considered an illusion – or the reality of the simulacrum, which is a textual oxymoron at prima facie – it will be determined through the experience of the *live visuals becoming alive.*

Nevertheless, stating that people have illusory perceptions of themselves in relation to a 'real' self and to the 'real' perception of them that others have only reinforces the idea that Live Visuals will allow people to manifest their multiple perceptions, as simulated and/or real will no long matter. These multiple perceptions will create multiple ever-changing personae that will be further layered through the engagements with the multiple visual environments and the people/ avatars that populate those environments, both real and virtual.

In the end, these fantasies of identities and of worlds, manifested through illusory identities and worlds within virtual contexts, are part of the reality with which people engage. Although fantastic and illusory, these worlds are a reflection of a partial reality of the identity of the creators and users. It is impossible for these worlds and identities to exist outside of the 'real.' This concept of real is made of negotiated and negotiable frameworks of engagement that are in a constant process of evolution and change.

The end of post-modernity and relativism may lead to the virtuality of truism: the representation of ourselves in as many multiple versions – already we have multiple and concurrent digital lives – within the world/s – ideological or corporate – that we will decide or be forced to 'buy into.'

It is this control of the environment around us and us within that environment that will increasingly define the role that live visuals will play in negotiating real and virtual experiences. The conflict will arise from the blurred lines of the definition of self and other; whether the 'other' will be another individual or a corporation.

The potential problems of this state of the live visuals within a real/virtual conflict will be discovered as time moves on. In the end this is a giant behavioral experiment, where media and their influences are not analyzed for their social impact *ex ante facto*; this is something that happens *ex post facto*.

Nevertheless, in this ex post facto society there are some scholars that try to understand and eviscerate the problems related to the process of visuals becoming alive. This issue collects the analyses of some of these scholars and embeds them in a larger societal debate, hinting at future developments and problems that society and images will have to face as the live visuals become more and more alive.

The contemporary concerns and practices of live visuals are crystallized in this volume, providing an insight into current developments and practices in the field of live visuals.

This issue features a new logo on its cover, that of New York University, Steinhardt School of Culture, Education, and Human Development.

My thanks to Prof. Robert Rowe, Professor of Music and Music Education; Associate Dean of Research and Doctoral Studies at NYU, for his work in establishing this collaboration with LEA.

My gratitude to Steve Gibson and Stefan Müller Arisona, without them this volume would not have been

possible. I also have to thank the authors for their patience in complying with the guidelines and editorial demands that made this issue one that I am particularly proud of, both for its visuals and for its content.

My special thanks go to Deniz Cem Önduygu who has shown commitment to the LEA project beyond what could be expected.

Özden Şahin has, as always, continued to provide valuable editorial support to ensure that LEA could achieve another landmark.

Lanfranco Aceti
Editor in Chief, Leonardo Electronic Almanac
Director, Kasa Gallery

1. 3D printing the new phenomenon will soon collide with a new extreme perception of consumer culture where the object seen can be bought and automatically printed at home or in the office. Matt Ratto and Robert Ree, "Materializing Information: 3D Printing and Social Change," *First Monday* 17, no. 7 (July 2, 2012), http://firstmonday.org/ojs/index.php/fm/article/view/3968/3273 (accessed October 20, 2013).
2. Walter Benjamin, "Protocols of Drug Experiments," in On Hashish, ed. Howard Eiland (Cambridge, MA: Harvard University Press, 2006), 58.
3. " The point here is not to issue a verdict in the debate between Adorno and Benjamin, but rather to understand the debate between them as representing two sides of an ongoing dialectical contradiction." Ryan Moore, "Digital Reproducibility and the Culture Industry: Popular Music and the Adorno-Benjamin Debate," Fast Capitalism 9, no. 1 (2012), http://www.uta.edu/huma/agger/fastcapitalism/9_1/moore9_1.html (accessed October 30, 2013).
4. Paul Virilio, *Open Sky*, trans. Julie Rose (London: Verso, 1997), 97.

