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LEA

LEONARDO ELECTRONIC ALMANAC

VOL 17 NO 1 A collection of articles, reviews and opinion pieces that discuss and analyze the complexity of mixing things together as a process that is not necessarily undertaken in an orderly and organized manner. Wide open opportunity to discuss issues in interdisciplinary education; art, science and technology interactions; personal artistic practices; history of re-combinatory practices; hybridizations between old and new media; cultural creolization; curatorial studies and more.

Contributions from

Frieder Nake, Stelarc, Paul Catanese

and other important cultural operators.

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Teaching Video Production in Virtual Reality

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ABSTRACT

Teaching video production using video game technology and a method of live manipulation of digital puppets and props offers new possibilities for narrative, *without shifting focus away from storyline and dramatic content, due to technical hurdles. This production technique known as Machinima has been steadily gaining in popularity and prominence due to the relative ease and speed in which small production teams can learn to use video game software in this new way and quickly create professional quality animated movies.*

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Educators teaching narrative video production courses immediately face many inherent limitations while using classic methodology. For example, if a student production team wanted to create a dramatic narrative involving medieval castles with actors in period costumes, or a chase sequence with automobile collisions, they would be blocked by the difficult logistics of creating such visual effects. Although shooting and editing professional quality video has recently dropped dramatically in price, budgetary constraints place limits on costumes, sets, props, equipment, travel, etc. Good actors are hard to find (many students opt to forego actors altogether), convincing special effects are difficult or impossible to create (such as rocket ships and explosions), outdoor location shots are subject to the cooperation of the weather, and indoor shots are limited to space availability.

Students with big story ideas are immediately directed to keep their productions limited in scope and to not attempt more than they can feasibly do from within the confines of a low-budget production. As a result, many student narrative ideas must be excluded from the realm of possibility.

Animated video may be seen as a way to overcome many of these limitations, as visual elements are limited only to what can be drawn or else rendered in a 3D animation program. This comes with its own set of production challenges as cell drawing and painting is a field unto itself and computer generated 3D modeling and animation is extremely time consuming in terms of both learning the software tools as well as the actual production of the animated sequences. Moreover, students must spend much of their time concentrating on how to make characters walk and move in a convincing manner before even beginning to set upon the task of telling a story. This technology creates a tremendous barrier between story idea and final video output. But there is yet another way for students to apply the video graphic techniques that they learn in video production courses.

Commercial PC video games and on-line multiplayer video game platforms open an immediate portal into the creative possibilities of animated video productions, shot within the near limitless expanse of virtual reality. Tools such as the *Secondlife* client (secondlife.com) offer relatively strait-forward and uncomplicated tools that can be used to create characters, costumes, props, sets, and lighting. Alternatively, because Second Life itself is a pervasive virtual universe populated by a great many digital object venders, it is possible to purchase the aforementioned items at very reasonable prices. Moreover, amazingly well-crafted houses, castles, cities, towns, space stations, and under-sea worlds are readily available for shooting 'on location'. Actors and production crews need not even be in the same physical location to work together, as they can literally be in different parts of the world while meeting on a virtual set. The newest versions of video games such as Half Life, Unreal, and Crysis come with level editors, providing access to a virtual sandbox with a complete set of models, characters, and environments available for use.

Using the video production technique of Machinima, students turn their computer monitors into cameras and recorders. Video clips are assembled in standard video editing programs such as Premier or Final Cut Pro, with voice-overs, sound effects, and scene transi-

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tions added in a similar fashion as classic video productions. Using this method, students can concentrate more fully on telling a story, free from budgetary and logistical restrictions. Many of the techniques learned in Machinima production translate easily into classic video production as well, providing an effective hybrid of teaching and learning tools.

NARRATIVE AND NEW MEDIA

"Omnipresent and culturally privileged, narrative gains much of its power from its ability to change forms easily and repeatedly. However different the media that serve as a given story's vehicles – however distinct the oral, written, illustrated, or film versions of a particular narrative – we readily recognize the story's ability to be translated into different forms and yet somehow remain the "same" story." [1]

Today's movie-watching audience is not the same people who ducked when watching the Lumiere Brother's film of a train coming toward them. [2] Modern audiences have not only grown to accept entirely computer-generated characters in animated movies, there is even fear among some that such characters will one day replace real actors. Audiences are able to react emotionally to computer-generated characters and follow the story narratives as easily as they would when viewing movies made using hand-drawn or cell-animation. Typical members of media-watching audiences have also become used to the view-angles, camera movements, and general virtual reality look of 3D video games. For these reasons, it has become an acceptable idea to extend the use of video games beyond the original intent of the game makers, and turn them into a medium for the creation of movies. The threshold of acceptability has been crossed, both in terms of technological advancement of the medium itself as well as the evolution of the eye of the audience.

