Discourse Timer: Towards Temporally Dynamic Texts

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Abstract

This paper studies the possibilities of temporally dynamic digital texts. Temporal dynamics may be either dependent on the reader's use of time, or independent of it. Using the categories defined in narratology as our starting point, we outline a list of simple functions that allow a very complex temporal manipulation of narrative digital texts. We will also describe a set of authoring tools, Discourse Timer, which is specifically designed to employ these functions

FROM SPATIALITY TO TEMPORALITY

So far digital texts have been usually discussed in terms of hypertext, which is usually described as a spatial form of writing. Especially the literary-aesthetic discussion of hypertextuality has focussed on spatial practices (see e.g. [2], [10]). Furthermore, much effort has been invested in studying the ways text links are employed in literary hypertexts. We take another approach, and emphasise the temporal organization and structuring of texts. So, text links are temporarily pushed to the margin, as we concentrate here on the ways the links and other aspects of digital texts may be pre-programmed. That is, in addition to following Ted Nelson's lead and conceiving links as choices offered for the reader, we treat links as parts of the authored structure.

The short history of literary digital texts does present us with a variety of temporal practices, even though this dimension has not been thoroughly discussed so far. Michael Joyce's *Afternoon* [9] employs conditional links, with the effect of temporally postponing the accessibility of certain parts of the hypertext. Stuart Moulthrop's *Hegirascope* [11] is a 'textual cinema', where each node possesses a measurable true time duration. *Reagan Library* [12], also by Moulthrop, varies the amount (or length) of text in a node relative to the reading time: if you reread certain node, its contents have changed. Thus, in the existing hypertext works we already

have such examples of ways to manipulate the relation between *story time* (the time of events told) and *discourse time* (the time of narration) which do require significant expansion of the traditional narratological categories. In this paper we aim to give a more systematic account of these new relations.

(PSEUDO)TIME OF NARRATOLOGY

In classic narratology [4, 6, 7, 13] time in narrative fiction was studied in three dimensions: *order*, *frequency* and *speed*. Order deals with both the order of the events as they happened, and as they were narrated (the point of departure here is that events may be told in the same order as they happened, or, in a different order). With frequency the situation is very much the same: the events may be told as many times as they happened or different amount of times (a single event may told twice, for example). The speed is very different phenomenon, however, since there is no proper way to quantify speed in textual narrative. Instead, we have to rely on certain conventions providing us with the framework of *pseudo time*. Thus, if the events of a life time are recounted in a few pages, we have the feeling that narration is speeded up, that the discourse time is faster than the story time. Or in another direction, if a simple event like choosing a proper tobacco pipe from a rack is recounted in 20+ pages, we have the feeling that the discourse time is slower than the story time. Somewhere in between, there is the balance where discourse time and story time are seen as approximately the same.

It is extremely important to notice that pseudo time is really not a temporal measure at all, but a spatial one: pseudo time is counted in number of words, sentences and pages used to describe certain event(s). For print oriented narratology the clock measured true time has had no significance at all (or only as a background comparison model); discourse time is always reduced to pseudo time.

DISCOURSE TIME OF TEMPORALLY DYNAMIC HYPER-AND CYBERTEXTS

With temporally dynamic hypertext, however, we need also to take into account the measurable true time, as we can, for example, define the duration for each node (as happens in *Hegirascope* where each node gives way to the next one in 30 seconds). Thus, from now on, we have to divide discourse time to two separate categories of pseudo time and true time. All in all, we need four temporal levels:

1. user time (the time the user spends reading the hypertext)
2. discourse time (the time of the narrative discourse)
    - pseudo time
    - true time
3. story time (the time of the narrated events)
4. system time (the time of the hypertext system states)

It should be noted that some of the temporal effects are dependent on the user time, some are independent of it. That is, there are such programmed changes in the system, which follow their course no matter what the reader's actions are, and on the other hand, there are such events, which are steered by the reader's actions (intentionally or unintentionally).