Zoom:0
shuffle:true
rotation:0
timer:2s

sound by:Coden
info

a vector graphics tool for audiovisual performances

AVVX

Screenshot from AVVX.
AVVX (AudioVisual Vector eXchange), Nuno N. Correia, 2012, application for visual music performances.
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by

Nuno N. Correia

Aalto University, School of Arts, Design and Architecture, Media Lab Helsinki
mail@nunocorreia.com
http://mlab.taik.fi
http://www.nunocorreia.com

A B S T R A C T

This paper presents AVVX (AudioVisual Vector eXchange), a tool for live visuals and audiovisual performances developed by Nuno N. Correia. AVVX aims to answer the following question: how to design a tool for live visuals, allowing for the quick development of graphic materials, with open standards, and using the Internet as a resource for content exchange? The paper contextualizes the tool with related works, and with past projects from the author. The paper then presents the motivation for the creation of the tool, the design decisions behind it, and its development process. The main motivation for the creation of AVVX was the opportunity to teach a live visuals workshop in Ljubljana in June 2012, which had as outcomes an audiovisual performance and a VJ (Video Jockey / live visuals) performance. The author decided to focus AVVX on vector graphics manipulation. AVVX was released online as free and open-source software. A community website was built to share the content created for AVVX (AVVX.org). The paper also briefly discusses the operation of the tool. The workshop and its outcomes are then described. Two performances by the participants followed the workshop. After the workshop and the performances, the participants answered an online questionnaire, aiming to evaluate their experience with AVVX. The paper presents the results of this questionnaire. Conclusions are then reached based on these results, in addition to the author's experience as workshop teacher and AVVX designer. Paths for future developments are discussed.

INTRODUCTION

AVVX (AudioVisual Vector eXchange) is an application for visual music performances. It was designed with the following objective: to allow for the quick development of graphic materials; with open standards; and using the Internet as a resource for content exchange. The motivation for developing the software

came from two main factors. Firstly, the desire to develop more open tools than the ones I had previously created in the past – particularly on the visual content side, but also regarding the code itself. Secondly, the invitation to teach a short but ambitious workshop in Ljubljana (in June 2012) – the outcomes of the three-day workshop would be two performances, in two different venues in the city.

The workshop, entitled Marmelada ('jam' in Slovenian), was organized by the Slovenian Independent Biennale. It targeted mostly participants with a graphic design and motion graphics background, and little experience with programming. Therefore, I wanted to create a tool that would be well suited to this workshop, easy to use, allowing for the quick production of sufficient graphic materials for two performances, and also expressive enough for the participants to create per-

sonal live visuals for the performances. I also wanted to create a tool that would allow for an easy exchange of visual materials, taking advantage of the web – my past projects had tried to gradually take more advantage of web resources.

CONTEXT – VISUAL MUSIC AND PREVIOUS WORK AS VIDEO JACK

The term 'visual music' can have different meanings, but in this article it will be used as "a visualization of music which is the translation of a specific musical composition (or sound) into a visual language, with the original syntax being emulated in the new visual rendition."[1] There is a long tradition of using abstract geometrical shapes for creating visual music. For example, Oskar Fischinger (1900–1967), one of the visu-

al music pioneers, pursued a purely abstract approach in his animations. Fischinger was inspired by Bernhard Diebold, who called for "new artists, 'Bildmusikers' [visual musicians]" to achieve Wagner's ideal of gesamtkunstwerk (total artwork), "preferably abstract in nature." [2] This approach was also pursued by a new generation of artists influenced by Fischinger, such as John Whitney, a pioneer in the use of computer graphics for animation. [3]

As personal computers became more powerful in the 1990s, real-time video manipulation became easier. In that decade, the term VJ (Video Jockey) became more widespread in the context of visual music and live visual performance – Golo Föllmer and Julia Gerlach place the emergence of VJing in the clubbing scene of the 1990s. [4] Chris Salter explains the emergence of "screen-based performance" in the 1990s, adopting "a long litany of names such as audiovisual performance, real-time video, live cinema, performance cinema, and VJ culture" [5] (to this list one could add "live visuals") as the result of these two branches of techno-cultural development: on the one hand, "breakthroughs in digital computation, particularly the development of hardware and software components for the capture, processing, and manipulation of image and sound" and on the other hand, "the international rise of the techno/club scene, which rapidly exploited such technologies." [6] Software such as ArKaos [7] and NATO for Max [8] were released for this purpose. Digital video became a major raw material in live visual performances. This trend continued into the 2000s. However, some contemporary audiovisual performers continue to pursue an abstract and geometrical approach that can be traced back to pioneers such as Fischinger and Whitney.

