Third 2008 International Conference on Convergence and Hybrid Information Technology

Towards a Visual Graph-based Story Outline Authoring

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Abstract

In this paper we present an authoring tool for collaborative visual creation of story outlines. A visual graph-based approach was adopted in order to allow story outlining of a wide range of types and genres of stories, while offering a story representation paradigm suitable for multi-author collaboration and for the integration and organisation of external sources of documentation of the story. Such a paradigm of story representation is also effective for an easy and semi-automatic rapid creation of story prototypes which can be obtained by mean of a specifically developed templating engine.

1. Introduction

The media for narrative expression have grown both in quantity and in quality with the advent of digital technology. This is especially true with the appearance of several completely new media of expression which can be used for storytelling, such as videogames, interactive fiction, hypertexts and multi-media. However, the diffusion of digital technology has also profoundly influenced traditional media and "formats" (text, video, audio, …), in the ways they are used, and in the ways they are created.

Not necessarily does one need to integrally apply the McLuhan's maxim "the medium is the message" [1], to recognise that the medium in itself embeds the message and that the narrative intentions of the author come fully to life only when the story acquires its materiality through or by mean of its specific target medium.

However, notwithstanding this fundamental fact, we can still abstractly think about a story as a sequence of fictional or non-fictional events, and – more importantly – we can agree on the idea that every real and concrete process of story-creation and story-production (in its target medium, be it a text, image, video, hypertext, or an interactive medium) always goes through the process of story outlining, where the contents of the story gets collected (or invented) and organised, having in mind (or not) the target medium through which the final story will be recounted.

In this paper we present a methodological approach and a software tool developed precisely for the purpose of supporting authors is such process of story outlining.

The software tool is based on a visually-oriented collaborative story-outlining approach, and offers the possibility to generate rapid story prototypes through which the authors can further specify their narrative intentions, and in the same time allowing to others (e.g. reviewers, producers, directors) to have a better insight into the contents of the story and in the way the authors are intending to narrate it.

A specific emphasis in the story-outlining software tool has been put on the possibility to use external digital resources (images, texts, videos, or more composite digital assets) as contents and sources for documenting and describing the content of the story. Be these resources taken from a dedicated structured digital assets repository, or just a set of URI's of digital resources available on the Internet, this feature gives the possibility to authors to link and attach a collection of digital materials which may subsequently be used downstream, during the production process (for example in the production of a documentary video about a historical event).

Departing from these premises, we are proposing an approach for representing and visualising stories through a specifically designed modelling and visualising language and its related software, whose design objectives and requirements are:

- to effectively represent and visualise relevant structures and aspects of stories;
- to support effective cooperation (across network), with possibilities of synchronous and always-on asynchronous cooperation;
- to be easy to use and understand (adaptable both for the general public and for professional authoring);

978-0-7695-3407-7/08 $25.00 © 2008 IEEE
DOI 10.1109/ICCIT.2008.207

– to be enough general to admit a large number of types and genres of stories (both fictional and non-fictional);
– to permit a rapid story prototyping with visual and structural previews;
– to allow structured archiving of stories and their easy retrieval and reuse.

2. Background

This paper focuses on expressive, visualisation and collaborative aspects of the story authoring approach and software environment, without going too much into details of the field of semiology, literary criticism and narratology [2].

It is important not to confuse the authoring environment presented here with the so called virtual or interactive storytelling (which is a form of interactive entertainment where the reader/user/player plays a role or decide interactively about the evolution of the story [3], like in the experimental interactive fiction *Façade* [4][5]). It also must not be confused with various tools and approaches for computer-based story generation [6], or with (script)writing support systems like *Celtx* [7], *Final Draft* [8], *Practical Scriptwriter* [9] and the more theory-heavy *Dramatica* [10,11].

The key problem our authoring environment was designed for is how to formally and visually represent a story in order to be effective both for the purpose of visualisation, understanding and manipulation of its structure, as well as for better and more effective collaboration among multiple co-authors. Therefore, the two main aspects we address is (*i*) the problem of story representation and visualisation, and (*ii*) the collaborative story-outline creation.

It has been discussed elsewhere [12] that illustrative and visual techniques and approaches to story representation may prove useful and address the breaking down of a narrative for better structuring and organising the process of creation and production.

