

LEA

LEONARDO ELECTRONIC ALMANAC

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

LEA is a publication of Leonardo/ISAST.

Copyright 2013 ISAST

Leonardo Electronic Almanac

Volume 19 Issue 3

July 15, 2013

ISSN 1071-4391

ISBN 978-1-906897-22-2

The ISBN is provided by Goldsmiths, University of London.

LEA PUBLISHING & SUBSCRIPTION INFORMATION

Editor in Chief

Lanfranco Aceti lanfranco.aceti@leoalmanac.org

Co-Editor

Özden Şahin ozden.sahin@leoalmanac.org

Managing Editor

John Francescutti john.francescutti@leoalmanac.org

Art Director

Deniz Cem Önduygu deniz.onduygu@leoalmanac.org

Editorial Board

Peter J. Bentley, Ezequiel Di Paolo, Ernest Edmonds, Felice Frankel, Gabriella Giannachi, Gary Hall, Craig Harris, Sibel Irzik, Marina Jirotko, Beau Lotto, Roger Malina, Terrence Masson, Jon McCormack, Mark Nash, Sally Jane Norman, Christiane Paul, Simon Penny, Jane Prophet, Jeffrey Shaw, William Uricchio

Cover Image

The Encounter, Elif Ayiter, 2010, Screenshot of Cinematic Play Session in Second Life. © Elif Ayiter. Used with Permission.

Editorial Address

Leonardo Electronic Almanac

Sabancı University, Orhanlı – Tuzla, 34956

Istanbul, Turkey

Email

info@leoalmanac.org

Web

- » www.leoalmanac.org
- » www.twitter.com/LEA_twitts
- » www.flickr.com/photos/lea_gallery
- » www.facebook.com/pages/Leonardo-Electronic-Almanac/209156896252

Copyright © 2013

Leonardo, the International Society for the Arts,
Sciences and Technology

Leonardo Electronic Almanac is published by:

Leonardo/ISAST
211 Sutter Street, suite 501
San Francisco, CA 94108
USA

Leonardo Electronic Almanac (LEA) is a project of Leonardo/ The International Society for the Arts, Sciences and Technology. For more information about Leonardo/ISAST's publications and programs, see <http://www.leonardo.info> or contact isast@leonardo.info.

Leonardo Electronic Almanac is produced by
Passero Productions.

Reposting of this journal is prohibited without permission of Leonardo/ISAST, except for the posting of news and events listings which have been independently received.

The individual articles included in the issue are © 2013 ISAST.

LEONARDO ELECTRONIC ALMANAC, VOLUME 19 ISSUE 3

Live Visuals

VOLUME EDITORS

LANFRANCO ACETI, STEVE GIBSON & STEFAN MÜLLER ARISONA

EDITOR

ÖZDEN ŞAHİN

The Leonardo Electronic Almanac acknowledges the kind support for this issue of

Sabancı
Universitesi



Goldsmiths
UNIVERSITY OF LONDON



NYUSteinhardt
Steinhardt School of Culture, Education, and Human Development

NYUSteinhardt

Steinhardt School of Culture, Education, and Human Development



MUSIC AND PERFORMING ARTS PROFESSIONS

Ron Sadoff, Director

Music Technology

B.M., M.M., Ph.D.

Including a new 3-Summer M.M.

Immersive Audio, Computer Music, Informatics, Cognition, Recording and Production

Music Composition

B.M., M.M., Ph.D.

Concert Music, Jazz, Film Scoring, Electro-Acoustic, Songwriting

- **Study with a premier faculty** who are active in the local and international music field, including Juan Pablo Bello, Morwaread Farbood, Phil E. Galdston, Paul Geluso, Tae Hong Park, Kenneth Peacock, Agnieszka Roginska, Robert Rowe, S. Alex Ruthmann, Ronald Sadoff, David Schroeder, Mark Suozzo, and Julia Wolfe
- Work within a **large and enriching university environment** in the heart of New York City
- Have access to **state-of-the-art facilities** including the James L. Dolan Music Recording Studio, one of the most technologically advanced audio teaching facilities in the United States
- **Collaborate** with an outstanding variety of department performance groups, along with choreographers, visual artists, writers, filmmakers, and scholars in other fields
- Take advantage of **special courses** offered abroad and during the summer

Visit www.steinhardt.nyu.edu/music or call **212 998 5424** to learn more.



NEW YORK UNIVERSITY

NEW YORK UNIVERSITY IS AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY INSTITUTION.

Leonardo Electronic Almanac
Volume 19 Issue 3

8 EDITORIAL Lanfranco Aceti

12 REVISITING CINEMA: EXPLORING THE EXHIBITIVE MERITS OF CINEMA FROM NICKELODEON THEATRE TO IMMERSIVE ARENAS OF TOMORROW Brian Herczog

22 THE FUTURE OF CINEMA: FINDING NEW MEANING THROUGH LIVE INTERACTION Dominic Smith

30 A FLEXIBLE APPROACH FOR SYNCHRONIZING VIDEO WITH LIVE MUSIC Don Ritter



46 AVATAR ACTORS Elif Ayiter

64 MULTI-PROJECTION FILMS, ALMOST-CINEMAS AND VJ REMIXES: SPATIAL ARRANGEMENTS OF MOVING IMAGE PRESENCE Gabriel Menotti

78 MACHINES OF THE AUDIOVISUAL: THE DEVELOPMENT OF "SYNTHETIC AUDIOVISUAL INTERFACES" IN THE AVANT-GARDE ART SINCE THE 1970S Jihoon Kim

88 NEW PHOTOGRAPHY: A PERVERSE CONFUSION BETWEEN THE LIVE AND THE REAL Kirk Woolford



108 TEXT-MODE AND THE LIVE PETSCII ANIMATIONS OF RAQUEL MEYERS: FINDING NEW MEANING THROUGH LIVE INTERACTION Leonard J. Paul