As noted with temporally dynamic hypertexts the temporal model of traditional narratology is not enough. Pseudo time is still useful, but in addition we can introduce real duration for the narrated events, or we can fix their existence to a limited time frame. In a simple example a text passage describing an event that was supposed to have lasted for 45 seconds, is readable only for the same 45 seconds of time (note that the length of the passage may vary from a single word to several sentences, thus, the pseudo time is still relevant concept). Furthermore, the passage may be accessible only, let's say, during a period of time starting 20 minutes after opening the document and lasting for two minutes. Obviously, for film narratology (cf. [3]) this measurable *true time* has always existed and is traditionally called screen time. In that sense there's nothing extraordinary in our model - it only combines these two media specific ways of understanding discourse time, and describes temporally dynamic hypertexts in both registers.

We are currently developing an authoring tool called *Discourse Timer*, which is designed to allow an easy way to manipulate both the true time and pseudo time dimensions of narrative hypertexts. We will describe *Discourse Timer* in more detail below, but first we need to describe some of the relevant narrative categories.

NARRATIVE CATEGORIES

Next we will first discuss the concepts of frequency, speed, and order as described in narratology, and then introduce new categories brought along by the temporal dynamics. The default settings are derived from ordinary hypertexts that are not temporally dynamic. To use Espen Aarseth's concepts they utilize *static scriptons* and *intransient time* [1]. The following categories show some of the possibilities to

change this situation, but this does not imply that authors should simultaneously use all the combinatory variations. Or to put it differently, the default values are always the same: static and intransient. It should also be clear that when we are moving from static scriptons to intratextonic or textonic dynamics (by changing the content and the number of scriptons and textons) or allowing users to configure the settings of text production, we have also moved from hypertexts to cybertexts [1].

As noted above *Discourse Timer* understands discourse time both as pseudo time (space) and true time (time measurable in seconds and minutes). The former can be altered by adding or subtracting signs or by changing their contents, and the latter by limiting the accessibility or the existence of the node or the hypertext as a whole. *Reagan Library* shows some of the potential of the former and *Hegirascope* of the latter not to mention William Gibson's *Agrippa* [8].

Discourse Timer treats order, frequency and speed as pseudo time only, and other parameters as true time only. In what follows only a small amount of possibilities inherent to some of these variables can be discussed.

- Order. Usually the events of the story can be arranged into a chronological order despite of the actual order they are narrated. When this is not the case classic narratology speaks of achrony, and authors like Alain Robbe-Grillet and Robert Coover have made good use of various types of achronies ever since the 1950's. By adding, removing and changing signs of the node (for example by erasing all temporal markers or indicators) we can control the amount or the degree of *achrony* in the narrative and cause more or less complex epistemological and ontological doubts concerning the status of a particular node. Or we can create parallel and possible worlds by creating temporally autonomous nodes and zones. If the author doesn't wish to use any of these possibilities, then the text stays in its original state.

- Frequency. In this category we can manipulate frequency, that is, repetition: some things vanish and other things keep coming back. At one extreme there's an empty node baffling readers and implicating a loss, and at the other end there's a node that keeps expanding while being read by unsuspected reader or user. This allows very elaborate games of memory - one might imagine a text where all dialogue vanishes after being read once or twice while everything else stays the same, or not quite.

- Speed. Classic narratology recognizes the following five speeds (in an accelerating order): *pause, stretch, scene, summary* and *ellipsis*. *Discourse Timer* can change the status of a node from one of these categories to another or introduce much more minor changes (only "a little bit" slower or faster pace). Ellipsis is understood as an empty node (to implicate either that something existed or will exist). By leaving the node empty instead of deleting it or making it inaccessible the structure of the work is highlighted

and unprecedented expectations are created (in terms of both suspense and curiosity). This way the timing gets all important: the reader has to be in the right place in the right time or take a risk of missing something important or at least relevant. Basically, we are dealing with the amount of narrative information given to the reader. It's also important to realize that speed, frequency and order are usually very tightly interconnected variables. So by simply adding more text to a node the author can affect all these three dimensions. That just goes to show one of the practical strengths of *Discourse Timer*: it produces complex and intriguing results by very simple means.

- Duration. *Discourse Timer* understands duration in true time and on two levels. In practice this means that the default value is unlimited duration as explained above. To alter this state *Discourse Timer* introduces various limitations or restrictions, on one hand on the level of individual nodes, and on the other hand on the level of the whole hypertext. These restrictions affect either the true time (in seconds, minutes etc.) that the reader can use per node, or the number of times a node can be approached, or both (see below).