The popularity of software for live video performances such as ArKaos, and later Modul8, [9] Resolume, [10] etc. (excellent as these tools may be) has possibly led to a

lack of personal artistic approach in many of the live visual performances I have attended. Often, live visual performers have been using the same effects and presets from these software packages, leading to A certain absence of identity in their visuals. Additionally, the difficulty in generating a sufficient quantity of new appealing video footage may drive some VJs to use stock footage or to reuse other materials (for example, from cinema or TV). This also creates, I believe, a feeling of lack of identity (with many honorable exceptions from video sampling virtuosos). The need to come up with efficient solutions for generating a large quantity of material is understandable – a VJ often needs to perform long hours, avoiding repetition of material, several nights per month.

My approach has been to avoid what I consider to be an over-explored path of video manipulation, and pursue other strategies for creating and manipulating visuals, such as combining vector graphics with computer-generated animation. Although I also use figurative animation in some projects, I am particularly interested in exploring abstract visuals and their openness to interpretation. I found inspiration in the pioneers of visual music and their geometrical visuals. I believe that today's technology is very suitable to further explorations in this aesthetics – to attempt to represent or complement music with shape, color and motion. It also relates particularly well to contemporary electronic music, often generated mathematically. In my own approach, namely with my work as Video Jack with illustrator and designer André Carrilho, I have been attempting to combine the versatility of contemporary interactive and generative digital art with the expressiveness of the hand-drawn animated geometrical shapes of visual music pioneers such as Oskar Fischinger.

AVVX aims to explore the potential of using simple geometrical shapes for live visual performances. It fits

in a line of work I have developed as Video Jack. More specifically, it builds upon software we have developed for live visuals, combining vector-based animation with programming behaviors. The previous Video Jack project that is closest to AVVX is *Idiot Prince*, [11] from 2006. In *Idiot Prince*, users could create their own "interactive music video" online to the music track of the same name by: choosing an animation behavior (for example, scaling); picking an animation module (for example, fireworks); and manipulating parameters of the animation (for example, direction of movement). We have used software that explores the same structure as *Idiot Prince* in numerous VJing performances, with added animation modules and behaviors.

In 2010, Video Jack released *AV Clash*, (www.avclash.com) an online project "which allows for the creation of audiovisual compositions, consisting of combinations of sound and animation loops." [12] Unlike previous Video Jack projects, where all the visuals and sounds were conceived by André Carrilho and me, in *AV Clash* the sounds were retrieved from Freesound.org, [13] an online sound database. Freesound.org is a free sound library, with the sounds being released under a Creative Commons license. When reflecting about future developments of *AV Clash*, the following question took shape: how to open up the visual side of a future project for audiovisual performance (using vector-based animation), in the same way that *AV Clash* had opened the audio side (to materials not created by Video Jack)? AVVX aims to be a first step in that direction.

THE APPLICATION

Most Video Jack projects have been developed using vector graphics, since they are very light and flexible, quick to create, and can be easily animated. Additionally, there is a long tradition of using simple geometric

elements for visual music – for example, the work of Fischinger and Whitney – that has demonstrated the potential of this aesthetics. The usage of vector graphics files favors a 'less is more' approach, instead of relying on video manipulation, as VJs often do. It also offers an alternative to graphics generated exclusively by code, by allowing for the introduction of a more 'human' / 'hand drawn' element in the vector graphics. Vector graphics are also lightweight and easy to include in any project (particularly important in a web context).

In order to allow for the usage of external visual elements in AVVX, while maintaining the vector graphics approach of Video Jack projects, I decided to use the SVG (Scalable Vector Graphics) format. SVG is a "widely-deployed royalty-free graphics format developed and maintained by the W3C SVG Working Group" as well as a "markup language for describing two-dimensional graphics applications and images, and a set of related graphics script interfaces." [14] Being widely supported and free was decisive for the choice of the format. Unfortunately, I could not find an online database of vector graphics that would be structured in a similar way to how Freesound.org deals with sounds. Therefore, I would have to create a simple custom structure for users of AVVX, which could ideally evolve in the future into an online database of vector graphics for live visuals.