124 OUTSOURCING THE VJ: COLLABORATIVE VISUALS USING THE AUDIENCE'S SMARTPHONES Tyler Freeman



134 AVVX: A VECTOR GRAPHICS TOOL FOR AUDIOVISUAL PERFORMANCES Nuno N. Correia

148 ARCHITECTURAL PROJECTIONS: CHANGING THE PERCEPTION OF ARCHITECTURE WITH LIGHT Lukas Treyer, Stefan Müller Arisona & Gerhard Schmitt



164 IN DARWIN'S GARDEN: TEMPORALITY AND SENSE OF PLACE Vince Dziekan, Chris Meigh-Andrews, Rowan Blaik & Alan Summers

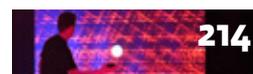


176 BACK TO THE CROSS-MODAL OBJECT: A LOOK BACK AT EARLY AUDIOVISUAL PERFORMANCE THROUGH THE LENS OF OBJECTHOOD Atau Tanaka



190 STRUCTURED SPONTANEITY: RESPONSIVE ART MEETS CLASSICAL MUSIC IN A COLLABORATIVE PERFORMANCE OF ANTONIO VIVALDI'S FOUR SEASONS Yana (Ioanna) Sakellion & Yan Da

202 INTERACTIVE ANIMATION TECHNIQUES IN THE GENERATION AND DOCUMENTATION OF SYSTEMS ART Paul Goodfellow



214 SIMULATING SYNESTHESIA IN SPATIALLY-BASED REAL-TIME AUDIO-VISUAL PERFORMANCE Steve Gibson

230 A 'REAL TIME IMAGE CONDUCTOR' OR A KIND OF CINEMA?: TOWARDS LIVE VISUAL EFFECTS Peter Richardson

240 LIVE AUDIO-VISUAL ART + FIRST NATIONS CULTURE Jackson 2bears



256 OF MINIMAL MATERIALITIES AND MAXIMAL AMPLITUDES: A PROVISIONAL MANUAL OF STROBOSCOPIC NOISE PERFORMANCE Jamie Allen

272 VISUALIZATION TECHNOLOGIES FOR MUSIC, DANCE, AND STAGING IN OPERAS Guerino Mazzola, David Walsh, Lauren Butler, Aleksey Polukeyev

284 HOW AN AUDIO-VISUAL INSTRUMENT CAN FOSTER THE SONIC EXPERIENCE Adriana Sa



306 GATHERING AUDIENCE FEEDBACK ON AN AUDIOVISUAL PERFORMANCE Léon McCarthy

322 CHOREOTOPOLOGY: COMPLEX SPACE IN CHOREOGRAPHY WITH REAL-TIME VIDEO Kate Sicchio



336 CINEMATICS AND NARRATIVES: MOVIE AUTHORING & DESIGN FOCUSED INTERACTION Mark Chavez & Yun-Ke Chang

352 IMPROVISING SYNESTHESIA: COMPROVISATION OF GENERATIVE GRAPHICS AND MUSIC Joshua B. Mailman

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 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 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 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 (accessed October 30, 2013).
4. Paul Virilio, *Open Sky*, trans. Julie Rose (London: Verso, 1997), 97.

CINEMATICS AND NARRATIVES

Movie Authoring & Design Focused Interaction

by

Mark Chavez & Yun-Ke Chang

MARK CHAVEZ
Assistant Professor
Nanyang Technological University
College of Humanities, Arts, & Social Sciences
School of Art, Design & Media,
ART 04-18
+65 6316-8827
MCHAVEZ@ntu.edu.sg

YUN-KE CHANG
Assistant Professor
Nanyang Technological University
College of Humanities, Arts, & Social Sciences
Wee Kim Wee School of Communication and Information
Division of Information Studies
SCI 04-06
+65 6790-6866
YKCHANG@ntu.edu.sg

INTRODUCTION

“Cinematics and Narratives: creating stories within real-time visual toolsets” was a research project funded by Singapore’s National Research Foundation. This research attempted to understand the emotional impact of artistic imagery in an animated movie. We wished to understand and manipulate the design elements for an improved affective result. In the process of this investigation we created an authoring system that has adaptive qualities, e.g. changeable color and texture, volume variations, and camera motion changes. To further enable our creative and artistic authorship we created a system that dynamically manipulates the visuals of an animated narrative. In the process we have attempted to combine the languages of cinema and visual design with simulation.

Our movie system is able to revise the visual and auditory impact of a narrative in real-time to make a better movie experience. We have designed emotional peaks into our movie narrative by assigning varied design values to events in the movie. These dynamic design values change in a direct attempt to evoke audience reaction. Our assertion is that by cueing design changes at specific times and under specific condi-

ABSTRACT

Our research looks at the processes we undertook to create an animated movie using a simulated virtual environment. It will describe the methods used to detect audience sentiment and how we used this information to change the movie and get an improved reaction from an average audience. Using the audience’s affective state we changed the playback performance of the movie, in particular the visual design to optimize the affective quality of the movie, making it more impactful to the audience. The goal of this research was to investigate within the context of an animated movie the impact of design, in a real-time context. If manipulated beyond a standard animation style sheet, will the resultant movie have a stronger impact? This movie concept was explored through numerous stages. We started our investigation by conducting a survey with a web-based evaluation of abstract design, then moved onto a simple character based installation and later created a twenty minute short animated movie called [Vengeance+Vengeance]. Our assertion is that by dynamically changing the visual and sound characteristics of the design of an animated movie within a fixed linear narrative we can optimize its impact. Our assertion has been validated by the fact that the movie is the official selection of 12 international film festivals and competitions and has received six awards.

tions during playback, we are able to get appropriate and desired responses from the viewer. In combining a technical interface with an aesthetic interface, the system adjusts the visual and auditory design elements to elicit impact at specific moments in real-time. Working in this environment, we are able to manipulate the design of our movie based on feedback detected from an audience.

Our Approach

Our study started with a look at abstract imagery and its affective values. We wanted to know if particular styles of imagery would provoke the viewer to react as intended. Researchers were assigned the task of creating images that had specific emotional values.