With regard to the collaborative side of the problem, there is a growing body of literature and practical experiences related to specifically text-centred collaboration, propelled by the success of wiki-based and wiki-like technologies (like the so called *Wikinovel*, e.g. the well known experiment *A Million Penguins* [13]).

But while collaboration around and through *visual and graphical* entities and artefacts is an established practice in many fields (and in particular in design sciences and practice), to our knowledge there are no purpose-specific tools for collaborative story outlining supporting rich visual modelling, representations and manipulation of artefacts.

2. The story-outline visual modelling language

The formal structure our authoring environment is grounded on is the *story-outline modelling language* (SOML), which was specifically designed by us for this purpose. In SOML, a story is represented as a set of "activities" which are placed along a *story timeline*. The position of an activity within the timeline represents it chronological placement within the story, and therefore the timeline is a representation of the time-duration-order of the narrated story (see Fig. 1.).

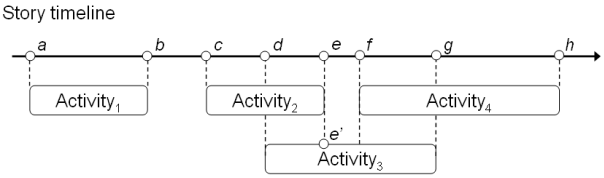

Fig. 1. Example of a story timeline with story activities

Even if, from the formal point of view, the timeline is nothing more than an ordered set of time-markers designating significant moments in the story (like *a*, *b*, *c*, *d*, *e*, *f*, *g* and *h* in Fig. 1.), from the point of view of user's interaction the story creation process is organised around the visualisation of an empty timeline which authors gradually populate with activities by putting time-markers of the beginning and end of every activity.

By default, the timeline is not a linear representation of time. In other words, the graphical representation of the timeline is not necessarily *isochronic*. There are types of narrations (e.g. of historical and documentary type) where an isochronic timeline may be necessary and useful, but there are also stories where only ordinal relations among different activities in time are relevant and known (i.e. among different events the only known and necessary relations are "before", "after" or "during"). In these cases no duration nor the exact time of beginning and ending expressed in absolute time is given. For these reasons, at the beginning of the story-outline creation process, the authoring tool offers the possibility to define the characteristics and to parameterise the timeline starting from the following three basic types:

1. isochronic, but not corresponding to the real-world historical time (e.g. possible in alternate history or futurological stories);

2. isochronic with respect to the historical time (e.g. historical documentary);
3. anisochronic with respect to time, with only ordinal relations among events (e.g. possible in tales and fiction stories).

The authoring tool allows to insert activities overlapping in time (like $Activity_2$ and $Activity_3$ in the example in Fig. 1.). This is the reason why, besides special time-markers representing the *beginning* and the *end* of each activity, we introduced the concept of generic time-marker. In fact, all time-markers in a story can be used by authors in the so called *behaviour maps* (as explained below) to better describe and define the temporal relations among various activities and events within activities. Taking for example the time-marker *e* in Fig. 1, we can notice that it represents the end of the $Activity_2$, but it can also be used (as *e'*) by authors in the description of the $Activity_3$, should there be a need to declare and insert information about the overlapping, synchrony or parallel development of the two activities respectful to the moment of time represented by *e*.

From the narrative point of view, an *activity* in SOML is a set of actions, events and states that can be described by two types of "map": (*i*) the *structure map* (see Fig. 2.) and (*ii*) the *behaviour map* (see Fig 3.).

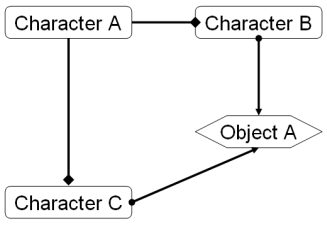

Figure 2. Example of a structure map

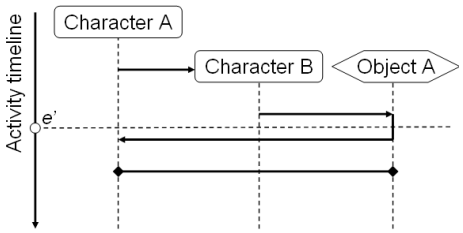

Figure 3. Example of a behaviour map

A *structure map* represents the states and the relations of constitutive elements of an activity (for example a structure map can describe the characters and their relationship in the respective activity), while the *behaviour map* represents the sequence and the development of events and actions *within* that activity. Therefore, the behaviour map has its own "local" timeline along which the authors can put the constitutive behaviours (events, actions, transitions, etc.) of the activity.