Similarly to projects I had developed as Video Jack, AVVX was developed using Adobe Flash. This option was due to two factors. Firstly, time constrains – in order to have the software ready for the workshop, it was decisive that I could quickly reuse code from previous projects (mainly from *Idiot Prince*). Secondly, I wanted to use a web-friendly development environment that would deal well with SVGs.

Preparing visuals for AVVX involves creating the SVGs and indexing them in a XML file, aggregating them into

'groups.' These 'groups' (up to 100 are supported) can be different frames that will compose an animated sequence, or merely related graphics that the user decides to aggregate together. The XML file also supports metadata for the images, such as authorship information. Upon launching the software, the XML file and associated SVG files are loaded. At the moment, three animation behaviors are available in AVVX: 'slide' (horizontal or vertical translations); 'zoom' (scaling) and 'trail' (random movement of graphics across the screen). Users can manipulate different parameters of these animations, such as speed and direction.

All behaviors and their parameters are changeable using the keyboard. Users can also choose which SVG 'group' to select with key presses. A text box gives feedback about the current behavior, parameters and groups, besides author information (name and URL of the author of the visuals can be added to the XML). If the author name and URL are available, the name will be displayed with a link to the author's specified

URL. This textual information can be hidden with a key press. AVVX has two ways to present image in a 'group' in temporal succession: either following the sequence in which they are listed within the XML 'group,' or randomly within that group (a 'shuffle' mode). The user can switch between these modes with a key press.

AVVX also allows for the playback of sounds. A sound file (in the MP3 format) can be associated with the XML, and loaded into the software. Using the keyboard, the user can play or stop the sound. When the sound is playing, the animations become audio-reactive. The audio reactivity consists of scaling the animations in proportion with the sound amplitude (independently of other scaling animation taking place). This was inspired by how audio reactivity was implemented in Video Jack projects, such as *AV Clash*.

Prior to the workshop, AVVX was released as open-source (MIT license) in Google Code. [15] Windows

Developing visuals at the AVVX workshop, 2012.
Photo © Natan Esku, 2012. Used with permission.

Trails:5
shuffle:true
rotation:4
alpha:0.2
size:1
spacing:4
rate:1

sound by:Coden
images by:Nuno Correia
info

Screenshot from AVVX. *AVVX (AudioVisual Vector eXchange)*, Nuno N. Correia, 2012, application for visual music performances. © Nuno N. Correia, 2012. Used with permission.

and Macintosh versions of the software were made available for download from a dedicated page in my personal website. [16] Within the download package, sample SVGs and a sample XML are provided. In the same web page, instructions for AVVX were setup.

THE WORKSHOP, PERFORMANCES AND ONLINE REPOSITORY

The workshop took place in three consecutive days (2–4 June 2012), preceded by a seminar on visual music, open to a broader audience (on the evening of the 1st of June). Both seminar and workshop took place at Kino Siska, a modernist cinema / performance center from the Yugoslavian era that has been very tastefully renovated, and has become one of the main venues for live music in Ljubljana. The workshop (and related events) was organized by the Slovenian Independent Biennale, under the name Marmelada, aiming to promote the creation of multi-disciplinary works. During the seminar, I made a presentation on visual music and audiovisual composition, including my own projects. Some workshop participants, and other guests, presented work related to live visuals.

The main work was developed on the first and second day of the workshop (2–3 June). I presented AVVX to the nine participants, and explained them what the final project would be: to pick one sound track of approximately five minutes, and create vector-based visuals for this track with AVVX (or another similar

tool of their choice). With this material they should perform on the evening of the third workshop day in Kino Siska. The performance would be free to the general public. They should also prepare a video of approximately five minutes with the same material, to be shown in each of the three large screens that are facing the outside of the venue, that are used by Kino Siska to promote their events. After this briefing, the participants spent the remaining time of the workshop developing visuals and learning how to use AVVX. Some participants also made changes to the code, in order to better suit their needs. I made changes in the software based on suggestions of the participants, and uploaded new versions to Google Code. One of the participants chose not to use AVVX, since the graphics he decided to use (moiré patterns) were too complex to be handled by the software. He chose to use a commercial VJing software instead.