Once sorted according to assigned values, we put the images into a web-based evaluation system and had the imagery rated by 40 external people. The results of this survey informed our next phase of research. The question we ultimately sought to answer was, “can design alone change the perception of a linear cinematic narrative?”

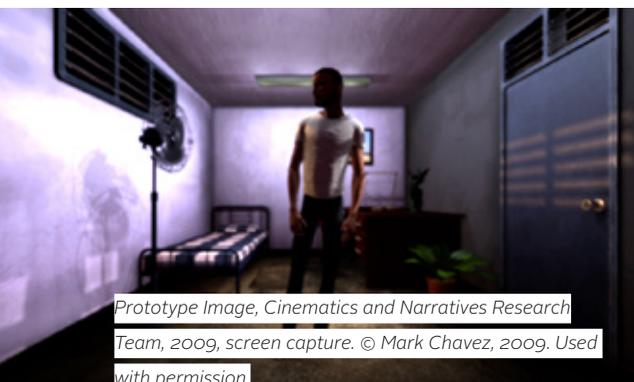
In this next phase of research we created a narrative template upon which our visuals were able to change dynamically. We adjusted the movie’s aesthetic according to a predetermined template. Our template approach uses the narrative style as an archetypal artifice. The structure of the movie narrative is a linear storyline set within an action/sci-fi/vengeance theme.



Prototype Setup, Cinematics and Narratives Research Team, 2009, design sketch. © Mark Chavez, 2009. Used with permission.

We chose this genre of filmmaking for its characteristic big action sequences evoking intense emotional response and low quiet scenes evoking more settled, quiet impressions. Designed to facilitate the construction and understanding of our cinematic experience, our goal was to define a reliable system of measuring expression in that would ultimately result in a movie that has more impact. The change to design was more in-play with the stylistic depiction of the characters though was also evident in the overall ambience of the environment, in the settings assigned to color, tone and contrast as well as camera movement.

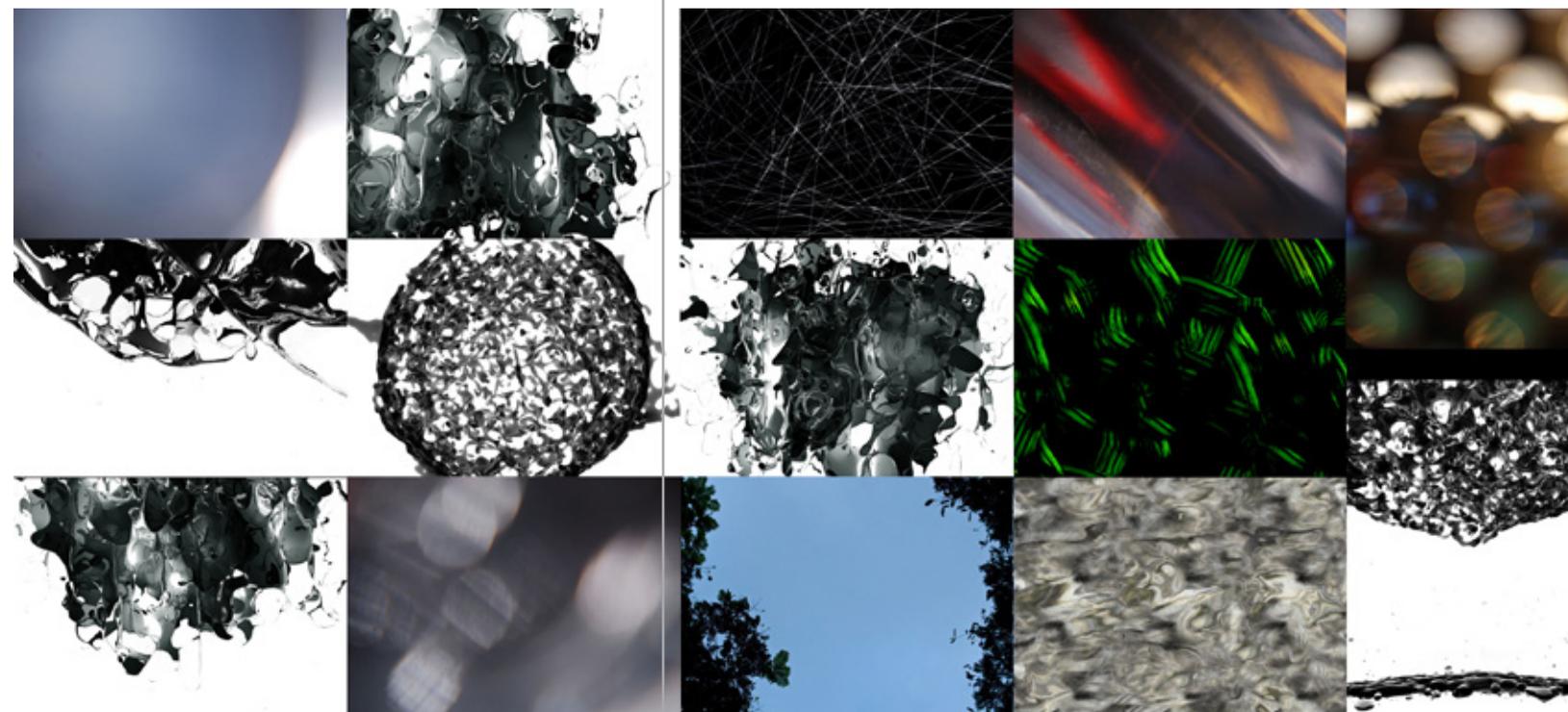
Although our system investigated the use of tracking interfaces such as motion tracking, facial tracking systems, and a Brain Computer Interface (BCI) developed within our research group and outside, we also utilized surveys with extensive questionnaires. Initially we constructed a prototype system that used proximity and numbers of viewers as a control mechanism.



Prototype Image, Cinematics and Narratives Research Team, 2009, screen capture. © Mark Chavez, 2009. Used with permission.

In this prototype the viewer was faced with a single character situated in what looked like a hotel room. The character's visual mood would change according to the number of people in the room watching him.

