Space and Time in Ergodic Works

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Abstract: The following paper discusses dimensions of space and time in interactive ergodic works. It starts by presenting four examples of ergodic works, describing how the dimensions of time and space are created and how they are experienced by users. These analyses use concepts and theories developed by Markku Eskelinen, Janet Murray, Lev Manovich and Espen Aarseth, in an attempt to understand space and time in relation to ergodicity.

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1. Introduction

Interactive ergodic works exist within a logic of completion by users' actions (as defined by Aarseth in 1997). Without the users' actions, which generate several possible material expressions, an ergodic work will not be fully realized. Since the work partially evolves in response to users' actions, it seems clear that the dimensions of time and space need to be readdressed in ways that go beyond the usual categories of print — based or film — based narratology. Because of its concern with the ergodic nature of certain modes of interactivity, new media theory offers concepts that are useful for thinking about these issues.

It would seem, at first glance, that the dimension of time is the one that undergoes the most significant transformations. For instance, in the case of hyperfiction, narrative discourse ceases to exist in a single order and allows for different paths, different points of access to the story, and, necessarily, different meanings. Of course, even in traditional narrative, the relationship between the time frame in which the events occurred and the timeline of their narration cannot (and, most of the times, does not) directly match, as we can see through the narratological categories of analepsis and prolepsis. The biggest problem that arises in ergodic works is the relative difficulty we have in classifying more or less random relations between the time frame of events and the timeline of narration that result from users' actions (Eskelinen 2012).

The way time is produced and experienced in interactive media is so strongly altered that several scholars have suggested, more or less emphatically, that the defining characteristic of interactive media is spatiality, instead of twentieth century's mainstream media's (cinema) temporality (one of them being Aarseth, in his 2001 article presented here as a reference). Lev Manovich, on the other hand, models his analysis of new media on early cinema and on forms of montage, which see the database as a source of temporal relations (Manovich 2002). Janet Murray in turn reads hypertextuality in terms of navigational structures that can be understood spatially (Murray 2011). In this paper, concepts developed by Markku Eskelinen, Janet Murray, Lev Manovich and Espen Aarseth for thinking about time and space in interactive media will be applied to four ergodic works.

2. Time relations in ergodic works – Camille Utterback's Liquid Time and Markku Eskelinen' theorization of time in ergodic works

Liquid Time, a video installation by Camille Utterback (Utterback 2002), has been repeatedly analyzed in theoretical texts regarding interactive media [Janet Murray being one of the, in the text given as a reference here — Murray 2011]. Given its declared relationship with time, it was chosen as my first example in this paper. I will try to relate it with Markku Eskelinen's analysis of time relations in interactive narrative works (Eskelinen 2012), and find out if some of the points he makes are present in *Liquid Time*.

Eskelinen refers to classic narratological categories about time relationships between narration and story commonly accepted by most scholars, and then expands them so that we can use them to analyze not only traditional narratives, but interactive ergodic narratives as well. Some categories survive unscathed the introduction of interactivity, but most are changed in one way or another. Basing his analysis on Genette's approach

to the subject, Eskelinen considers time through the categories of order, duration, and repetition. He introduces two other possible time dimensions that can be verified with interactive media: system time and reading time. He expands these categories, having in mind the differences introduced by interactivity — for example, about order he says that while being the only category subject to changes in classic hypertext fiction, order is sometimes overstressed by scholars as the main innovation of interactive fiction. Nonetheless, the order of narrative elements is certainly altered with users' actions, maybe not in such a novel or random fashion as some scholars would have led us to believe. Analepsis and prolepsis exist in both oral and printed narrative, and chronological sequence is not always the main criterion for ordering events in narrative time. However it is possible to identify some changes in this category when subject to interaction, namely, the fact that analepsis and prolepsis can be absolute or relative, in relation to the whole or parts of the narrative: if all the possible orders have an unchangeable element, then the anachrony is absolute; if only some are repeated, then the anachrony is relative.

Eskelinen goes on to question the frequency of narrative elements, coming to the conclusion that not many differences distinguish traditional from interactive media, as traditional media categorization (by Genette–Eskelinen 2012, 146) already contemplates the possibilities of narrating once or several times either events that occurred once, or several events, in multiple combinations — thus remaining only the necessity to consider variability of frequency; and duration/speed/rhythm of the narrative, which he develops around the concepts of narrative time and screen time (as cinema's screen time, having inherited this view from Bordwell) (Eskelinen 2012, 150). It would be redundant to extensively describe Eskelinen's approach to time relationships in narratives here. The interest of his revision of narratological categories is to see how they apply to the example presented here, Camille Utterback's *Liquid Time*.

