Some digital media approaches to non-linear narratives and interactivity.

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ABSTRACT
In this paper, I describe the conflation of non-linear and linear narratives through digital media using examples from the interactive documentary *The Shoebox* that is built around three 360 degree panoramic Virtual Reality scenes. In *The Shoebox* users can play each of the three VR scenes as a scripted linear sequence or they can interactively navigate from one scene to another or to additional media. This interactive architecture is to be further extended to include an additional layer. When the user clicks an icon or a node and accesses a fragment of media, for example: video fragments; still photographs; animated stills; or audio clips, the selected fragment descends to a timeline within the field of view. As each icon is clicked these fragments build along the timeline and after a number of segments have been acquired the timeline itself can be played as a linear sequence. The construction of this additional layer of sequential, temporal narrative, obtained through non-linear interactive actions, plays the content of the story in the traditionally, cinematic way.

Categories and Subject Descriptors
D.3.3 [**Multimedia Software**]: LiveStage Pro 4

General Terms
Documentation, Design, Experimentation, Theory.

Keywords
Linear narrative, non-linear narrative, Virtual Reality, 360 degree panorama, interactive.

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The practical piece accompanying this paper is a prototype for an interactive digital documentary titled *The Shoebox*. It is based on the true story of a 10 year old girl who loses both her parents in separate incidents and who is taken from her family home and put into a series of boarding houses until she is age 21.

> When a WWI veteran, who has been blinded in one eye on the battlefields of France, drives his car into a tram, he is killed. He leaves behind a wife and 3 daughters. It is 1937. Tragically, 3 years later the girls' mother also dies from a mysterious illness. The girls, Gwendaline 17, Marjorie 14 and Heather 10 are put under the guardianship of their father's brother, Uncle Jock, a stock and station agent who lives in Kaniva, north-western Victoria, Australia. A silence descends over the family as the old ones feel it is best not to upset the girls by talking about their unfortunate situation. Uncle Jock insists the girls are not to be separated. Yet it is WWII and accommodation of any sort is very scarce. So they are boarded 100's of kilometres away in a succession of houses. For Heather, the youngest, it is a dozen homes in 11 years. With only scraps of information and two small photographs she ponders her origins and the cause of her mother's death for over sixty years until unexpectedly, at the age of 72, she is handed a shoebox containing documents that fill in some of the pieces of her story.

This prototype uses LiveStage Professional® software and the technique of 360 degree QuickTime® virtual reality (VR) panoramas to explore the documentary form. There are two methods of navigation, auto play and manual. In auto play mode, an narrated linear narrative accompanied by programmed movements and pop up images is played for each of the scenes. In manual mode, the user explores each scene with the navigation buttons (pan left, pan right, tilt up, tilt down, zoom in and zoom out) or by drawing the mouse around the scene. Additionally in manual mode, the user accesses hotspots and nodes embedded within each VR panorama to activate clips and to move between scenes. These non-linear narrative techniques of hypertext, links, and nodes, enable the user to navigate their own path through the piece. This fragmented delivery method was chosen to mirror the fragmentation of the nature and content of the story.

Digital Medias that combine the use of linear, temporal narrative and non-linear, spatial narrative as well as the user's interactivity are discussed in this paper. How have non-linear devices and interactivity changed the landscape for both users and producers? Are these forms incompatible with traditional

narrative techniques or can they work together to achieve both user comprehension and user participation with the work?

> 'We are entering an age of narrative chaos, where traditional frameworks are being overthrown by emergent experimental and radical attempts to remaster the art of storytelling in developing technologies' (Rieser & Zapp 2002:xxv).

I became interested in digital modes of presentation after many years working as a documentary photographer and audio-visual producer. This was during the 1980's and early 1990's when audio-visual presentations required banks of up to 60 slide projectors, each loaded with a full carousel of 80, 35mm transparencies, each programmed to display on the screen at prescribed times and durations. From the mid 1990's the AV industry was quick to take up the versatility and speed of video production and I too pursued that direction. With the continual improvements in digital media software and with faster and faster computers, video is now sharing this domain with QuickTime® movies, animation, Flash®, 3D graphics etc.