With more people watching the room would become darker and the character would move in a more erratic manner. Additionally the sound effects would become more severe and sharp. The uneasy feeling that we wanted the character to evoke would make the viewer



uncomfortable. They ultimately would leave the room. Simultaneously we were conducting studies using abstract images in an online survey. This study was to gain a basic understanding of visual design principals, what kind of imagery evokes fear or happiness or sadness. Finally after some production time we tested our observations in an 18 minutes & 30 seconds long movie. In what we term as an Active Cinema movie system, we have developed a methodology where the visual design style of the movie is changeable in a director driven interface.

Sadness, Cinematics and Narratives Research Team, 2009, photographs and digital paintings. © Mark Chavez, 2009. Used with permission.

AN OVERVIEW

Richard Oliver & Russel Winer¹ define expectation as a consumer's subjective evaluation of the value of an attribute at a particular point in time. In this study, we examine on three specific attributes of the system, namely emotion detection, level of control and its feedback system. Targeted at these three items, we discover the means to possibly design the system such that it possesses valuable attributes that are sought after for. Besides these three items, we also find out what are the ideal movie genres and duration for Active Cinema.

Emotion Detection. Looking from the perspective of emotion recognition, diverse emotions are difficult to distinguish. Maja Pantic² suggested that we cannot currently expect to measure cognitive influences as these depend on self-reports which are likely to be highly variable. However, we can measure nonverbal

signals which often arise during expression of emotion. Based on past studies that worked on the area of interest in affective computing, we gather various forms of nonverbal signals that can be utilized as emotion inputs for Active Cinema. These signals include voice intonation, facial expression, head movements, eye movements, body gestures and physiological reactions such as skin clamminess, muscle control, heart rate and brain wave. ³⁴²⁵⁶ Jeffrey Cohn ⁷ suggested that, in order to enable computers to understand human emotion, it is imperative for computers to account for a range of human-human interactions that include expressive behavior, speech, and context. Therefore, human affect analyzers should include all human interactive modalities such as sight, sound, and touch. ² Devices such as camera, microphone and wearable computers were required to capture audience's physiological responses. Wearable computers would include devices such as skin detector, pulse monitor, brain wave sensor and breathing detector. Through our study, we investigate which are the expected physiological inputs and required devices for collecting these audience's emotional inputs for an ideal system.

Emotions, Images Retrieval

Scientific studies in the information retrieval realm [8-10] have observed that images convey meanings that provoke viewers' emotion. To give the evidence

of cognitive processes the relationship between image and emotional meaning can be analyzed in a study of the impact of visuals on emotion. ¹⁰ For these studies, the perception of emotional meaning is largely based on concrete recognizable objects in pictures conveying explicit meaning, such as detailed images of people (e.g. feet, hands, face, etc.) and indicatively emotional gestures like hug, kiss, etc. A limited amount of research exists in information science and cognitive psychology on the study of the relationship between what the artists intend to provoke in their work and what the viewers' interpret. Existing emotional image retrieval studies are mostly based on tests of viewer's tagging-evaluating behavior and quantitative methodologies. Few studies have been devoted to testing the dynamic relationship between viewers' perception and components of image. As a foundation research for our project, we attempted to understand how emotional meaning imbedded into imagery influences the viewers' perception. Our research involved researchers from different areas, e.g. artists' creative work, information retrieval science and media-effect studies.

In an attempt to address the needs of our research in relation to current theories concerning how viewers perceive the emotional meaning of imagery with meaning embedded through the creative intuition of artists, we conducted a small survey.



A Gesture-based Interface and Active Cinema, Mark Chavez, 2011, digital video.
© Mark Chavez, 2011. Used with permission.



Emotion Study trailer, Ina Conradi and Mark Chavez, 2010, digital video. © Mark Chavez, 2010. Used with permission.

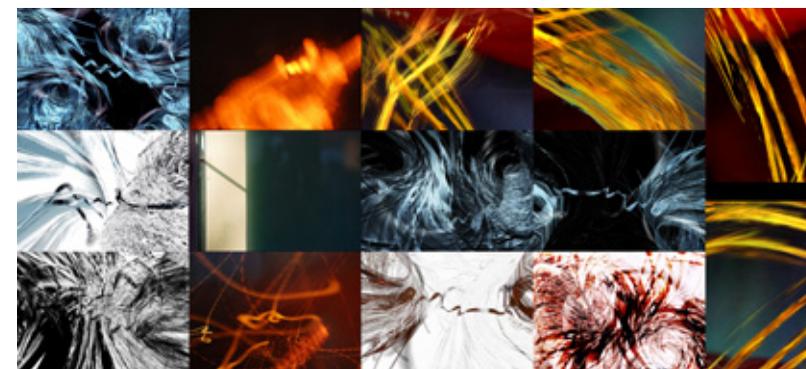
Emotion (Image) Study

When we look at colors on the painter's palette, a double effect happens: a purely physical effect on the eye, charmed by the beauty of colors firstly, which provokes a joyful impression as when we eat a delicacy. But this effect can be much deeper and causes an emotion and a vibration of the soul, or an inner resonance, which is a purely spiritual effect, by which the color touches the soul itself. ¹¹

