

# LEA

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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

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# Live Visuals

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**LANFRANCO ACETI, STEVE GIBSON & STEFAN MÜLLER ARISONA**

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**ÖZDEN ŞAHİN**

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# 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. <sup>1</sup>

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.” <sup>2</sup>

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. <sup>3</sup>

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 viscosity of hyper-mediated images that, as pollution, pervades and conditions our vision without giving the option of switching off increasingly 'alive' live visuals. 

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 procession 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 longer 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 Öndüğü 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/mooreg\\_1.html](http://www.uta.edu/huma/agger/fastcapitalism/9_1/mooreg_1.html) (accessed October 30, 2013).
4. Paul Virilio, *Open Sky*, trans. Julie Rose (London: Verso, 1997), 97.

## ABSTRACT

*I've been a VJ/visualist for years at many concerts around the world, and I was always disappointed in the concert format: a very one-way medium where the audience listens to the band and watches what the VJ chooses to show them on the screen, without any input of their own besides collective cheering in between songs. I strove to change this dynamic to create an environment where the audience has creative input in the experience, thus collaborating not only with the band and VJ, but with each other as well.*

*Thus I wrote Layer Synthesis Device: a collaborative VJ app. It can be used as a large-scale video installation or even as live video performance software at concerts and shows. It brings the audience together by allowing them to manipulate the large video projection with their smartphones. Anyone can log on to geolocated screens near them with their web browser and change video clips or GIF animations as well as mix the different layers of videos together. Any changes they make are updated in real-time on the publically projected screen as well as everyone else's phone's screen.*

## OUTSOURCING THE VJ

**“Outsourcing the VJing” to the audience brings each person's creativity and playfulness into the realm of public performance.** The audience pays more attention to both the music and visuals because they are interacting and creating them live, leveling the disparate playing field between audience and performer.

Use of Layer Synthesis Device (LSD) has a very low barrier for entry: there is no app to download; users visit a URL displayed in the corner of the public projection and start VJing right away. It works with most modern smartphone web browsers, including iPhones and Androids, as well as tablets and desktop computers. Screens are geolocated so users automatically manipulate the screen nearest to them.

The included video and image content varies widely in theme and style to provide a full range of possibilities to choose from, including ambient backgrounds, motion graphics, psychedelica/glitch, found footage, loops from old silent films, and other interesting and visually striking clips found in a VJ's repertoire. This allows each audience member to develop their own style and share it with the others in an attempt to encourage more people to VJ and explore their own creative expression through remixing and playful collaboration.

Layer Synthesis Device, Tyler Freeman, May 6,  
2012. Video projection and mobile Web site.  
© Tyler Freeman, 2012. Used with permission.

# OUTSOURCING THE VJ

*Collaborative Visuals Using the Audience's Smartphones*

by

**Tyler Freeman**

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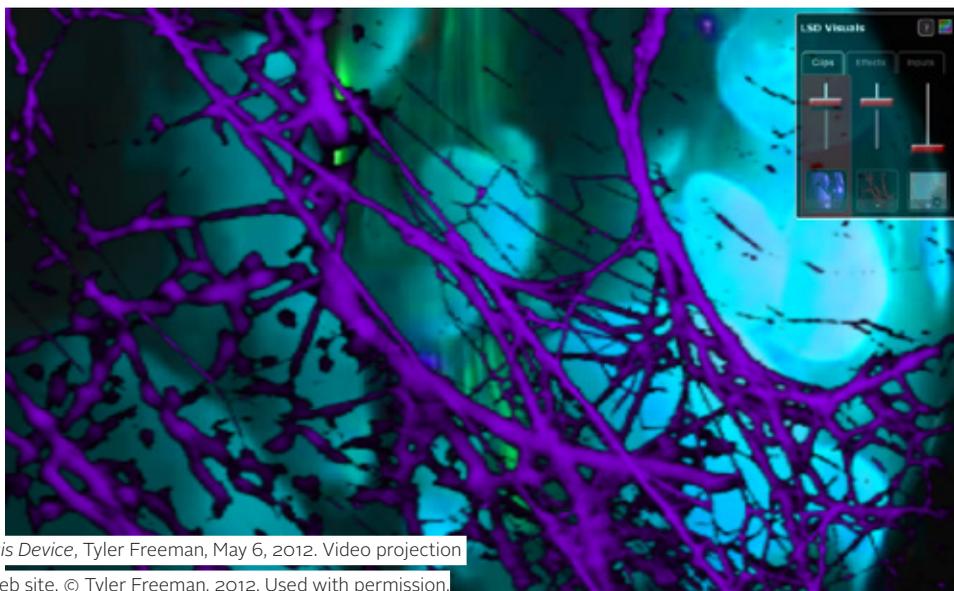
## AS AUDIENCE-CONTROLLED VISUALS AT CONCERTS