Liquid Time is described by its author as an exploration of "… how the concept of 'point of view' is predicated on embodied existence". More interestingly, for the case at hand, is how this concept is put in practice: "In the *Liquid Time Series* installation, a participant's physical motion in the installation space fragments time in a pre-recorded video clip." (Utterback 2002). The temporal dimension of this piece is visually explored and it is manipulable by the visitors — its users. We see, in a single work (a video) multiple timelines and, consequently, multiple relationships between narration time, story time, and screen time, to use Eskelinen's terms simultaneously. Hence, according to Eskelinen's categories, we can classify time relationships in *Liquid Time* as follows:

- as regards order, since *Liquid Time* doesn't have a fixed order of narration of events, we can say it presents the pre-recorded video clips in a random fashion (every time, a different order is presented); it is also non-linear, as the events are not presented chronologically or consequentially. As the video is altered by the user's proximity or distance, we can only guess that generated analepsis and prolepsis are relative, since they occur once in any possible timeline. Finally, it is possible that, since the video shows us spaces in New York, perhaps there is a different organizational principle, such as space, in which case we are talking about a syllepsis (multiple order of events, non-chronological), in Genette's words.
- moving on to frequency: the frequency of repetitions depends entirely on the user's random actions; plus, most of the times we will be talking about resemblance, and

not complete identity between repeated sequences. We can thus say that *Liquid Time* is indeterminate in frequency of repetitions' terms.

- lastly, as we consider the duration and speed of *Liquid Time*, as well as its possible relation with a pre-defined system time and a viewing time, it is possible to come to the conclusion that nothing is rigid; the work's duration and speed are a reflex of the user's actions, and *Liquid Time* is accessible for as long as the user wants. Whereas the time of the events captured in video and the time of each video sequence are fixed (and I do not, at the moment, know how they relate), the viewing time is not: each user, in each viewing, changes the viewed sequence and the relations between the time of the video capture and the time of its fruition, a reflex of the importance given by the Utterback to singular points of view. Each time a viewer affects, with his or hers actions, the sequence he or she is watching, it is being created a new instance of *Liquid Time*, a personal and unique one: in this lies the reason of its existence, as it is, undeniably, an ergodic work.

As a conclusion, I will propose that the time in *Liquid Time* is, indeed, liquid; that the analysis of its possible facets, as proposed by Eskelinen, and the way they react to each other and to the user, give strength to this idea of fluidity — *Liquid Time* is liquid not only superficially, but in all of its aspects. Time relations are viscous, never solidified; *Liquid Time* observes, in depth, and as much as I can understand, this liquidity in all categories defined by Eskelinen.

3. Space as an interaction design strategy – Simon Penny's Fugitive and Janet Murray's approach to space in new media

As time gives way to space as a crucial perceptual experience in new media environments, we must think about the ways in which space is organized and if and how it changes the user's experience. Janet Murray (Murray 2011) talks about space as an interaction design strategy, challenging common notions associated with the linearity of the twentieth century's mainstream media, cinema. The possibility of translating time into space and space into time further complicates our interface — mediated experiences in digital media environments.

The spatial affordances of the digital medium can be used for designing different kinds of interaction, including interactions in ergodic works. Murray goes on to describe several strategies for the design of interactivity, comparing them with their analog counterparts, such as containers (list and tables, the library model), landscapes and maps. Murray then discusses the nature of virtual space in the mind of the user, its relationship with discreet places, and the evermore present ubiquitous digital devices that force us to adjust to and locate ourselves within multiple spaces and the over imposed layers of information that they represent (augmented reality). Most importantly, Murray questions the ways in which virtual space expands or contracts real — life spaces — as we add layers of virtual spaces onto the real spaces, she wonders if, for example, "… gestural interfaces for video games are allowing us to think of the space between interactor and the device as a site for inscribing commands". This way of thinking is especially relevant when we think in terms of works such as *Fugitive*.