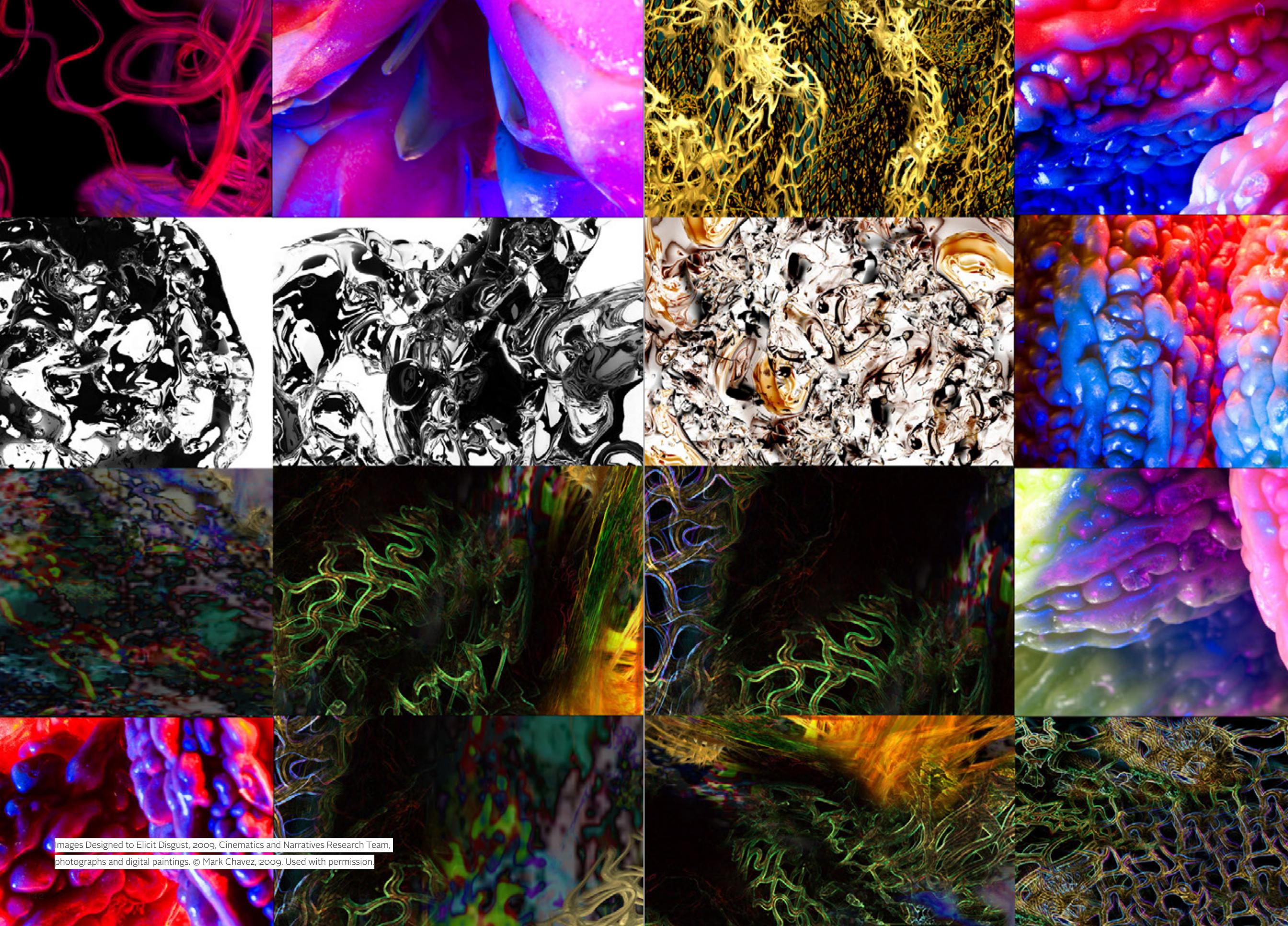
Everyone knows what the word emotion infers. Emotion is a mental state associated with thought and behavior. Emotional states are provoked by extrinsic conditions, such as events happening around us, and intrinsic physical needs. Arguments in emotion studies also have shown that human emotion can be the result of cognitive processes or can occur outside of the cognitive system. Scholars have studied human emotion through subjective description of emotional experiences. These studies dissociate emotional expression from emotional experience. ¹² Other studies have examined physical data such as facial expression, body reaction and so on and are assumed to be a relevantly objective measurement that tangibly reflects the subjective estimation of the evaluated emotional

state. ¹³ Scherer pointed out in his article that "defining emotion is a 'notorious' problem." Although he tried to highlight the importance of this definitional issue in his research, so far not a single scholar or a study claims that they could give out a consensual definition of emotion. The more important issue we confront in our study is to ascertain a reasonable classification of emotion in lieu of the definition.

Emotions can be roughly divided into three types, positive, negative and neutral, although neutral emotion is automatically wiped from the classification. According to Gerrod Parrot ¹⁴ emotions are categorized into a short tree structure constructed by primary (basic), secondary and tertiary groups. The first-tier emotions, the primary feelings of human beings, comprise love, joy, surprise, anger, sadness and fear. Paul Ekman, a pioneer in the study of emotion and their relation to facial expressions, classified emotions into anger, disgust, fear, happiness, sadness, surprise. ¹⁵ Klaus Scherer argues that the classification of emotions only shows the "prototypically patterned types of significant events in the life of organisms." ¹⁶ There are more variations in categorization methods depending