With my background as a photographer I became interested in the software that stitches still photographs into seamless 360-degree panoramic images. Commonly called virtual reality (VR) panoramas, certain software allows these to be combined with, video sequences, still images which can be animated or simply left as stills, and audio samples including music, sound effects, narration and dialogue. I began working with VR panoramas using PhotoVista® software and soon became aware of Dr Debra Beattie's work with *The Wrong Crowd* (2003) an autobiographical online documentary, which utilises similar, but more versatile, software called LiveStage Pro®. LiveStage Pro® can meld together an umber of digital applications and once an assembly is arranged the program generates a QuickTime® movie that can be played via DVD or the Internet. I decided to follow Dr Beattie's lead and explore *The Shoebox* story with this software.

The Wrong Crowd constructs each of its seventeen VR panoramas as single scenes that can be played by the user on auto or in manual interactive mode. With my prototype *The Shoebox*, I am linking the VR panoramas through hotspots without the need to return to a menu. This allows the viewer to interactively jumping from VR to VR in addition to accessing hotspots that open up more clips. In this way I am exploring interactivity and non-linear narrative to mirror the fragmented nature of my mother's story with the fragmented delivery in a digital environment. Additionally, each VR scene can be played on auto play with programmed movements through the scene and accompanying scripted narration.

A number of commentators have discussed digital media's use of non-linear narrative as well as its ability to incorporate interactivity. Referring to non-linear narratives some claim there is no real difference from a linear narrative tradition, while others advocate a new revolution in form. The primary difference, most agree, is that the narrative in digital media can be explained as a shift from the linear, horizontal, temporal and sequential mode of traditional narrative to a non-linear, vertical, spatial and simultaneous domain with new media forms. Or to put it another way linear narratives make use of time, while non-linear narratives make use of space.

In regard to interactivity the difference is one of audience reception. As Negroponti (1995:84) phrased it a decade ago 'being digital will change the nature of mass media from a process of pushing bits at people to one of allowing people (or their computers) to pull at them. This is a radical change…'. With traditional modes of media the audience leans back and is a witness or observer to the unfolding events, whilst with interactive modes the audience leans forward and is a participant in the pace and revelation of the story (Pesce 2004). In this paper I will explore the differences in temporal and spatial narratives and investigate how interactivity has changed the landscape for both the producers of new media and its users/audiences.

Classical narratives predominantly follow the Aristotelian model of revelling dramatic events, whether they are factual or fictitious, in a realistic fashion using characters as tools to create identification in the audience. As Zapp (2002:78) says:

> The viewer is taking on the role of a voyeur, witness or emotional judge. He or she is immersed in the story by emotional means of identification, as the plot aims to provoke sympathy or antipathy with the characters or draws possible parallels to the viewer's subjective reality.

Dovey (2002:143-4) describes this audience identification as a type of transportation, which is achieved through temporal devices. 'Linear succession, cause-and-effect, is what allows the reader/user to 'relax' into the tale. … The user is left with the satisfaction of an experience with beginnings, middles and ends'. Le Grice (2001:290) also acknowledges the temporal importance in linear narrative and says 'narrative is a method by which events – real or imaginary – are given coherence through the representation of sequential connections'. Manovich (2002:69) agrees, stating 'cinema … replaced all other modes of narration with a sequential narrative; an assembly line of shots which appear on the screen one at a time'.

Consequently temporal linear narrative has become the primary mode of cinematic story telling, yet re presenting sequential linear time in film does not necessarily equate to chronological story telling. As Rieser (2002:147-8) explains 'the very linearity of film stimulated a number of conventions to counteract its effect. Flashbacks, jump-cuts, etc. reintroduced fluidity to a rigid medium'. These conventions may have varied the order of time in the narrative however; they did not change the intrinsic temporality of the product. The linear, horizontal, sequential and temporal features nevertheless remain.