Yet this new medium by no means makes it any less important, nor does it offer any substitute for the mastery of the techniques that a good movie-maker applies when telling a story. The basic structural elements, the tropes, the style, the visual allegories, and the Mise-en-scène must always be considered. For this reason, using video game technology as a vehicle for filming in virtual reality lends itself well as a tool for narrative video instruction.

HISTORY

A good narrative video production course will likely begin with an introduction to the history of the medium. Much of video history may be intertwined with film and animation history, perhaps beginning when Peter Roget presented his paper 'The persistence of vision with regard to moving objects' to the British Royal Society in 1824. [3] This introduction should be followed by a number of films and videos that respected scholars have considered seminal to the canon of motion picture history. A certain number of these might be picked out and screened by the class as a whole and would be considered a 'must see' by the instructor. Although filming in virtual reality has a relatively short history, there are nevertheless a number of films that are considered important milestones in this medium and could offer a useful chronological perspective of its development.

The history of shooting films in virtual reality is intrinsically tied to the history of virtual reality itself, and more importantly, the availability of virtual reality to the masses. Virtual reality, in a visual sense, could arguably be defined as a computer generated space in which viewers can look in any direction in a simulated three dimensional environment, as seen through a computer rendered view. This requires that a computer must be able to generate these views quickly enough to make use of 'the persistence of vision' effect and give the illusion of fluid motion. The technology to do this along with its cheap commercial availability has been largely developed by the video game industry. They have capitalized on the creation of something to do while in virtual reality: shooting enemies.

In 1996, id Software released Quake, which was the company's first truly 3D videogame, essentially allowing the player to look anywhere and go anywhere.

"...id Software also chose to keep in the extremely popular demo recording feature. Players began to record multiplayer deathmatches with a more cinematic flare. And at this point a critical shift occurred – the viewpoint of the player had become the viewpoint of the director. *"* [4]

Later that year, a group of players calling themselves 'The Rangers', used Quake to create a short narrative film called *Diary of a Camper*. The story consisted largely of a single player's technique of hiding in one place as a means of defeating a large group of enemies, with the dialog typed in by the actor/players during the recording. This was considered to be the first popular 'Quake Movie' as it was called at the time, with many similar movies quickly following. As video game technology got better, the production value of the animated movies also got better, and hackers began to make their own software utilities to better convert video games into useful filming environments.

The term 'Machinima' (or machine animated cinema) was coined by Hugh and Anthony Bailey in the year 2000, coinciding with the launch of their new website, Machinima.com. The term was used as a way to define movies made with a video game engine of any kind. Later that year, ILL Clan released *Hardly Workin'*, a Machinima created with the Quake II engine with entirely custom made models and environments, which visually rivaled many of the 3D animated movies of that time. Two years later, the Academy for Machinima Arts and Sciences was formed and the first Machinima Film Festival was held.

In 2003, Machinima broke into the mainstream with a number of notable films airing for a wide audience. Fountainhead Entertainment produced a music video for the group Zero 7, *In The Waiting Line*, which entered into standard rotation on MTV. They also released a stunningly beautiful Machinima *Anna*, created with freely available software Machinimation, and featured complex weather and light effects. Rooster Teeth Productions released the first episodes of *Red Vs. Blue*, a soon-to-become very popular comedy series that has been running for multiple seasons up until and including the date of this writing. Another notable series is *The Strangerhood*, also by Rooster Teeth productions, which uses the video game *The Simms 2.* This series is a parody of popular culture and television shows.

Creating a dramatization based on true events, Alex Chan released *The French Democracy* in 2005 using the video game *The Movies*. This film is a re-enactment of the incidents that triggered the riots in France in 2005. Chan felt that the media did little to explain the cause of these riots and wanted to reveal the racial and cultural discrimination in France that contributed to the unrest. This film was perhaps the first use of Machinima as means of political activism. In 2007, Douglas Gayeton released *My Second Life: The Video Diaries of Molotov Alva*, a fictional documentary Machinima series filmed in the on-line world of Second Life. High production value and a philosophical self-reflexive storyline contributed to the compel-

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PREPRODUCTION

ling quality of this work. In 2008, Ian Chisholm mixed together two different video games (Half Life 2 and Eve On–Line) to create *Clear Skies*, and a year later *Clear Skies 2*. Superior voice acting, stunning graphics, and professional camera work brought the medium of Machinima to a new level of quality with the release of these two films. Put together, these two films equal the approximate running time of a full-length movie.