Fugitive emphatically describes itself as a non-narrative, opposing narratives to

interactive media as mutually exclusive categories. Simon Penny mentions cinema as a sort of antithesis of *Fugitive*:

> **Fugitive and cinema**
>
> *Fugitive*, while screenal, is emphatically not cinema. Like all interactive media, in *Fugitive* there is no pregiven narrative. Rather a unique experience unfolds for the user as a result of her interaction with the system.
>
> **Fugitive undoes cinema**
>
> If the user moves circumferentially, the scene that is triggered is a pan. As long as she circles, the image also circles, unfolding successive frames of the pan in successive positions around the wall. If the user moves radially, the shot triggered is a zoom, corresponding to the position in the pan. Fugitive, in a sense, 'undoes' cinema, since the image is aligned, (relatively) to the original position of the camera. As the user moves toward the image, the image zooms. The system can be understood as a kinesthetic video editor. Each user makes a different movie, depending on her behavior. (Penny n.d.)

(One could argue that cinema can be interactive as well, and that statements such as "Fugitive, while screenal, is emphatically not cinema. Like all interactive media, in Fugitive there is no pregiven narrative" are perhaps overlooking a few of those cases — admittedly, not too many.)

The point we will try to focus on with this example is that, in its attempt to avoid being cinema, *Fugitive* uses space and spatial means for interaction as its main characteristic. *Fugitive* is, in short, a video projection that, inside the limits of its cylindrical screen, runs away from the user as he/she tries to approach it in more or less frantic ways, which are mirrored by the system's faster or slower movements. In addition to the movements of the projection, the images that are projected are also triggered in response to user's motion: when the user runs faster, the system chooses a video with a higher frame-rate to project; if the user moves circularly, the video will have a camera movement that echoes the user's movement. These decisions echo, in our view, Murray's questioning of the space between users and system and the possibilities that it brings to interface designers.

Penny gives some information about the system behind *Fugitive* and the philosophy that originated the project. Interestingly, he states that *Fugitive* reacts not to the instantaneous position of users but to the temporal dynamic of their ongoing movements (Penny n.d.). This aims to capture the user's 'mood', task that would not be possible if the only available data was the instantaneous position of the interactor. *Fugitive* attempts to interpret "…gross bodily movement as an indicator of "mood"…" and then respond to it, in an instantaneous (as much as possible) fashion, so as to reaffirm to the user that the piece is interactive and that its (the user's) actions have a response" — Murray also stresses the need to find transparent and immediately satisfactory ways to give agency to the users, agency being the capacity to change the system and its responses.

As *Fugitive* maximizes the space it is given, attempting to convey multiple messages (of the body as a presence in interaction, of the ways in which to interact with the piece, and so on) through interaction in a space, originating responses in different ways of travelling (visually — through the eyes of a camera) through a given space, and as such

is, in our view, a valid example to discuss, if not the categories presented by Murray (only the landscape category is of some use to the analysis of the images presented in *Fugitive*), at least the spirit of her questioning and the broad strokes of her approach to designing interaction strategies that fully explore space. In *Fugitive*, ergodic intervention results in multiple outcomes that translate the kinetic and spatial relation of user to the cinematic representation of space.

4. Space and database aesthetics – Jonathan Harris' We Feel Fine and Lev Manovich's concept of database

We feel fine, a web based installation by Jonathan Harris in collaboration with Sep Kamvar, attempts to pick up every mention (on the Internet — mainly from blogs, as Harris explains in his Ted Talks (Harris 2007, 2008)) of the word *feel* or *feeling*, and then grabs the whole phrase and displays it, trying to make visible in one or another form of organized display the enormous amount of feelings floating around the world of personal expression on the Internet.

In this section of the article I will try to discuss Lev Manovich's emphasis on the database as a prime medium of expression (and, among others, artistic expression) of our computerized society, as he calls it (Manovich 2002), and cross them with the concepts behind *We Feel Fine*, in an attempt to better understand its concepts and the reasons behind its existence.

Manovich starts by naming the database form as the main aesthetic form of new media. He compares it to cinema, a (mostly) narrative form that was mainstream in the twentieth century, and establishes some parallels and contrasts between the way that database (new media) and narrative (cinema) function in their ways of conveying meaning and organizing its constitutive elements. Database corresponds to the result of a "digitizing craze" (Manovich 2002, 198) and is described as a "collection of images, texts and other data records" (Manovich 2002, 195). On the other hand, narrative is described as only one of the ways though which we can access these collected elements.