The participants were told that, if interested, they could also perform in a second showcase in a major festival in Ljubljana (UF! – Urban Festival), taking place on the 12th of June in Krizanke, an old monastery in the center of the city, another major local live music venue. It would mainly be a VJing / live visuals event, with the music being the responsibility of two local DJs. These local DJs had been invited to do a short DJ session after the opening seminar, in order for the participants to become familiar with their musical style. Because I did not know beforehand how much interest there would be in this second performance, I was planning to perform myself in case of lack of
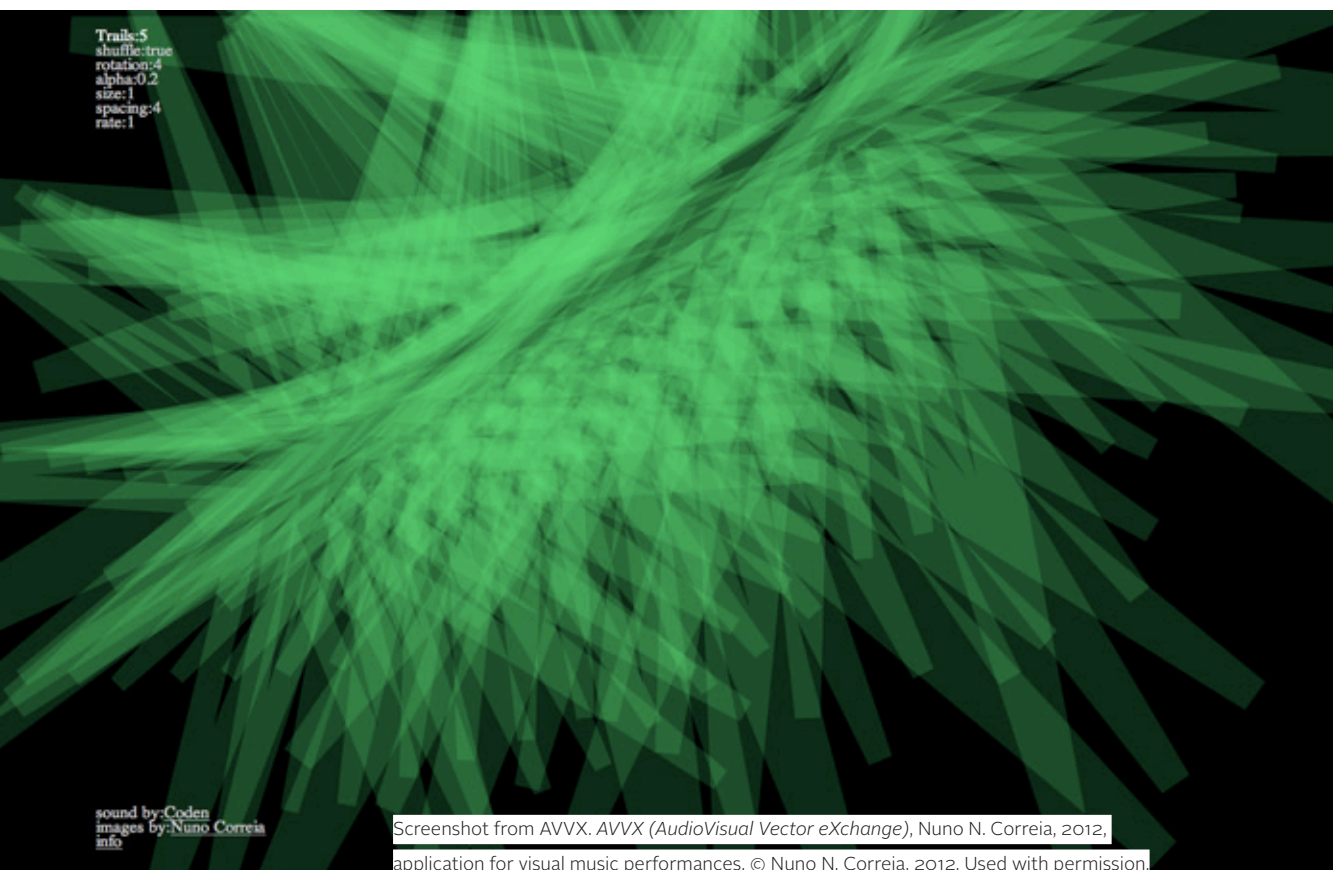
AVVX performance in Kino Siska, Ljubljana. 2012. © Nuno N. Correia, 2012. Used with permission.

enthusiasm from the participants. However, they all showed interest in the event. We set up an extra workshop day, on the 10th of June, to organize the materials and the logistics for the UF! performance. This performance would have a duration of four hours and a half – four hours of live visuals accompanying the local DJs, and a half hour audiovisual performance (similar to the previous one at Kino Siska). Participants were asked to choose if they wanted to present a VJ performance or an audiovisual performance, and their time slots were distributed accordingly. Four chose to participate in the audiovisual performance, and the remaining five in the VJing performance.