Commercial media companies began using Machinima techniques as well. In late 2006, Comedy Central aired "*Make Love, Not Warcraft*", episode 147 of the animated series *South Park*. This episode uses Machinima in many of its scenes as *South Park* producers created a satirical look at the MMORPG (Massive Multiplayer Online Role-Playing Game) *World of Warcraft* by Blizzard Entertainment. Several professional movie houses have been using Machinima film making techniques as a way of pre-visualizing complex computer generated animation, although examples of these scene tests may not be publicly available. Stephan Spielberg used a modified version of the game *Unreal*, for previsualizations of *A.I. Artificial Intelligence* as did George Lucas for the later episodes of *Star Wars*. [5]

There are many thousands of other Machinima examples readily available for screening in a narrative video course (most are archived at machinima.com) although because the roots of this medium grew from amateur and first-time film makers, there is much critical analysis and sorting work yet to be done if a proper canon of Machinima films is to be assembled. Although the history of Machinima is relatively short, the technique is maturing rapidly. The workflow and the methods used to create these movies is very similar to that of traditional video, much more so than the production techniques of either film or animation.

> *"Need a fire fight? Game engines are good at them. How about a sweeping vista? Not a problem. How about a gigantic battleship swooping from the skies, firing plasma charges from its cannon, crewed by the ghosts of those who died to its guns, whilst below a thousand Vikings battle their way up a mountain pass? No worries pal. Would you like fries with that?"* [6]

In a traditional narrative video course, preproduction concerns might consist of creating a general plan, writing a script, drawing storyboards, rounding up the talent and the production crew, etc. With respect to these items, creating videos in virtual reality is essentially the same, but other pre-production concerns differ somewhat or must be translated for this new medium.

1. Scouting locations

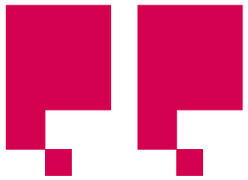
This translates either into choosing which video game (or games) to use as a base environment or backdrop, or in the case of shooting video in online multiplayer games, one must literally scout locations in virtual space much in the same way that one would do this in physical space. Online worlds such as *Second Life, Eve On Line*, or *World of Warcraft* have virtually hundreds of square miles of environments to choose from for shots that could be used for filming on location. Even most stand-alone (offline) 3D video games have many miles of interesting terrains, cities, buildings, rooms, and other interior and exterior spaces to choose from. It is also possible to create a location from scratch using elements provided by the game makers and assembled with level design editors that are provided with such games as *Unreal, Half Life, Crysis*, and others. In the case of *Second Life*, all of the virtual world elements are created by users, so there are new locations being generated every day.

2. Costumes and Props

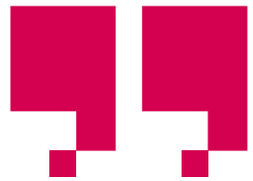
In most cases, costumes are permanently attached to the available character models although certain games allow for customization. Many online games offer a character editor, making it possible to choose the features and appearance of your character from a fixed set of possibilities. *Second Life* offers complete customization with clothing and skin that can be user created or available for purchase from other users. Generally props follow similar guidelines, and for the more intrepid, it is possible to actually custom create props, clothing, and characters in a professional 3D modeling program such as Maya or 3D Studio Max and import them into PC games such as *Unreal* or *Half Life*. It is often quite a bit of work to create custom models and doing so is perhaps beyond the scope of most small scale virtual reality video productions, similar to how building furniture or a house is beyond the scope of traditional small scale video productions. Often, Machinima producers will mix custom made and prefabricated elements in their productions.

3. Camera and sound equipment

Essentially the computer or television screen is the camera in a Machinima production. Ways of recording the screen include wiring the video output from a game consol or a computer directly to a standard video camera in order to record it. Using the telecine method, one can even aim a video camera at an LCD screen and record it directly, although the visual quality will certainly suffer. There are a number of software tools to record the computer screen without using a video camera at all. Perhaps the most popular for windows machines is *FRAPS*, due to its ease of use, high quality and frame rate, as it is made to tax the computer processor as little as possible. For Apple computers, *Snapz Pro* works very well as a screen capturing software tool.



Even most stand-alone (off-line) 3D video games have many miles of interesting terrains, cities, buildings, rooms, and other interior and exterior spaces to choose from.