- Reading time per node. Default value: unlimited reading time. The possibilities inherent to limitations can easily be imagined with the help of an already existing example, *Hegirascope*. First of all, limitations build pressure, and if that feeling is mirrored in the content of the hypertext, that's even better. Limitations can be deliberately frustrating and undermine readers' attempts at mastery and control. The time given may be much less than what the reader needs to traverse the node. So instead of getting it all the reader may get only a glimpse. Obviously, this requires the taste for permanent uncertainty.

- Total reading time. Default value: unlimited. Various limitations introduce yet another narrative situation where the reader might have to filter out noise and irrelevant narrative threads to complete the mission in given time. If used gently, this kind of solution may enhance immersion. On the other hand, these limitations can give an automatic answer to the often-repeated question of how do I stop this thing?

- Revisiting. This factor concerns the possibilities to revisit a node on the course of one reading session. Default value: unlimited. Once again, limitations highlight the remembrance(s) of things past.

- Rereading. Default value: unlimited. Limitations could enhance more serious attitude towards classics - what if it was possible to read *Tao Te*

Ching only twice in a lifetime. If we compare these options to performances and happenings, they are not so new.

- Vanishing speed. Default value: immediate and simultaneous vanishing. This concerns the situations where signifiers are added, removed or changed. These processes could equally well be gradual with different speeds, orders (from the beginning or the end of the node) and linguistic specifications (for example: first names vanish first).
- Simultaneity. There can be either one or several text frames on the screen at the same time. In the latter case the frames can be in synchrony or autonomous. Basically, one node can be split into multiple frames or multiple nodes can be displayed on the screen simultaneously. Default values: one frame per node, and one node per screen.
- Permanence. The hypertext can be either permanent or temporary (ephemeral). In the latter case it is programmed to vanish in the course of time, and there's a real beginning and a real end in the same package or happening. Default value: permanent.
- Occurrence. Default value: cyclic. Other options: linear as specified. This parameter regulates the type of change: linear here means irreversible. In such cases something changes but does not change back. Here as elsewhere the most dynamic possibility is the combination of these two: some things are repeated (or return) while other things are unique. To be precise, there are three interconnected values at work: appearance, disappearance and reappearance.
- Reception time. Default value: always. This means there are no restrictions as to when the text can be accessed. Restrictions can be chosen from the following set of options: the time of the day (mmhh - mmhh), month (ddmm - ddmm) or year (yyyy-yyyy) the dates in parentheses being the opening and closing hours.
- Changes. Basically, every change can be either *given* (user independent), or *caused* (user dependent) or *chosen* (see Settings). *Discourse Timer* favours given and chosen changes. In the latter case temporal variables presented in this section of the paper are dependent on how the reader uses his/her time (see the section on Counters and User Time below). In the former case the reader navigates in a temporally dynamic environment where links, nodes and signifiers appear, disappear and reappear. Obviously, the ideal arrangement is the combination of these two. Still, given changes is the default setting.
- Settings. Settings are meant to be final and that's also their default setting. However, in some cases it would be interesting to show the settings to the

reader (as a scary form of metafiction), and in others the reader might even want to "freeze" some settings to increase (or decrease) the coherence of the work.

- Totality. This parameter determines whether the hypertext is closed or open. The former option refers to the text that contains all its signifiers right from the beginning (at the moment of publishing) and will not be supplemented later by new signifiers. This is also the default setting. The other option allows the work to be supplemented.

This array of parameters is far from exhaustive. Still, it should at least give a glimpse of the novel narrative possibilities beyond static scriptons and transient time of classic or first-generation hypertexts. (Some of these possibilities are implemented in Markku Eskelinen's cybertext fiction *Interface 3* that will be published in Finland in October 2001. [5])

DISCOURSE TIMER

With *Discourse Timer* authoring tools it is possible to create

1. dynamic hyper- and cybertexts, which' values of order, frequency, and speed can be manipulated at will
2. dynamic narrative texts, which employ measurable and limitable discourse time.

It should be noted that after a decent narratological analysis, most of the existing narrative texts could be easily transformed to dynamic hyper- and cybertexts using *Discourse Timer*.