Because of the short amount of face-to-face time to develop and organize all these materials, a web workflow was created to share information and files, based on Google Docs, Google Groups and DropBox. One main computer was used for the performances, running the different versions of AVVX from the participants, and their respective visuals and music. The performances in Kino Siska and UF! went as planned,

except that in the Kino Siska performance I replaced one of the participants who could not attend the performance. She had sent her materials beforehand, and I had time to familiarize myself with them. This gave me the chance to perform in public with AVVX for the first time, although using materials built by someone else. Extensive photo and video documentation was gathered, relative to the workshop and the two performances. [17]

After the workshop, the participants were asked if they agreed that their visuals (SVGs) would be made available online for free download, under a Creative Commons Attribution license. Seven of the eight participants that worked with AVVX agreed. I then setup a dedicated website for the purpose of sharing these visuals – AVVX.org. [18]

The AVVX.org website is still a very rudimentary repository of visuals. For now, a user cannot upload visuals him/herself. Also, a user needs to download SVGs from AVVX.org to her/his computer in order to use

them in AVVX. This should not be necessary – AVVX could list the visuals available from AVVX.org, and load them directly from the website to the application.

QUESTIONNAIRE AND RESULTS

To evaluate if the application met its objectives – to design a flexible tool for live visuals, allowing for the quick development of graphic materials, with open standards, and using the Internet as a resource for content exchange – an online survey was conducted after the workshop and performances. As I left Ljubljana shortly after the final performance, an online questionnaire seemed appropriate. Additionally, the workshop had a strong online component, and AVVX is designed with the purpose of leveraging web resources, therefore the participants were familiar with using online tools in this context.

The questionnaire contained 28 questions, mostly close-ended, but with nine open-ended ones. The close-ended questions consisted essentially of five-point Likert scales. [19] All eight participants that used AVVX for the performances answered the questionnaire. The questionnaire was not anonymous, since I wanted to ensure all the participants would reply to it. Therefore, I had to identify those I might have to insist to fill it. This lack of anonymity might have come with a cost – the answers might have been biased towards more positive results, since the participants could have been afraid of being overly critical out of politeness.

The questionnaire was divided into four groups: 1) personal information; 2) development of visuals; 3) interactivity, animation and end result; and 4) final remarks. In the questions regarding end result, topics related to experience were explored, delving into the concept of aesthetic interaction, proposed by Peterson et al. as an "extended expressiveness towards interactive sys-

AVVX performance in UF! Festival, Ljubljana. 2012. © Nuno N. Correia, 2012. Used with permission.

tems," that would reach "beyond ideals of efficiency and transparency, e.g. like considering the emotions, attraction, and affect invoked by design." [20] Most of the aspects related to the objectives of the tool were covered, except using the Internet as a resource for content exchange (the online repository for AVVX was only created after the questionnaire). Five of the participants were above 30 years of age, with three in their late 20s. There was a half/half gender distribution. Three participants had a bachelor's degree and four a master's degree. All had done previous work as artists or designers, and six had experience as DJs / VJs / musicians.

The six participants who had previous experience as VJs were asked to comment on the strengths and weaknesses of AVVX compared to other VJ software. Regarding strengths, two of the participants use the word "simple," and three used expressions such as "minimal" / "minimalism" / "less is more" as strengths of the software. As far as weaknesses are concerned, one of the respondents listed several functionalities that could be added, such as improvements in 'behaviors' and 'groups,' and also microphone input; two mentioned that more complex SVGs should be supported; another considered that the software needs a UI overhaul; the use of Flash was mentioned as being a problem; and another participant would have liked video files and bitmap images to be supported.

Regarding development of visuals, all participants considered that the development of SVGs for AVVX was very easy, and that importing the SVGs into AVVX was very easy as well. Half of the participants considered that they developed a "completely adequate" amount of visuals for the performances within a reasonable time, while the other half considered that an adequate amount of visuals was developed. When asked to comment on the process of developing visuals for AVVX, one user complained about the "inability of

adding and creating more complex vectors as it slows down the animation."