LSD can be used either as a real-time collaborative performance instrument at concerts, or as a video installation without music in a gallery or on the street. Its interface is similar to many popular VJ applications, such as Resolume or Modul8, allowing the user to control three or more layers of video clips and images, and blend those layers using opacity sliders and multiple blending modes (additive, subtractive, difference, etc.). It is also possible to use it in solo mode, without collaborators, by projecting one main browser screen with the interface elements hidden and using a second browser opened to the same page either on the same computer or a different device. From there the VJ can manipulate the visuals without revealing the interface on the projected screen.

Inviting collaborators to join is easy. Just press the 'share' button, which displays a URL in the corner of the screen. When people visit the URL on their smartphone, they will get a list of screens near their GPS location that they can control. They choose your screen and can instantly start VJing!

As opposed to other collaborative software, there is no order or hierarchy built in to LSD. Anyone can control any part of the visuals at any time, even when someone else is also trying to control the same part. Not even the original VJ has priority over the others.

This ensures a more democratic, albeit more chaotic, system. The visual chaos of many users trying to manipulate the same three layers adds dynamism and unpredictability to the performance, which can be especially evocative accompanying fast-paced music, since the scenes of video are constantly switching and fading in and out: a sum of the collective will of the audience/performers. The alternatives – a turn-based system where each participant gets full and exclusive control for a limited amount of time, or giving each person control of their own layer – did not work as well in initial testing: it just wasn't as fun for the participants (especially having to wait one's turn) nor did it produce as interesting results aesthetically. Letting the participants create their own rule structure – by finding each other in real life and working together – is more interesting than enforcing a particular set of rules in the software, especially when the hardcoded software rules may not work in a particular social situation.



*Layer Synthesis Device*, Tyler Freeman, May 6, 2012. Video projection and mobile Web site. © Tyler Freeman, 2012. Used with permission.



*Tentacles*, Geoffery Shea, Michael Longford, and Rob King  
July, 2011, Outdoor video projection and Mobile App.

© Tyler Freeman, 2012. Used with permission.

## AS SOCIAL URBAN SCREENS

Today's urban environments have become less about interaction between people and more about personal consumption of media and products. According to Mirjam Struppek, "cities have recently become more and more engaged in the struggle against a feeling of 'place-lessness' caused by the spread of international architecture and branded shopping that pays no attention to local characteristics."<sup>1</sup> Allowing the city's inhabitants control over their surroundings will help them re-appropriate their own neighborhoods with their own aesthetics instead of the corporate gloss and advertisement assaults on the public space.

It is possible to allow participants to upload their own images and videos to display on an urban screen, such as a wall on a building or a screen in a gallery window, which gives them the ability to share their cultural and aesthetic values with the local community. "The contribution that these screens would then make to a lively urban society would integrate them more into the communal context of the space and therefore help to create local identity."<sup>1</sup> With LSD, users will not only be able to upload their own content, but also remix and elaborate on other content from the com-

munity, creating an ever-evolving social dialogue in the neighborhood, which "could help to prevent further disconnection in the perception of urban space."<sup>1</sup> However, this also places the burden of moderation on the community: the screens will need a moderator to remove inappropriate images, or a democratic system of moderation where the community itself can approve or remove offending images.

But collaborative urban screens would do more than transform the architectural and cultural space; it would transform the inhabitants as well by encouraging them to interact with each other in a public place using a normally very private device. "In a study of subway system use, researchers found that iPods and other types of devices are commonly used to create a social shield, resulting in an air of civil inattention."<sup>2</sup> Hopefully, by sharing control over a virtual public space, neighbors and denizens could coalesce in a real-life public space as well, using the very devices that isolate them.

## HISTORY OF MOBILE-BASED COLLABORATION

One of the first popular pieces to use mobile phones in a concert setting was Golan Levin's *Telesymphony* (2001), "a performance where sounds were generated by the choreographed ringing of the audience's mobile phones."<sup>3</sup> The audience would download ringtones to their phone which the performers on stage would trigger by calling them – not so much a collaboration between audience and performer, but more a relocation of the speakers.