Of course not all new media objects are databases: games, for example, usually contain narrative elements, and their database is subject to an algorithm — the other half, Manovich tells us, of the "ontology of the world according to a computer". The web is, in Manovich's view, the place where the database has developed in its purest form: a "gigantic and always changing data corpus", something that operates under an "anti-narrative logic" (Manovich 2002, 196).

Interestingly, Manovich goes on analyzing some of the films of Greenway and Vertov, calling their works databases in film form, and ending his text by considering that Vertov, in particular, has done something that new media designers "still have to learn — how to merge database and narrative into a new form." (Manovich 2002, 212). He has done this by filming a database, or presenting us (the viewers) several shots, and several techniques, in a non-narrative way, in his *Man with a Movie Camera*. I will argue that Jonathan Harris has done the opposite movement — presenting narratives, or narrative pieces, in a database form — thus possible having "learned" how to combine narrative and database in an aesthetic and artistically meaningful way, and not resorting to a known form, such as a film, but using new media specificity.

We Feel Fine, as described earlier, picks up specific sentences from every web user's personal narrative. These specific sentences start, of course, by the statement "I feel" or similar. *We Feel Fine* then goes on organizing, creating statistics, rearranging, or even animating particles with data that is shown to us as we choose. There are several ways of observing how people are feeling in a given moment: all of them are at the very least dependent on spatial representation, which is, for Manovich, the only way to create a pure database (Manovich 2002, 209).

We feel fine achieves yet another accomplishment: it manages to present us with something Manovich claims is our expectation of computer-based objects (while he refers specifically to computer narratives, I will stretch this concept to any computer made object that in some way inherits analog behaviors and characteristics, such as an art work as *We Feel Fine*). Manovich says that, while we reject the modernist concept of medium-specificity, we still expect computer-made objects to bring new dimensions to traditional forms. *We feel fine*, in my opinion, does just that: explores computer conventions, ways of creating meaning and form, and uses them to create new shapes from the frequency, tone, and other characteristics of World Wide Web users' feelings and how they are expressed through it.

We Feel Fine spatially organizes data created by internet users, for us to read and interpret. Visual spaces are created each time we, as users, make choices or refresh the system. As internet users we have another interesting possibility: we can create content that will be captured by *We Feel Fine*, creating thus a feedback circle. *We Feel Fine* could not live without the event of ubiquitous interactivity. Either way, ergodicity is required to bring these informational spaces to life: as we chase the tiny circle-shaped feelings through the screen and generate different outputs of this feelings gatherer, we create, through our actions, new visual instances of a giant database — the internet.

5. Space in video games – Mary Flanagan's [Domestic] and Espen Aarseth's discussion of space in video games

As a final example, though obviously not the last possible analysis, I would like to approach space and the spatial dimension in new media twisting Aarseth's words about space in video games to include artworks that function in a video game structure. There are many such examples — in fact, growing in numbers — but, for the current research, *[Domestic]*, a piece by Mary Flanagan from 2003 (Flanagan 2003), seemed like a perfect choice, given that the author appropriates a video game space and redefines its rules for her own purposes. *[Domestic]* aims to recreate a childhood memory in a way that engages the spectator/user of the piece. The depicted event is not recreated realistically: instead, we find ourselves navigating through corridors that present us with the inner feelings and thoughts of Flanagan as a child, experiencing the traumatic circumstance of a house fire.

[Domestic] is built over the game engine of *Unreal Tournament*, a multiuser first person shooter, and allows us to use certain tools that are adaptations of *UT*'s weapons: books, literature, in the author's words, as a way to escape the horrors, an escapist tool that solves problems by erasing them from the child's mind — and our game/artwork space.

In *Allegories of Space — The question of spatiality in Computer Games* (Aarseth 2001) Aarseth considers the possibility of classifying computer games by the way they explore

the spatial dimension. Space is, in Aarseth's words, "the defining element in computer games" (Aarseth 2001, 154). This idea, in these words or similar ones, is repeated several times in the article. Aarseth analyses other possible defining dimensions or characteristics — such as time — and comes to the conclusion that most, if not all, computer games, revolve around spatial exploration in one way or the other. The way such exploration is implemented varies and can be ordered in classes, given some characteristics: for example, he defines outdoors and indoors games as, respectively, games that allow free movement in contrast to others, which are "discontinuous, labyrinthine, full of carefully constructed obstacles". Other distinctions can be made between the player's "puppet" and the environment, or between games that allow the player to influence the game world and games that don't.