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A 'player' becomes the camera by concentrating fully on framing the recording screen for the best shot, using the standard movement controls on a keyboard, mouse, or gamepad. It is also possible to script camera movements in many video game editors, similar to attaching the camera to a dolly, crane, or complex rigging. A number of *Second Life* users have created various camera scripts and rigs for the purpose of Machinima.

Generally it is not advisable to use the native sound coming from the video game unless the video movie references the game itself. It is much easier to overdub all of the audio in a video editor, as this provides a much greater level of control and precision. The problem of lip-synching the characters to the overdubbed voice track can be solved in several ways. Certain video games (such as *Half Life* or *The Movies*) provide tools (or tools are available online) for inputting voice and getting the character's lips to move accordingly, and the effort involved with doing this can range from very little to extremely labor intensive. Another possibility is to use *Reallusion's Crazytalk* software, which uses a still image of a character and turns it into a talking animation with very believable realism. This is accomplished by inputting an image file, an audio/voice file, and the corresponding text. The software wraps the face image onto a talking 3D model for very realistic results. Another technique that is often used is to have the character's mouth not visible or partially obscured, and to move another part of the body to indicate that the character is talking. This technique has been used with great success in the filming of *Red Vs. Blue* (see above), which uses video games *Halo* and *Halo 2*. The character's faces are covered completely by helmets and visors and are filmed nodding their heads up and down when they are speaking. Other gestures could be used to indicate talking such as hand or body movements, as long as the voice and movements are synchronized, keeping the illusion convincing.

4. Video format

Generally the raw video files will be stored on a large hard drive. Using recording software like FRAPS, it is already possible to film in HD quality, depending upon the speed of the processor in the 'camera' computer. Hard drive data storage has dropped sufficiently in price to rival the cost of storing video on digital videotape cassettes. A marked difference between traditional video and Machinima style movie making is that Machinima does not actually require using a video camera at all, and so the usual concerns associated with these devises can be eliminated.

PRODUCTION

Most of the considerations and techniques of story telling using traditional video are exactly the same for Machinima video production. Shooting from interesting camera angles; framing the scene; keeping track of lines of sight; paying attention to the continuity; lighting the scene and characters effectively; can all be taught and critiqued much in the same way as traditional video. At this point, video instructors can really screen movies and animations from many different sources and talk about the various techniques used to convey a narrative and how it might be applied to Machinima productions. This is really the crux of teaching video production in virtual reality, as the final stories can either be effective and powerful or suffer from the same flaws and pitfalls of other forms of film-making. In this way, Machinima is more akin to traditional video production than it is to cell or 3D animation. Animation techniques often include the pulling and stretching of characters to exaggerate weight, motion, or communicative gesturing. Animators can manipulate every shape and texture of the film frame, similar to drawing or painting. On the other hand, Machinima is filmed live and in real-time, with human actors directly manipulating 'digital puppets', shooting scenes over and over until the right take is recorded. Actors must work together and coordinate in a synchronized fashion, following a script and a director. Due to the fact that Machinima can be filmed in a networked environment, it is possible for each of the actors to physically be in a different location (and anywhere in the world), meeting together on a set in virtual space. This makes it possible for student groups from across the globe to collaborate on videos, with hardly any extra pre-planning as student groups that are in the same location. It is possible for production teams to enlist the services of 'extras' from within online communities such as *Second life*. Extras can be in charge of creating their own clothing, or wear digital copies of clothes passed out by the costumer. It is even possible to pay these extras at the end of the day (with real money or other forms of compensation such as valuable digital objects) from directly within the online environment.

Often, most members of a Machinima production team will decide to film in the same physical location such as a computer lab. This makes it possible to see and hear each member, creating a 'back-channel' means of communication while engaging in the digital puppetry. Besides being able to use audible signals for timing cues and synchronized motion, the cameraperson can provide immediate feedback while the scene is being filmed.

Oftentimes it is useful to script the camera to move the same way every time the film shot gets rehearsed and repeated. This removes possible filming mistakes and so makes one less factor to consider while performing the scene. It can also be very challenging to move the camera smoothly when using a keyboard or a mouse. As with traditional video production, it is possible to film the same scene from multiple angles by having more than one person log in to the game environment as a 'camera' character.

Effects such as floating in space, breathing underwater, flying through the air, walking on clouds, or walking through walls are easily achievable. Fire, explosions, rain, snow, or burning meteorites can be created and easily switched on or off. Although all of these options are available, as with traditional video, a good narrative still relies upon the effective development and communication of a good story. In this respect, instructing in either medium is much the same.