Collaborative art on phones was not as prevalent until years later, when the smartphone became ubiquitous. A leading example is The Stanford Mobile Orchestra: a group of researchers and performers who provide smartphone apps to the audience and use their input to create collaborative concerts. One of their pieces, *Heart*, by Jieun Oh, was one of the only other online web apps designed for a visual performance, collecting heartbeat information from the audience and aggregating it on a large projection screen.<sup>4</sup>

Next came *Tentacles*, by Geoffrey Shea et. al., a large outdoor projection where passers-by could use an iPhone app to control their own sea-creature avatars and interact with others' avatars in real-time.<sup>5</sup> An interesting aspect is that the user's phone screen would only show a small area around their avatar, but the large projection showed the entire ocean of participants, invoking a degree of entropy and unpredictability in the global, public space, even though each individual had complete control over their local area – perhaps a metaphor for the personal 'life raft' a person's smartphone provides against the crashing waves of the public.<sup>2</sup>

Another smartphone-based piece is *OctoCloud*.<sup>6</sup> A circular tabletop projection surface with angular shapes protruding from it lets participants use their phones to play a colorful game that shifts and warps the tabletop projection. It was an Android-only piece

localized to the installation space – users had to connect to a specific Wifi network in order to participate, raising the barrier of participation for the nontechnical or casual passers-by. To allay this, there were several phones tethered to the piece which anyone could pick up and use, however at this point, the 'loaner' phone was simply a touchscreen as part of the installation, lacking the personal familiarity of one's own phone.

Using one's own phone for collaborative art pieces is an important part of LSD; it gives the participant a sense of personal ownership of the result, instead of the detached feeling of just pressing buttons on a screen. It is location-aware, so when many screens are available in various places, the user has a consistent knowledge that they have control over the environment around them. Instead of looking inward, immersed in the comforting personal world of their phone, they look outwards at their surroundings and exert their will externally, adding their personal contribution to a public space and interacting with the other inhabitants.

Mobile "is seen as a distinctly intimate and private technology."<sup>7</sup> In fact, in some cultures the word for mobile phone literally means "extension of the hand," so appropriating it as a performance instrument is a natural progression.<sup>8</sup>

A related example of the audience taking ownership of a piece is Theo Watson's *Faces*: a video projection of people's faces on the side of a building in downtown San Francisco, the portraits of which were from a camera on the sidewalk. Over a period of six months, *Faces* "captured and displayed 30,000 portraits with an average of 160 portraits a day."<sup>9</sup> The most surprising result was when the artist went through the photos afterwards and found that a single person's face was displayed a good portion of the day, every day for those six months.<sup>10</sup>

This grizzly, grizzled man was apparently a local to that neighborhood and would visit the installation sometimes hundreds of times a day to take a new portrait: the so-called 'King of Faces,' with his likeness constantly gazing over his urban alley kingdom, never usurped for more than a moment by a wandering tourist's exploratory portrait. He took ownership of the piece and constantly asserted it the entire time it was active, co-opting it with his own personal narrative and emotion/performance.

LSD works in a similar way, allowing a particularly zealous participant to hunt down any public screens and leave his signature image behind: a blending of the pre-supplied videos according to his own aesthetic desires, propagated around the city until another participant comes along to remix that image, each one building off the last, evolving into a budding tree of divergences and associations that visualize the emotional-temporal map of the denizens of an augmented urban environment.

Additionally, when choosing to control a public LSD screen, you are choosing to open your own phone to the control of others. Since every user's video manipulations are applied to the public screen as well as all other connected users' phones simultaneously, you are in fact volunteering your personal device to the whim of the public, relinquishing your total control of your personal/intimate device, the extension of your hand, to the manipulations of a collective, in order to have a voice in that collective. The participants not only take ownership of the public space, but of each other's personal space as well, breaking through the 'social shield' usually created when using a phone in public.<sup>11</sup>

*Layer Synthesis Device*, Tyler Freeman, May 6, 2012. Video projection and mobile Web site. © Tyler Freeman, 2012. Used with permission.



## TECHNICAL IMPLEMENTATION

LSD takes advantage of the latest HTML5 technologies to offer a standardized experience between mobile and desktop platforms. By using pure HTML5, you can run it in a web browser without downloading any apps or plugins, so participating is as simple as going to a website.