Aarseth then discusses the nature of virtual and computer games' spaces. Combining two extremes of virtual and real space theories, to Aarseth space in computer games is both a realistic and a symbolic representation, since it is, in the end, a reduction of real space to a symbolic form and a set of rules.

[Domestic], living on top of a computer game's structure, can be classified and analyzed under Aarseth's system. Being both a semi-indoors game and multiuser, *Unreal Tournament* presents some of the characteristics identified by Aarseth in these types of games: we have labyrinths to cross, but mostly we are playing against other humans; the landscape is not symmetrical but its usage is open to both opposing factions. Having inherited the spatial structure of *UT*, *[Domestic]* happens in a space dominated by dark corridors, niches we cannot see from a distance, and it is required of us that we clear some obstacles — the traumatic parts of the event — recurring to escapist tools. It seems, thus, that we have here the typical indoors topology — one that is mediated by obstacles we must overcome — a symbolic construction of life and what it means to live, to overcome difficulties and to reach a higher level of comfort. While walking through *[Domestic]* we build new instances of these memories — for each user, a new game becomes materialized, new sequences, different consequences, as the algorithm responds to the player's actions.

More importantly, though, *[Domestic]* is a space constructed by human dynamics — it is the spatial representation of a memory; a created space, inhabited by symbolism, that would not exist if such and such experience did not happen to Flanagan. *[Domestic]* is, in the end, a "reductive operation leading to a representation of space that is not in itself spatial, but symbolic and rule — based (Aarseth 2001, 163).

6. Conclusions

After applying the selected descriptive models to the analysis of space and time in ergodic works, I came to the following conclusions:

- Firstly, and obviously, there are significant differences in the ways we can approach the dimensions of time and space in ergodic and non ergodic works. These differences have been described and classified in multiple ways. One major highlighted difference is the way timelines mix and create new relationships after the user inputs his/her data. I have confirmed that Eskelinen's classification of new categories for these relationships are operational when applied to Utterback's *Liquid Time*, and can be

expanded to fit other artworks dealing with the ergodic production of the experience of time. It would be interesting if, moving through the superficial hype surrounding the rearrangement of time in interactive objects, we, as scholars considering new media, could begin to see how time and its multiple dimensions are indeed put to creating new facets in our knowledge. *Liquid Time* conveys a message (or a plurality of messages) that can be further expanded when analyzed under Eskelinen's work.

- As we move on from the dimension of time to the dimension of space, I have tried to see if some of Murray's considerations about this factor in interaction design are similarly relevant for describing *Fugitive*. Murray's work attempts to classify every kind of object, focusing mostly its effort in prosaic new media objects, such as web pages, applications, and others, but its general meaning can be applied to artworks too. *Fugitive* allows us to test some of the concepts Murray presents, such as the possibility of actions affecting both real and virtual spaces (considering the real space of the installation and the represented cinematic space), and the space between them. The marked gap between these two spaces allows the user to pause and take into consideration his or hers relation to represented space; to space in cinema as well as to space in art; and to the space given to him or her for interaction in this particular work.
- Manovich's analysis of databases and the database culture we presently now live in seems to not only fit, but to have spawned the presented artwork, Harris' *We Feel Fine*. Artistic production exploring the rich material originated by the collective use of the World Wide Web, is more likely than not expanding the possibilities of the database form and aesthetics. Manovich's exploration of the concept is probably going to be more and more pertinent in the art world as well as in the broader new media world, and it would be interesting, in future endeavors, to continue to explore Manovich's text in confront with new media art pieces.
- Finally, in the more specific field of computer games, or video games in general, the dimension of space is one of great importance — Aarseth argues that it is the defining dimension of video games. *[Domestic]*, built over a computer game structure, is one of the possible examples of spatial exploration in ways that convey meanings and it is absolutely true that without the spatial dimension the piece would be a completely different experience.

Ergodic interactions affect our experience of space and time in new media objects in ways that differ from work to work. Although space seems to have been explored more extensively and meaningfully than time, I believe that the ergodic production of time needs to be addressed in greater detail. Critical and artistic exploration of the interactive dimension of time and space can open up new ways to create digital works, which don't simply go back to conventional formats inherited from past endeavors.

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