POSTPRODUCTION

Once the Machinima video clips are shot, they are treated in much the same way as with traditional video. Video files must be logged and sorted; editing decisions must be made as to which shots should be kept and which should be discarded; several rough cuts of the movie will be assembled; beginnings, middles, and endings will be decided. Although in contrast to traditional video production, it is likely that the entire audio track will have to be overdubbed after the video has been recorded. In this way it is like animation, where audio timing and synchronization becomes challenging and important. Fortunately, modern digital video editors make it possible to easily move audio clips in small increments of time so as to easily align them with their visual counterparts.

Some of the technical pitfalls that are virtually nonexistent in Machinima video are problems such as clips that were shot out of focus, clips that need color correction, bright light spots that blow out detail or color, bleeding of red tones, interlace issues, blurring of action shots, differences in tape stock or quality, or unwanted background noise from wind and traffic. On the other hand, Machinima clips can suffer from problems such as a character's feet not connecting to the ground properly, unexpected reductions in frame rate, lack of emotion in character faces, unrealistic body

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postures, and unconvincing gestures. Each medium has its own strengths and weaknesses and so must be dealt with accordingly.

As mentioned previously, dialogue is done in postproduction (as well as lip-synching if *Crazytalk* is being used). One of the limitations of *Crazytalk* is that it uses a still picture of a character to create the talking animation. This makes it impossible to have the character moving, walking, or driving while talking. A way around this problem is to take a picture of the character against a green surface and use traditional greenscreen techniques to remove the background area. Now a moving background can be composited with the talking character to give the illusion that the character is moving while talking.

There are a number of subtle video effects that may be added with a video editor or visual effects software while in post-production to soften the digital look that is rendered by many game engines. The focus can be softened slightly, motion blur can be added, and time-based effects can be added. The addition of a lush mixture of environment sounds can add greatly to the realism of a scene. Adding subtle room reflection echoes to the character voices can add believability to the space of the virtual environment.

DISTRIBUTION

Will a full length Machinima production one day win an Oscar? Certainly this is possible. When the right production crew makes a Machinima that has all of the elements and emotional impact as other award winning professional films, there is no reason why it could not be awarded similarly. Computer animated movies have risen to this very level of prominence in a very short time and Machinima is not far behind. It was not long ago that the idea of a computer animated film winning such an award seemed like an impossibility, but now this is commonplace.

In addition to the usual venues that feature animated films (both online and offline), there are a number of large film festivals that have had specific categories for Machinima, such as the Sundance Film Festival. Additionally, there are a growing number of festivals that are for Machinima only.

THE FUTURE OF VIRTUAL REALITY AND NARRATIVE VIDEO

Although still maintaining futuristic connotations, virtual reality has begun to seep its way into common everyday experiences. Whether this experience manifests itself while playing 3D video games, or talking with a friend in *Second Life*, or experiencing a simulation for learning purposes, computer generated living spaces are being integrated into the physical world. No longer does virtual reality need to be necessarily associated with the act of donning special goggles, wearing sensory suits, or standing in a multi-screened projection room (CAVE). [7] It is more like surfing the Internet, writing an email, or talking on a cellular phone. Extending our presence into a computer-generated space might be considered a natural outcome of advancing graphics technology. As long as there is something compelling to do in this space, we will spend time there.

Over time, as virtual experiences become more commonly integrated into everyday life, like using telephones, time spent in these spaces will be included in the narratives of visual media in all forms (similar to how common it is to see an actor in a movie using a telephone). The subject matter of Machinima narratives may change to reflect this. Rather than using Machinima as a way to represent physical reality, it may simply become a recording of the time that one normally spends while in this virtual reality. Machinima and live action film may be commonly mixed together. An example video narrative might involve a protagonist waking up in the morning (live action), spending a few moments online in a virtual environment while talking to his boss (Machinima), driving to work (live action), and spending the rest of the day talking to colleagues both in physical space and virtual space (mix of Machinima and live action).

Machinima video production techniques will likely become just another aspect of traditional video production. In the future, when one refers to traditional video, Machinima will likely be included. Teaching video with this production technique allows for many new possibilities in narrative choices, creates a bridge between traditional video and animation, and introduces students to a technique that is gaining prominence and popularity in professional studios. ■

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photograph Murat Germen, *Muta-morphosis #79*, İstanbul, 150 x 85 cm, 2011, 7 editions + 2 AP, courtesy of C.A.M. gallery.