The three visual layers are mixed and blended into a single projection using the HTML5 Canvas for 2D drawing. Each layer supports one static image, video, or even animated GIF image. (In fact, since the mobile browsers at the time of this writing can only play one video at a time, animated GIFs are used as a fallback for video files.) Users can manipulate vertical sliders to change the opacity of the different layers.

The collaborative element is achieved over a WebSockets direct connection to a high-performance database, which can accept data from multiple different users simultaneously and then send that information back out to all other connected users in real-time. In general, the lag from manipulating an interface element, such as a slider, to the server and out to the other users is less than 300 milliseconds, which helps immerse the user in an immediately responsive performance instrument.

The beauty of using WebSockets is that anyone can communicate with anyone through any internet connection: users don't have to be in the same place using the same network to collaborate. The real-time database plus WebSockets technology was originally intended for productivity and enterprise applications (multiple users editing the same document, for instance), but it was easily appropriated for a more artistic and playful application. By using geolocation APIs and the phone's GPS, the user can go to the website and always find the nearest LSD screen to manipulate. This allows for multiple screens around a city to be available to participants in that area.

LSD at its core is a generic video mixing program, so it can be used for applications other than live collaboration: for example, a remixable music video editor. I added a music player to it, using the real-time multimedia library Popcorn.js,<sup>12</sup> which can trigger video clips and transitions at certain points in the song. This allows viewers of the music video to change it while watching it – swapping out clips, crossfading to new scenes, etc. – and record their live manipulations into a timeline, similar to video editing programs such as Final Cut Pro or iMovie. Then the users can share their own video remix of the song with their friends, who will consequently make their own versions, creating a shifting, evolving landscape of audiovisual collaboration. I made such a music video for the San Francisco rock band Battlehooch,<sup>13</sup> but the technique can be applied to any music in order to crowdsource the creative process to the fans.

All of the code is open source, so the project is available to anyone to improve and implement new technologies as they appear. Future additions to the LSD system include:

- » A WebGL renderer with a plugin system for adding visual effects and 3D shaders, possibly using the Javascript framework Seriously.js.<sup>14</sup> This will increase performance on some browsers by moving the video manipulations to the graphics hardware.
- » An audio input system, so you could send live audio data as parameters to the effects, allowing for audio-reactive visuals. This could be used to detect the beat of the music playing at a concert, or perhaps even remotely letting participants upload their own sounds recorded from their phones to alter the visuals.<sup>15</sup>
- » A real-time multitouch system, where users send multitouch data from their phone to the main screen in order to control effects remotely with gestures. The touch points from each user could

screen: [odbol.com/lsd](http://odbol.com/lsd)



*Layer Synthesis Device*, Tyler Freeman, May 6, 2012. Video projection and mobile Web site. © Tyler Freeman, 2012. Used with permission.

control a different effect (e.g. particle systems following your fingers, bending or rotating the video layer by pinching and zooming with your fingers, even 'live graffiti' drawing.)

- » If this systems were standardized using the TUIO protocol for multitouch devices,<sup>16</sup> it would be easy for other devices and instruments to send data to LSD, such as an Xbox Kinect sensor or any Open Sound Control based instrument. MIDI support could also be added to control LSD with keyboards, drum machines and other electronic instruments. The W3C just released a Web MIDI API, which is "explicitly designed to enable a new class of applications on the web that can respond to MIDI controller inputs – using external hardware controllers with physical buttons, knobs and sliders (as well as musical controllers like keyboard, guitar or wind instrument controllers) to control web applications."<sup>17</sup>

## CONCLUSION

These sudden advances in mobile web technology are deepening the level of real-time interaction between the locomotive urbanite and the localized video installation, forging a creative connection between transient participants and their increasingly digital surroundings, allowing them to reappropriate the public space with their own visual culture and aesthetics. Not only can LSD be used as a performance tool for skilled artists, but as an educational introduction to the world of VJing for the common concert goer, street wanderer, or gallery gallivanter – slowly acclimating them to the process of VJing through social play.

Of course, the common participant may not have the artistic vision or skill of a seasoned visualist; however if the visualist can curate the video clips available to relay their message, the audience in control becomes more of an entropy function: pseudorandom noise data with which the visualist can sculpt a compelling performance and overall narrative, one in which everyone watching becomes an integral voice in a swelling choir of chaotic collaboration. ■

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