As far as interactivity is concerned, the results were less unanimous. One respondent considered the interactivity hard to use; another one neither hard nor easy; while the remaining answers were evenly split between easy and very easy to use. The first two users clarified their less favorable answers with further comments. The one who considered the interactivity hard to use stated that "I am not used to handle apps with keyboards and it was a little disturbing." The one who replied with an average score commented that "sometimes I was lost" but that with "time I could handle the interactivity."

Regarding animation, most of the participants (five) considered that the audio-reactivity was adequate, with one answering that it was very adequate, and another that it was inadequate. This last respondent suggests that audio reactivity should be different for low, mid and high frequencies. Two other comments focus once more on implementing microphone output for audio reactivity. The animation behaviors were appealing for half of the participants, very appealing for one, and neither appealing nor unappealing for three. Regarding further comments on animation, four of the participants showed interest in having more behaviors in the future, or more variation possibilities for the existing ones. One of the respondents mentioned that when loading complex SVGs the app becomes slow and 'strange details' appeared in the animation, but that these could be interesting too.

The opinions regarding the audiovisual end result were more positive than the previous topics (interactivity and animation): three participants considered the end results in the performances engaging; another three very engaging; while two responders were neutral regarding this aspect. These two last respondents clari-

fied their opinions: one stated that "the audiovisual result was good, but a little bit repetitive and not that flexible," and the other that the result was good taking into account the short time for preparation.

An additional question that I wanted to assess was if the application allowed for a personal result – or if the software shaped the end result too much, in the views of the participants. The majority of participants seemed to have found the software flexible enough to allow for their own creativity: two participants considered that the end result was personal; four that it was very personal; while two were neutral regarding this issue.

All but one participant considered that it was very important to have released AVVX as open source, with the remaining one answering that it was not important at all. Indeed, most of the participants changed the code, to a greater or lesser extent, with or without help (from me or from colleagues). Finally, all the participants answered they would recommend AVVX to someone interested in VJing and audiovisual performance.

CONCLUSIONS

One of the objectives of AVVX was to allow for the quick development of graphic materials. The choice of SVG as the format for the visuals seems to have been successful: all the participants had SVG-compatible drawing tools already installed in their own computers, and they were unanimous in considering both the development of SVGs and the addition of these to AVVX "very easy." Participants considered that they developed an adequate amount of visuals for the performances within an adequate or completely adequate time (despite the short preparation time). The most important problem detected related to the use

of SVGs was that complex SVGs slow the software substantially. One of the participants, however, incorporated this slowness in the drawing process and the resulting glitches into his performance. Another participant did not use AVVX entirely due to the complexity of his graphics and the slowness of the software in dealing with them (since he did not use AVVX, he did not participate in the questionnaire). Nevertheless, this issue should be address by converting AVVX to other eventually more efficient environments, such as JavaScript, or even C++/Objective-C solutions. JavaScript would probably not be much faster than Flash, but would have the advantage of keeping AVVX as a browser-compatible application (and therefore multi-platform), while a native C++/Objective C based app would be faster, but would need to be adapted for each possible platform (Mac, PC, iOS, Android, etc).

Another objective of AVVX was to design a flexible tool for live visuals. The issue of flexibility is related to interaction and functionalities (mainly the "behaviors" in AVVX), which should result in an engaging live audiovisual experience. Keyboard-based commands were problematic for two of the users. I also believe that AVVX still demands too much practice, and reliance on memorization, in order to obtain an adequate level of mastery – efforts should be made to improve usability. In the future, AVVX could be split into two screens, one for the performer and another for the audience. The performer screen could include thumbnail previews of the different visuals, which could be triggered either by keyboard or by touch (in case of touch screen-based platforms). Regarding audio-reactivity in the animations, it presently only works with pre-recorded files. This was adequate for the first performance, where the participants brought their own sound files, but not for the second one, where the participants were creating visuals for DJs. A common complaint was that microphone input should be added to the audio reactivity, so that an audio feed from a

DJ or musician could affect the animations. Frequency analysis could also be added. Another frequent wish in terms of future development was the addition of further behaviors, and the possibility of customizing existing ones. The results reveal that absence of these functionalities limits the flexibility of AVVX at this point, and the potential for engagement. My own experience performing with AVVX also confirmed the need to include more behaviors and behavior customization in the software, in order to allow for an adequate degree of expressiveness. Still, the end audiovisual result was engaging (for three participants) or very engaging (for another three) for the majority of the participants. Similar results were obtained regarding the potential for creativity with AVVX: the majority considered that they were creating a personal (two participants) or very personal (four participants) end result. This seems to indicate that the aim of designing a flexible tool was partly achieved.