At this initial phase *Discourse Timer* is a set of tools to be used in association with a multimedia authoring program. These tools allow the author easily to manipulate the temporal qualities of nodes and links. All the narrative categories described above can be easily manipulated, with related narrative effects.

Indexed Nodes And Links

Each node and link will have a set of discourse related indexes attached. With these indexes it is possible to indicate, among other things, if a node/link is accessible only for a certain period of time. The values of related indexes determine the time and duration of the accessibility. When a node/link is existent but not accessible, the user will see a cue informing him/her of the presence of a restricted node/link.

There are also grouping indexes: a set of nodes (or links) may be grouped together and various functions may then be ascribed to the whole set; ready-made group functions include possibilities like serialising (nodes/links being existent/accessible in successive order starting with the first item in the set for a period of x, after which it is closed down and the second item is activated etc.)

Usually it is possible to make do with just a modest number of indexes per nodes/links. Since all the nodes/links are automatically set for default values (which effectively equal the usual spatial hypertext), only those categories which in any specific work are employed in non-default manner require indexing. And it seems plausible that to achieve readable results, in one work usually only a few categories are tampered with.

Node and Content Related Indexes

The indexes may be referring to the behaviour of a node as an entity, or, to the contents of the node. Thus, it is possible to delete/change the contents of a node, while the node as such remains intact in the structure. Also, the user may be intentionally made to face an empty node.

Counters and User Time

There are two temporal counters in use: 1. *real time counter*, i.e. calendar time (values referring to actual time), 2. *system time counter* (starting when the document is opened). The system time counter can be used to measure the time the user has spent for the whole document, or, separately, for any single node. Thus, the temporal structuring may be relative to the actual time, true time (ie. reading time), the duration of the session, or the reading time used for each node, or any combination of these.

The story time is manipulated with means of pseudo time: adding or deleting text in a node can introduce changes in story time.

One more counter is still needed, namely frequency or *visit counter*. Actually, this should be in plural, as every node/link requires its own counter, keeping track of the number of visits to that particular node (in *Reagan Library* this kind of counter is made visible - the number of dots in the lower right hand corner showing the number of visits so far - although it does not go above the value of four). Thus, the user time can be regulated both as measurable time, and, as visit frequency.

Group Functions

There is a set of pre-programmed functions, which can be assigned to sets of nodes. This means that simple temporally organised documents can be designed easily - only the group indexing is required, plus the assignment of specific functions to each group.

Script Language

Other possibility available is a script language, which allows the author to write customized and more complex functions. Naturally, the pre-programmed functions can be used also in connection with the scripting.

User Controlled Links

As experience with literary hypertexts shows, purely associative linking offers satisfactory results only in very strictly defined aesthetic practices. Still, there is a choice of text links and other user controlled links available in *Discourse Timer*, but since the temporal structuring makes part of the nodes and links only accessible at restricted periods, there may even be reading periods without the reader having to choose any links. It is, however, always possible to minimize the role of temporally programmed links, and concentrate on the user controlled ones; thus, with different combinations of temporally programmed and user controlled links, it is possible to produce a variety of works which may be effectively close to the classic hypertexts, traditional print texts, or cinematic texts, instead of genuinely cybertextual approach. A text specific, well-balanced combination of temporally programmed and user controlled links should heighten the immersive aspect of reading the text.

FROM DISCOURSE TIMER TO DISCOURSE CONTROLLER

Once *Discourse Timer* software is properly working the next step is to generalize its functioning. While the temporal structuring seems to us as the most urgent need for digital text authoring, there are unlimited possibilities for controlling the narrative discourse. All kinds of input data can be employed instead or in addition to the temporal variables to control the flow of narration. One possibility would be implementing *Discourse Timer* - or Discourse Controller as it should be called here - to WAP environment and used in connection to the Mobile Positioning System

(MPS) so that reader's (who is using a WAP phone as a reading device) location and movement in actual space would affect the text he/she is reading.

Another highly promising direction would be multi-user systems, where the actions of a group of readers affect each other's reading. This way, complex and unpredictable structures could emerge from the forms of group behaviour and dynamics.

Finally, we have focussed here on text only hypertext because of the obvious advantage of keeping the software development as simple as possible. But excluding the technical requirements, there should be no obstacles for adapting this concept to the moving image video editing too.

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