As it can be seen in Figures 2. and 3., the building blocks of both types of map are nodes and arcs. The nodes can be configured in the software to be visually and semantically of different types, and are intended to represent the constitutive elements of a story, such as characters, places, objects, phenomena, and so on. The arcs on their turn are meant to represent the relations between the nodes. We call both nodes and arcs together the elementary "particles" of the story-outline.

Every elementary particle can be further described with annotations, additional documentation and digital assets linked from a digital assets repository. In fact, the particles (both nodes and arcs, in both structural and behaviour map) are "containers" where the authors can insert links to digital assets from different sources (which may be specific digital assets repository, but also any other accessible resource e.g. identifiable with an URI). Besides putting digital assets together in a particle, the authors have the possibility to insert textual annotations and comments in order to "glue" the assets together, providing thus the desired meaning and contents to the particle and specifying its sense within the context.

The fact that these particles are composite entities is an essential and one of the key features of the story outlining approach adopted here. Indeed, it is important to underline that SOML can be used by authors with different level of detail, and with different expressive power and intensity. Since, as we have seen, the maps' particles are containers with references to relevant digital assets glued together by textual annotations, the decision what and how much of the story to put *inside a single* particle (be it a node or arcs), or on contrary what and how much of it to represent and *split into a composite structure* using the nodes-arcs paradigm, is something authors can freely decide and agree upon. The authoring tools does not impose any specific constraint on that regard, and therefore the decision can range from (*i*) one theoretically possible (but rather pleonastic) extreme of usage of putting just one single node in the whole outline and then inserting *all* the text and digital assets *into* that single node, to (*ii*) the the other extreme of a meticulous and detailed destructuring and breaking down of the story in activities, and subsequently in nodes and arcs of activities' structure and behaviour maps.

The decision whether to use the system only for a raw and rapid sketching of story-outlines or for building detailed and highly structured outlines stays in the authors' hands, who should ground the decision on

their collaboration, communication and production needs, conditions and constraints.

3. Rapid story prototyping

One of the distinctive characteristics of the authoring environment hereby presented is the possibility to generate a rapid prototype preview of stories. A story prototype is *a transposition* of a story-outline (in SOML) in a multimedia form. The layout, structure and organisation of the prototype depends on the parameters and options set by the authors at the level of *templating engine*. The templating engine offers possibility to decide about structural (rules and models of transposition of SOML), navigational and presentational aspects of the prototype, as well as about the type of the output media. Currently, the templating engine implemented by us can generate only hypertexts (i.e. a set of HTML web pages) as the output medium.

In an overall production process, such a prototype is an useful intermediate product, as it offers a preview of the elements of the story and allows users to browse/playback it in order to preview the contents and narrative intentions of authors. Given the fact that the story prototype is a self-contained object (e.g. a set of web pages), sometimes it may even be used as the final or quasi-final product (e.g. for rapid production of educational materials).

The main feature of the story prototype is to allow users to browse the timeline according to rules and constraints possibly set by authors at the level of the templating engine. Such rules and constrains may be mainly of navigational nature, allowing free or conditional navigation among actions of the story and among elements of single maps. In this way the authors can for example impose a specific and not necessarily story-chronological order of browsing/playback, expressing in that manner their narrative intention to present the story in a non-chronological order.

Furthermore, the hypertext prototype permits users to browse and explore the content and story elements organised according to different criteria and typologies (e.g. to see and browse the list of all "particles" such as characters, objects, places; to playback the story from the point of view of a one particle like a specific character, and to see its evolution, states and relations during the story).

4. Expressive possibilities and link with narratology analysis

It is important to emphasise that the formal structure and the nature of artefacts defined in SOML do not correspond and are not directly referable to concepts of any specific narrative theory [14]. Indeed, the purpose of SOML is not to offer a framework reproducing and requiring the formulation of stories through particular narratology and semiotic structures. Rather, SOML was designed as an expressive medium to support the representation and collaborative outlining of story contents through combination and composition of the above described artefacts and structures.