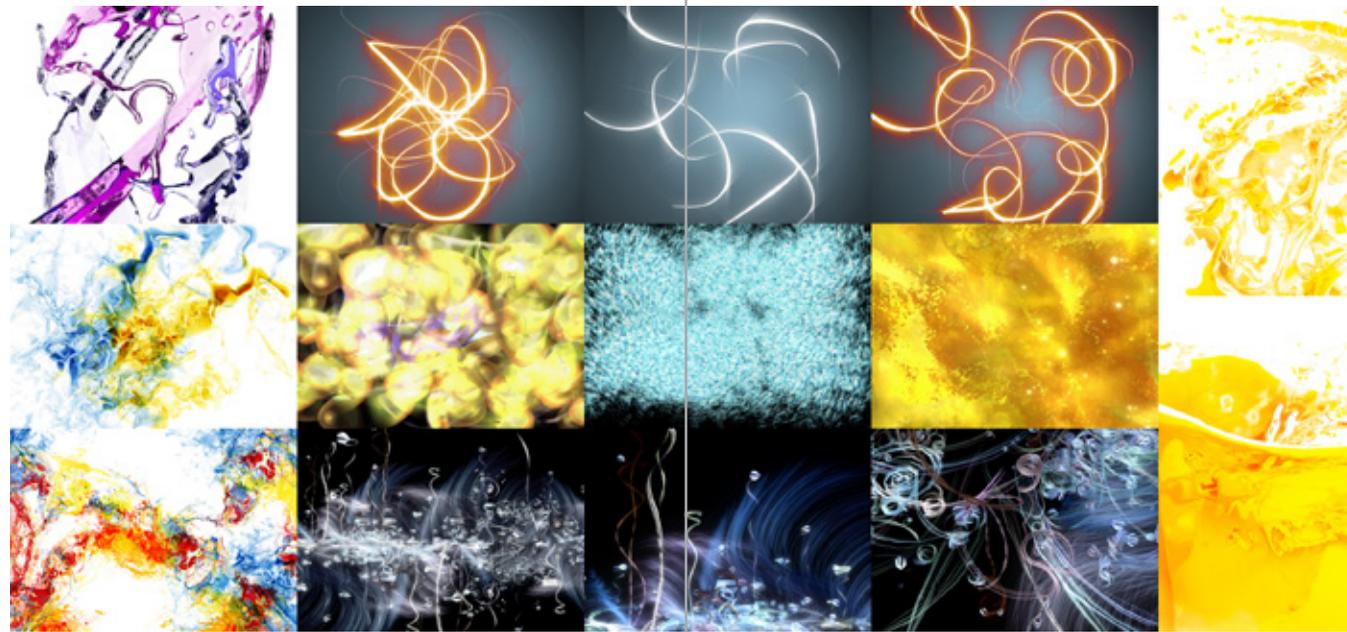


Images Designed to Elicit Anger, 2009, Cinematics and Narratives Research Team, photographs and digital paintings. © Mark Chavez, 2009. Used with permission.



Images Designed to Elicit Disgust, 2009, Cinematics and Narratives Research Team, photographs and digital paintings. © Mark Chavez, 2009. Used with permission.

Images Designed to Elicit Surprise, 2009, Cinematics and Narratives Research Team, photographs and digital paintings. © Mark Chavez, 2009. Used with permission.



on the theory adopted.^{9 17 18 19 20} We adopt the method of emotion classification from Ekman developed in 1978, that is the emotions that incorporate categories of *anger, disgust, fear, happiness, sadness, and surprise*.

Our basal study, conducted through an online survey, consisted of a list of art works that imply subjective meaning. To depict emotions, we adopted the term abstract as equivalent to the expression of “nonfigurative art” or the broader term “non-representational” art. Our artist researchers were instructed to eliminate figurative representation and to create an image of emotion that itself is charged with the affective energy of the particular feeling they were attempting to depict. We assumed that figurative representation might add superfluous challenges that could limit the artist’s capacity to express.²¹ We assigned our artist researchers the task of interpreting subjective emotional vision by creating images that in their mind evoked the feeling of anger, disgust, fear, happiness, sadness, and surprise with an added category of ambivalence/neutral. They collected and created abstractions derived from photographs, abstract computer generated artwork, abstract animated and live action movie clips. We organized these in the context of venue, visuals and the experience that were intended to they depict.

We found that the viewer sometimes responded to images intended to provoke fright when exposed to images intended to provoke disgust; likewise, the viewer may feel happy when the image is intended to surprise. Additionally gender differences can also be seen to affect our results. While male viewers are more sensitive to images intended to provoke Happiness and Surprise, female viewers are more sensitive to images that provoke Disgust and Fear. Our emotion study endeavored to gauge the viewers’ reaction to our designs, to establish a correlation between our in-

tended design and the viewers’ ability to interpret our images. We used our findings to inform our movie’s design and reflect on the conditional probability of expectation.

SYSTEM WITHIN A SYSTEM

In line with our goal of creating a movie system we began development of art assets for use in virtual reality simulation within the confines of a game engine. We needed to have five core requirements for the graphics engine to support our work. It needed to have high quality graphic capability, a level editor, and DLL bind in which to integrate our audience detection sensors, the ability to morph geometry as animation and for the engine to be a standalone application. Upon the completion of an exhaustive implementation survey, which included the development of our own engine, we settled on the Unreal Development Kit (UDK) beta release September 2010.

The Movie System: The Making of [Vengeance+Vengeance]

In our thematic research, we sourced live action movies from of Southeast Asia, Hong Kong cinema and Korean thrillers and other movies in the action/sci-fi/ revenge genre. In discussion sessions that followed screenings, we analyzed the narrative form that these

movies followed and used their structure as an archetypal form. Character primitives that appear in the movie have strong correlation to archetypes that are evident in movies made regionally and made the larger movie industry.

We designed a technical interface and an aesthetic interface. Our technical interface initially utilized facial and body pose tracking interface and a graphics display system that to adjust the playback of a real-time movie. Characters are made to playback in pre-

Creature in Three Styles, J. C. Wong, 2010, digital sketch. © Mark Chavez, 2009. Used with permission.



animated clips. Our aesthetic interface is constructed as per our earlier studies conducted on the interpretation of abstract imagery. The final work is comprised of three major parts: Storytelling, the narrative of the movie, Emotion Detection, our interface & data mining research and a Feedback System, the interactive mechanism that allows us to dial in stylistic settings.

Our detection mechanism senses the audience’s emotional state, whether they have the same feeling as the design prescribes. The feedback mechanism refines the visual style of camera, hand held or still, scene and environmental contrast, tone and colors, and the stylistic volumes of the characters. If the detected state is not in sync with the cinematic tone, the movie experience changes to influence the viewer to have the filmmakers’ desired response.

Expectation

The goal of creating our movie system was to enable change to the design of the content to gain the best possible reaction from a small sample audience. By manipulating the visual nature of the movie, we hoped



Researcher Aung Sithu Kyaw triggering actions with his facial expressions, Aung Sithu Kyaw.