In our digital era this linear temporality is now being challenged in a more significant way. As Le Grice (2001:296) points out, the very essence of digital forms is non-linear and in addition the way a computer stores data does not require a linear process or understanding. He says 'the computer, which is fundamentally based on what is called Random Access Memory … is the designation of the non-sequentiality of memory addressing – intrinsically opens up the condition of non-linearity'. Further,

> Solid state electronic systems (machines) achieve all their connections, do all their work, by electronic pulses; even if hierarchic, they are fundamentally non-linear. Whatever is conceived as the unit of data, its storage and retrieval is substantially freed from a predetermined sequence derived from the physically linear conditions of a mechanical

> medium (both film and video are locked into the mechanics of the linear sequence of the recording medium). Through the Random Access Memory (RAM) structure of the computer, the sequence of retrieval does not have to match the sequence of storage and all address locations are effectively equidistant (Le Grice 2001:282).

Still, Le Grice (2001:289) recognises that simply because a film is produced using digital processes, this does not necessarily make it non-linear. He claims, 'the current fashionability of the term "non-linear" creates some problem of definition', because although film-makers are now using non-linear systems more and more, particularly non-linear editing systems, these systems are only non-linear in the way they store and retrieve data, however, 'the principles on which they (the edited segments) are combined in the finished product conform to linear narrative concepts. The technology allows non-linearity – the concepts remain linear'. As Hales (2002:105) puts it 'in this case the technology is not leading to a change in thinking simply a way of getting things done more efficiently and more economically'.

The autoplay sections of *The Shoebox* conform to the principles of traditional narratives, with a narrator describing events chronologically and images appearing on screen to correspond with the accompanying narration in a linear, sequential, horizontal and temporal fashion. Cubitt (2002:6) highlights the increase in narrative forms through 'the rise of the popular press, film, radio and television', yet marvels at the longevity of linear narratives in this digital era stating:

> The remarkable persistence of narrative in twentieth-century media can only be apprehended as remarkable if we apprehend the environment in which it is now performed: a landscape of other modes of documentation and dissemination. Crucial among them are forms of data storage and retrieval that are not structures in time, as is the narrative, but in space.

Manovich (2004i:2) explains this perseverance of traditional narrative as the predisposition for new technology to mirror the technology it is replacing. He says 'one way in which change happens in nature, society, and culture is inside out. The internal structure changes first, and this change affects the visible skin only later'. Hence the first car resembled a horse drawn carriage and new media forms continue the use of temporal linear narrative within their spatial non-linear domain. Manovich (2004ii:2) refers to the inside out phenomenon as 'uneven development' and claims it hinders our appreciation 'that new media does represent a "new avant-garde" of information society even though it often uses old modernist forms'. Further he says,

> If the 1920s avant-garde came up with new forms for new media of their time (photography, film, new printing and architectural technologies), the new media avant-garde introduces radically new ways of using already accumulated media. In other words, the "new avant-garde" is the computer-based techniques of media access, manipulation and analysis.

Manovich gives as an example of this new media avant-garde the work of a group of graduate students from Helsinki's University of Art and Design. He describes their interactive late-night television program *Akvaario (Aquarium)* (2000), created for the Finnish national broadcasting company Channel 1, as a 'database narrative'.

> It is … a narrative, which fully utilizes many features of a database's organization of data. It relies on our abilities to classify database records according to different dimensions, to sort through records, to quickly retrieve any record, as well as to 'stream' a number of different records continuously one after another (Manovich 2002:66-7).