There is still much to be done in order to make AVVX more open-standards compliant, and to further leverage the Internet as a resource for content exchange. Although AVVX has been released as open source, it was developed with Flash, a proprietary technology. Effort should be done in the future to create a version of AVVX using open standards, such as JavaScript. This would ensure a higher cross-platform compatibility; guarantee that the project would be more 'future-proof'; and create a more easily accessible, and free, environment for students in future workshops. In any case, the project uses SVG, which is an open standard – and this approach was successful with the participants.

Setting up AVVX.org for content exchange was a first step towards online distribution of graphics for AVVX, but there is still a long way to go in that direction. Ideally, it should be easy for users to register and upload their content to AVVX.org. Also, it should be possible to load into AVVX any content from AVVX.org – AVVX should connect directly to AVVX.org for content management. This would allow a performer to have at her/his disposal, if connected to the Internet, all the library of visuals available at AVVX.org. AVVX could easily be adapted to load sounds from an existent online sound database, such as SoundCloud or Freesound.org. Because AVVX was designed using web technology, and because vector graphics are lightweight, there is a large potential for the creation of a connected community of live visuals performers, sharing graphical material (even in real time during performances). ∎

ACKNOWLEDGEMENTS

1. Personal info
1.1 Email: _____
1.2 Age: _____
1.3 Sex:
   - male
   - female
1.4 Occupation: _____
1.5 Education:
   - High School or equivalent
   - Bachelor degree or equivalent
   - Master degree or equivalent
   - Post-graduate (doctoral degree etc)
1.6 Have you previously done work as (multiple choice):
   - Interactive / media artist?
   - Designer?
   - Musician / DJ?
   - VJ (Video Jockey)?
1.6b If you have selected the last option in the previous question (VJ), please comment on the strengths and weaknesses of AVVX regarding other VJ software. _____

2. Development of visuals
2.1 Was the development of SVGs for AVVX easy?
   - Very hard – Very easy (1–5)
2.2 Did you have SVG compatible drawing software in your computer?
   - Yes
   - No
2.2b Regarding the previous question – if not, did you obtain SVG compatible drawing software easily?
   - Very hard to obtain – Very easy to obtain (1–5)
2.3 Was it easy to bring the SVGs into AVVX?
   - Very hard – Very easy (1–5)
2.4 Did you develop an adequate amount of visuals for your performance(s) within a reasonable time?
   - Very inadequate amount / Completely adequate amount (1–5)
2.5 Any additional comment on the process of developing visuals for AVVX? _____

3. Interactivity, animation and end result

3.1 Was the interactivity (changing visuals, behaviors, parameters) easy to use?

- Very hard – Very easy (1–5)

3.1b Any additional comments on interactivity? _____

3.2 Was the audio-reactivity (automatic manipulation of visuals in reaction to the music) adequate?

- Not at all adequate – Very adequate (1–5)

3.2b Any additional comments on audio reactivity? _____

3.3 Were the animation behaviors appealing?

- Not at all appealing – Very appealing (1–5)

3.3b Any additional comments on animation behaviors? _____

3.4 Was the audiovisual end result in the performance(s) engaging?

- Not at all engaging – Very engaging (1–5)

3.4b Any additional comments on audiovisual end result? _____

4. End remarks

4.1 Did you feel you were creating your own work?

- The end result was very impersonal – The end result was very personal (1–5)

4.2 Was the release of AVVX as open-source important for you?

(In other words, was it useful to be able to change and customize the code?)

- Not important at all – Very important (1–5)

4.3 Would you use AVVX again?

- Yes
- No

4.3b If not, why not? _____

4.4 Would you recommend AVVX to someone interested in VJing/audiovisuals?

- Yes
- No

4.4b If not, why not? _____

4.5 Other comments – strengths, weaknesses, suggestions for future developments _____

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