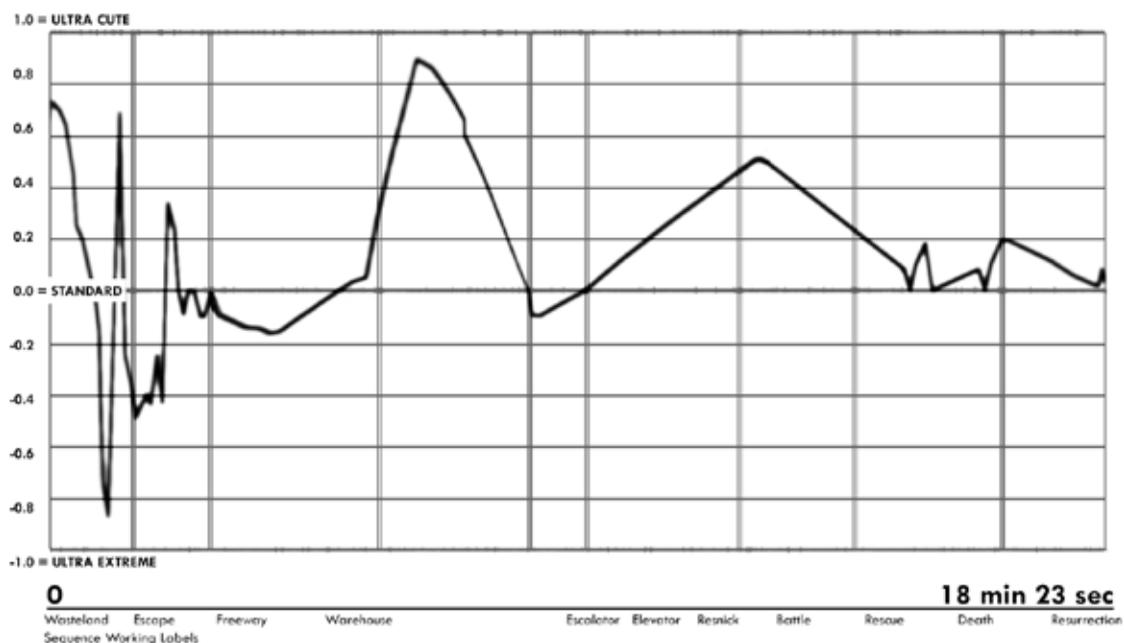
© Mark Chavez. Used with permission

to manipulate the audience's experience of the work. Our artistic goal was to get a better response from the viewer and make a better movie. However, we realized that the technology to sense our audience's emotional state though achievable to a limited extent would be difficult to implement for even a small audience of 5 people. Each technology required some degree of calibration and given the numbers of people in an audience, making broad assumptions on their emotional state would not serve the goals of our research. Given these limitations we decided to inform our

movie systems impact through pre and post-viewing survey questionnaire analysis. We utilized three categories of questions in measuring user expectations. These three categories include emotion detection, level of control, and feedback feature.

Emotion Detection

Forms of input and detection were measured as aspects of emotion detection. In a survey questionnaire, researchers asked respondents to indicate the suitability of the provided emotional input formats. The emotional inputs suitable for our movie system are facial expression, heart rate, brain activity, body gesture, eye movement, skin clamminess and head movement. Some of the detection devices that were considered were brain wave sensor, pulse monitor, camera, breathing detector, and skin detector. Besides the listed forms of emotional input and emotion detection devices, the respondents also offered suggestions. Two ideas for emotion input were audience participation in the movie system through interaction/reaction and the ability for the movie system to detect the user's level of concentration. One participant also suggested motion sensor as a suitable emotion detection device.



Final design styling for the movie [Vengeance+Vengeance], Mark Chavez, 2011. © Mark Chavez, 2011. Used with permission.



Stylistic Variations: neutral morphs to cute, Cinematics and Narratives Research Team, 2010, digital video. © Mark Chavez, 2010. Used with permission.

Stylistic Variations: extreme morphs to neutral, Cinematics and Narratives Research Team, 2010, digital video. © Mark Chavez, 2010. Used with permission.

The facial tracking system maps the viewer's facial characteristics, e.g. whether the viewer is happy, angry, attentive or ambivalent. Changes made to the scene to reflect the audience's mood. With more than one person in the audience, we average the sample to a common modality to get an overall mood of the audience. When we apply it to the trigger mechanism, it is not enough to demonstrate the degree of arousal, an essential indicator that reflects audience's participation and intensity of attention in the movie. Without imagery prompting the viewer, the system becomes essentially a face-based controller.

In our final movie system we play a sequence for the first time with a set of shots that have been set up initially by the director. During the playback of the movie we collect feedback from the audience. By a set of rules we mean aesthetics, narrative and filming variations that aid in achieving an optimal cinema viewing experience. After playing this sequence several times with several audience tests, we derive optimal playback rules for this sequence. We assign the values in a director driven system and then combine the result in compositing software.

CINEMATICS AND NARRATIVES

Project Prototype



Stylistic Variations: extreme morphs to neutral, Cinematics and Narratives Research Team, 2010, digital video. © Mark Chavez, 2010. Used with permission.

LILY - (CUTE STYLE) IN PRISONER LOOK



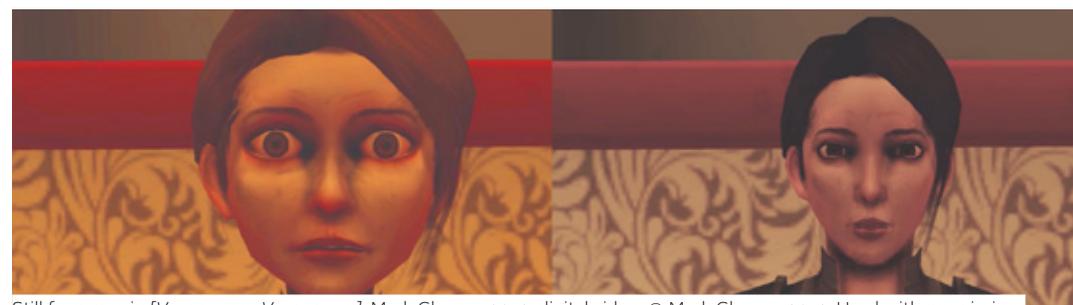
Stylistic Variations: neutral morphs to extreme, Cinematics and Narratives Research Team, 2010, digital video. © Mark Chavez, 2010. Used with permission.