So a work does not become non-linear simply by using digital applications or digital storage and retrieval systems, there has to be a change in the structure of the work from one based on time to one based on space. It is the added ability to move around within the work, to navigate vertically as well as horizontally, to explore spatial relationships as well as temporal relationships and to have access to media components in a simultaneous as well as a sequential way that changes it from linear to non-linear. As Dovey (2002:140) says,

> Hypertextual ways of working… invite us both as authors and users to experience information as a spatial arrangement. We are called upon to navigate the database in order to make sense of what is stored within. Knowledge that may once have been transmitted in narrative form, as a story, novel, report, essay or article, can now be accesses through a network of links in which a spatial relation between component parts can be preserved.

Ross Gibson and Kate Richards are another example of collaborative artists engaging with, Cubitt's new 'forms of data storage and retrieval' within landscapes 'of documentation and dissemination', and Manovich's 'new ways of using already accumulated media'. Accessing an archive of crime scene photographs taken between 1945 and 1960 by the New South Wales Police Service, Gibson, Richards and their team have created five distinct works between 1998 and the present. These include live performances; gallery installations; web portals; and a CD-ROM with the intriguing names of *Darkness Loiters, Crime Scene, LAW Live with the Necks,* and *Bystander*. In this instance I shall refer only to the CD-ROM *(LAW) Life After Wartime* (2003) that combines portions of the database of crime scene photographs with haiku-like texts and sound effects and music files into random sequences initiated by the user.

Gibson (2005:5) says the operating system underpinning *LAW* is designed as a 'speculation engine… throwing batches of pictures forward in turbulent patterns' and that 'the system gains cohesion according to the history of each investigator's interaction with the database'.

> Over time, a set of micro-narratives and mood-modulations accrue until eventually a kind of debateable meta-narrative builds up to account for the entire image-world of the archive. Crucially, each investigator will gather up a different set of micro-narratives and moods and each investigator will tend toward a larger story in idiosyncratic and personally stamped ways (Gibson 2005:5).

LAW is what Gibson calls a 'dramatic database' which explores the nonlinear, vertical, spatial relationships available through digital media forms. Additionally, he sees the user engaging with *LAW* as 'not a reader or a receiver of this art work' rather as 'implicated as an investigator' whose interactivity enables them to participate in the pace and delivery choice of the process.

While Gibson and Richards use not traditional linear story telling devices in *LAW,* Michelle Citron uses a combination of non-linear and linear narrative in her interactive CD-ROM *Mixed Greens* (2004). The third in a series beginning with *Cocktails and Appetizers* and *As American as Apple Pie, Mixed Greens* begins with a short animated introduction and then displays a set of icons, images of salad vegetables, lined up in neat rows. As the user rolls over each icon a word-category appears Mystery, Time, Place etc. Clicking on an icon, a corresponding fragment of linear video is placed on a timeline at the bottom of the frame. Up to a maximum of ten icons can be chosen and each new selection buts up against the previous one on the timeline. The timeline can then be played as one continuous linear sequence of video fragments. The order and arrangement of each viewing is open to change and variation depending on the user's selections. In all, there are 48 possible scenes or video fragments which in Citron's words, 'presents two narratives: four generations of my Irish Jewish heritage played against four decades of lesbian life in America, offering a do-it-yourself story in both documentary and fiction'.

Adrian Miles and Clare Stewart's interactive online video *Exquisite Corpse* (2002) deals with the mix of non-linear and linear narrative in yet another way. *Exquisite Corpse* 'consists of three "child" movies that load into individual "panels" within a single parent movie' (Miles 2005, p1). Each child movie plays as a linear sequence although this is disrupted by the user's interaction. Clicking on any of the child movies' top or bottom bars changes the frame rate (playing speed) of the clip and so each time the work is played the content is different. Miles explains:

> 'it is important to appreciate that … this is a 'film' that has no canonical sequence … it produces an almost infinite number of combinatory possibilities because you always move around the work differently, and with the variable playing rates of the clips complex variations occur'.