However, in order to discuss the expressive potentialities of SOML and to explain its role in an overall production process, from the outline to the final "product" in its target medium (be it a text, audio, video, hypertext, multi-media or interactive product), it is useful to refer to few concepts from the narratology analysis. In Table 1. we report some relevant aspects of narrations (adapted from [12]), together with the macro-phases of a typical production process. As it can be seen, we assume that only the final product possesses the entire, definitive and ultimate expressive power, while the story-outline (designed in SOML) and the prototype (created from SOML by the templating engine) can cover only certain aspects relevant for the storytelling.

Table 1. Relevant narrative aspects and the possibility of their treatment/expression in different phases of a production process (O – outline, P – prototype, S – storyboard, F – final story/production). The symbol "+" indicates that treatment and expression is possible, while the symbol "*" means that treatment and expression is only partially possible.

Narrative aspects	1. O	2. P	3. S	4. F
Plot, elements of the story	+	+	+	+
Story space and places	+	+	+	+
Characters and relations	+	+	+	+
Story time	+	+	+	+
Narrative time - order		+	+	+
Narrative levels and loops		*	+	+
Narrative time - duration		*	*	+
Narrative time - tempo			*	+
Narrative tension			*	+

5. Multi-author cooperation

The authoring environment has been specifically designed with multi-author cooperation in mind. It is important to distinguish two cooperative dimensions. The first one is the possibility of many authors to work on the same story, drawing diagrams and modelling the story-outline with the synchronous and asynchronous capabilities of the visual authoring tool. The second cooperative dimension emerges with the possibility offered by the overall system to query the database of

stories, allowing authors to reuse information and parts of stories created previously.

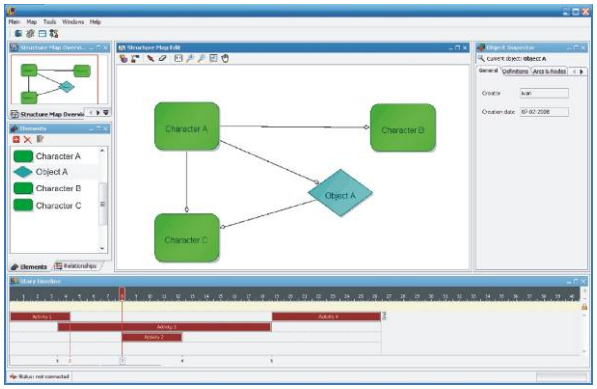

Figure 4. Example of the user interface and the drawing canvas in the authoring environment

The visual support and representation of the story is a crucial feature for an effective collaboration since it allows to:

- offer an overview of the structure of the story;
- better show and track the progress and changes made by different authors;
- allow a more precise subdivision of tasks and work;
- show the different contributions and comments made by different authors.

From the point of view of software architecture, the authoring environment is a set of extension modules for the *MaGIA* collaborative concept-mapping tool (for more details see [15]), developed in Java as a client-server architecture using and extended XML Jabber protocol for network interaction and data exchange. Therefore, the process of multi-author story outlining takes advantage of all the collaborative features in *MaGIA*, namely, synchronous and asynchronous collaboration, synchronised and unsynchronised map sharing, and instant messaging, among others.

5. Conclusions and further research

In this paper we have presented an approach and an authoring software environment developed for story outlining and rapid story prototyping. The environment and the related story-outline modelling language (SOML) should be seen as an expressive medium offering capabilities of visually representing story-outlines. It takes advantage of this visual paradigm to better support and assist the cooperative process of multiple co-authors possibly collaborating across network.

One further relevant result is the possibility offered by the templating engine to semi-automatically generate rapid previews of story-outlines, offering the opportunity to the authors and other roles in the production process to review and evaluate the contents and the related digital assets to be used in the story, as well as to better understand the intentions and narrative modalities proposed by the authors.

The authoring environment was developed on top of an existing collaborative concept-mapping infrastructure *MaGIA*, and that allows to take advantage of the tools and features for visual cooperation offered natively by that platform.

After the phase of prototypal testing, in the future we will dedicate our efforts on more relevant case-based testing of the platform, giving it specific test-drives to better evaluate its expressive power and operative usefulness in real-life production processes. Another field and direction of possible future development is to re-adapt the software as a Web-based system, in order to explore its potential and interests as a possible advanced "Web 2.0-like" service offered to general public for story outlining, rapid prototyping and story and digital assets sharing.

Acknowledgements

This research was supported by a research grant from the Italian Ministry of University and Research as part of the LC3 project [16].

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