CONCLUSION

Stroud Cornock and Ernest Edmonds²² proposed that the classification of interactive art is as an “art system” rather than an “artwork.” This research created a non-traditional approach to author an animated movie. In the process, we examined the artistic process, looking at abstract images that provoke emotional response. Then taking our observations and applying them to the visual design and manipulation of a fixed movie narrative to examine affective impact. Our prototype system was developed to examine the func-

tionality of our approach, possible reactions from an audience, and finally an award winning animated movie. In bringing these approaches together we have produced a system and a work of art that provides successfully explores the cinematic experience.

Our design rules take the response from audience to augment the visuals displayed onscreen. To be specific, when there is an animation sequence with a number of camera shots available in system, we assign set of



Still from movie [Vengeance+Vengeance], Mark Chavez, 2012, digital video. © Mark Chavez, 2012. Used with permission.



[Vengeance + Vengeance] Trailer1, Mark Chavez, 2011, digital video. © Mark Chavez, 2011. Used with permission.

rules crucial for the full experience and understanding of that sequence. The movie director has an expectation of what response is acceptable for this particular sequence in that he has assigned set the rules defining an acceptable reading of the movie. In a director driven system, the system in which we ultimately authored the movie [Vengeance+Vengeance], we assert that we achieved the best audience experience by tweaking these rules. Our assertions are validated by the many awards the film is receiving in film festivals.

We investigated users' expectation and relevant experience with interactive art to enrich our understanding of the viewers' backgrounds and new demands upon the format. With these results we are able to refine the final system with constructive information for different groups of target audience. The resultant analysis of the response of audiences to the system and resulting content cause us to reflect on the conditional probability of expectation and fallacy, adding to a theoretical contribution to contemporary audience research in animation studies. ■

Cinematics and Narratives Research Team, 2010.

© Mark Chavez, 2010. Used with permission.



ACKNOWLEDGEMENTS

This research is supported by the Singapore National Research Foundation & Interactive Digital Media R&D Program Office, MDA under research grant NRF2008IDM-IDM004-003, "Cinematics and Narratives – Creating Stories within Real-Time Visual Toolsets," Primary Investigator Mark Chavez

REFERENCES AND NOTES

1. R. L. Oliver and R. S. Winer, "A Framework for the Formation and Structure of Consumer Expectations: Review and Propositions," *Journal of Economic Psychology* 8, no. 4 (1987): 469-499.
2. M. Pantic and L. J. M. Rothkrantz, "Toward an Affect-sensitive Multimodal Human-computer Interaction," *Proceedings of the IEEE* 91, no. 9 (2003): 1370-1390.
3. M. Pantic et al., "Affective multimodal human-computer interaction," in *Proceedings of the 13th annual ACM international conference on Multimedia* (2005).
4. Z. Zeng et al., "A Survey of Affect Recognition Methods: Audio, Visual, and Spontaneous Expressions," *Pattern Analysis and Machine Intelligence, IEEE Transactions* 31, no. 1 (2009): 39-58.
5. M. Chavez and Aung Sithu Kyaw, "A Gesture-based Interface and Active Cinema," *ACM'11 Proceedings of the 4th international conference on Affective computing and intelligent interaction - Volume Part II* (Berlin: Springer-Verlag Berlin, 2011), 309-310.
6. S. Beckhaus and E. Kruijff, "Unconventional Human Computer Interfaces," in *ACM SIGGRAPH 2004 Course Notes* (ACM, 2004).
7. J. F. Cohn, "Foundations of Human Computing: Facial Expression and Emotion," in *Proceedings of the 8th international conference on Multimodal interfaces* (ACM, 2006).
8. C. Jørgensen, "Access to Pictorial Material: A Review of Current Research and Future Prospects," *Computers and the Humanities* 33, no. 4 (1999): 293-318.
9. P. Ekman, "Are There Basic Emotions?," *Psychological Review* 99, no. 3 (1992): 550-553.
10. S. Schmidt and W. G. Stock, "Collective Indexing of Emotions in Images. A Study in Emotional Information Retrieval," *Journal of the American Society for Information Science and Technology* 60, no. 5 (2009): 863-876.
11. W. Kandinsky, *Concerning the Spiritual in Art* (New York: Dover Publications, 1977).
12. J. Gross, O. John, and J. Richards, "The Dissociation of Emotion Expression from Emotion Experience: A Personality Perspective," *Personality and Social Psychology Bulletin* 26, no. 6 (2000): 712.
13. D. S. Messinger et al., "Infant Smiling Dynamics and Perceived Positive Emotion," *Journal of Nonverbal Behavior* 32, no. 3 (2008): 133-155.
14. W. G. Parrott, *Emotions in Social Psychology: Essential Readings* (Philadelphia: Psychology Press, 2001).
15. S. Haggblom et al., "The 100 Most Eminent Psychologists of the 20th Century," *Review of General Psychology* 6, no. 2 (2002): 139-152.
16. K. Scherer, "What Are Emotions? And How Can They Be Measured?," *Social Science Information* 44, no. 4 (2005): 695-729.
17. C. E. Izard, *The Face of Emotion* (New York: Appleton-Century-Crofts, 1971).
18. C. E. Izard, "Basic Emotions, Relations among Emotions, and Emotion-cognition Relations," *Psychological Review* 99, no. 3 (1992): 561-565.
19. S. Tomkins, *Affect Imagery Consciousness: Volume I: The Positive Affects* (New York: Springer Publishing Company, 1962).
20. S. S. Tomkins, "Affect Theory," *Approaches to Emotion* 163 (1984): 195.
21. M. Gooding, *Abstract Art* (Cambridge: Cambridge University Press, 2001).
22. S. Cornock and E. Edmonds, "The Creative Process where the Artist Is Amplified or Superseded by the Computer," *Leonardo* 6, no. 1 (1973): 11-16.



la Biennale di Venezia

**Arte
Architettura
Cinema
Danza
Musica
Teatro
Archivio Storico**



MOC **The MOC Pavillion**
Museo di Arte Contemporanea