With *Exquisite Corpse* Miles and Stewart are playing with the very temporality of linear narrative as well as the spatiality of simultaneous and sequential montage. Miles says:

> …this is a film that has no fixed duration. There is no end to this movie, simply because the three films loop, and the manner in which the narrative come commentary works is that the end of one loop and its restart is not a 'start' but becomes a return or a reprise. If you like the narrative structure and style is much more musical than what is usual within film with its fixed direction and duration (Miles, Corpse 2005:1).

These are just a few of the examples of artists experimenting with non-linear narrative and interactivity. Much discussion has taken place as to whether non-linear and linear narratives are binary opposites cancelling each other out and whether narration and interactivity are antithetical (Wand 2002:167). Also whether these modes are new or, in fact, have been displayed in different mediums throughout time. Rieser (2002:146) gives a concise summary when he says,

> The frequent assertion that interactive narrative is 'a contradiction in terms' centres on the argument that the diegetic space of narrative is comprised or destroyed by interactive engagement with the story; … this argument is based on a misunderstanding of narrative mechanisms. The active participation of audience is not new nor is it disruptive of narrative diegesis; it is merely incompatible with certain narrative conventions, which have become unduly emphasised by historical accident.

I will not explore the pros and cons of these debates in this paper, however what is becoming clear is that a number of commentators and digital artists alike are recognising that new interactive media is most understandable to users when it incorporates a mixture of non-linear and linear narrative devices. As Dovey (2002:143) claims not only do new media change the narrative from one of a horizontal temporal type to a vertical spatial type but that both should be functioning for a piece to be considered understandable. Acknowledging this trend Wand (2002:167), quotes Ulrich Weinberg a Professor at the academy of Film and Television Studies in Potsdam who says, 'Linear media are becoming part of the content of the world of non-linear entertainment'. Gibson (2004) explaining his process states,

> Most of my work entails finding historical fragments in the aftermath of some cultural 'breakage' or violence and then offering narrative or dramatic 'backfill' to explain the existence of the evidence. More and more, I am interested in how searchable databases, as well as, linear storytelling, can be used for such imaginative rather than didactic experiences.

In this paper I have described the structural difference between linear and non-linear narrative and demonstrated that the linear is based on 'temporal' and the non-linear is based on 'spatial' arrangements. With examples from artists and their artistic explorations within this field I have revealed how others have engaged with temporal, horizontal and sequential as well as spatial, vertical and simultaneous narratives and how these two seemly opposed techniques, rather than acting as binary opposites and canceling each other out, can operate in a complimentary way within the same piece. The non-linear techniques provide the hypertextual nodes and links that permit the spatial domain to be navigated in teractively by the user, and the linear provide the traditional narrative devices to bring together the fragments into an understandable story.

With my prototype of *The Shoebox* I have combined both linear and non-linear narrative techniques in this way. Each VR panorama can be played as a linear story, the auto play movement creates a diegetic space and the temporal narration reveals the content of the narrative. Additionally, the nodes and hotspots within each VR panorama work as networked pathways for the user to navigate further fragments of clips, and in this way engage with the work in an interactive way. This engagement places the user within the work, consequently changing their relationship from one of observer to one of participant with the piece.

I chose these devices as a means of revealing the story to the user in a fragmented way, as a mechanism to mirror the fragmented way the protagonist discovered the real events of her family's experiences. Some of the real events and facts on which this prototype is based are missing. Those that are known are disjointed and fragmented, and rely on her recollections and memories of a girl whose life has been traumatized and shattered. In a life of absence, memories are a vital tool for survival. Yet these same memories are also the site of enormous distress. The process of remembering and retelling can be extremely painful.

If a story is a documentary how should it be told? If the main protagonist of that story feels great emotional distress from the telling, should it be told? If the protagonist is also a close friend or family member, and feels great distress from the telling, how then, should it be told? These are some of the issues that can be discussed in another forum.

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