BRINGING LITERATURE TO LIFE WITH VIRTUAL REALITY

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Abstract – Whilst there have been numerous applications of Virtual Reality to the preservation of cultural heritage, these have naturally concentrated on the virtual reconstruction of physical artefacts. The traditional opposition between text and image has confined literature to different sorts of digital archives. In this paper, we introduce a radically new approach to the digitisation of literature, which is based on recent advances in Interactive Narrative technologies. More specifically, these techniques make it possible to represent the narrative structure of a novel or a play, in a way which provides principles for its staging in Virtual Reality, using virtual representations of its feature characters. We illustrate this approach through the adaptation of two classical pieces of European literature: Madame Bovary by Gustave Flaubert, and The Merchant of Venice by William Shakespeare.

INTRODUCTION

The development of Virtual Heritage has been predominantly associated with the 3D reconstruction of artefacts, architectural or archeological sites, or the virtualisation of exhibitions themselves [1]. This can be explained by the predominantly physical modality of accessing such artefacts, which can be readily transposed in a virtual world. However, other sorts of cultural objects, such as literature works or even tales from oral traditions, have only seen virtualisation through the digitisation of their linguistic content. Recent developments in interactive technologies make it possible to address the digitisation of literary works from a new perspective, in a way which preserves and evidences key structural properties such as a novel’s plot. Unlike transposition of literary works to traditional media, such as film or TV, their virtualisation supports a potential for exploration and discovery which was hitherto the preserve of other forms of virtual heritage.

In this paper, after giving a brief introduction to virtual and interactive storytelling, we show how the virtualisation of literary works can support novel forms of access and dissemination. We briefly describe the principles behind the interactive formalisation of narratives, and discuss the long-term potential of immersive virtual reality systems in terms of user experience. This discussion will be illustrated by examples from two experiments in the virtualisation of literary works: Madame Bovary, by Gustave Flaubert and William Shakespeare’s Merchant of Venice.

INTERACTIVE REMEDIATION OF NOVELS

Bolter and Grusin [2] originally coined the term remediation to account for the initial steps for transferring traditional content into new, emerging media. By extension, we are using this term to characterise the transformation of linear narrative into interactive versions. From the perspective of the work reported here, this interactive transposition is the essential step for the transformation of literary works into virtual heritage.
Figure 1. A narrative action from The Merchant of Venice formalised as a Planning operator: this action corresponds to Bassanio reassuring Antonio about the potential risk of the loan, after Antonio received the offer of the loan from Shylock.

Fundamentals of Interactive Storytelling

Although there have been many attempts at creating non-linear narratives, whose unfolding or denouement could be altered as a consequence of audience reactions, the field of Interactive Storytelling has seen significant developments in the last ten years. We shall only introduce here some core technical aspects relevant to the current discussion: the reader may consult more technical papers such as [3] [4] for in-depth technical descriptions. In its contemporary form, Interactive Storytelling relies on Artificial Intelligence (AI) techniques for the representation of story content and its recombination into different story variants. One of the dominant approaches consists in formalising the baseline plot as plan, which captures the logical and causal dependencies between the various elements of the story, and use AI Planning technologies to dynamically generate variants of the baseline plot, corresponding to different action sequences or even different endings. For instance, an interactive version of Madame Bovary can see the user influence the relationship between Emma and her lover Rodolphe, driving the story in different directions depending on whether Emma abandons her family or not. This example illustrates important dimensions of Interactive Storytelling. Firstly, that in order to maintain consistency and the identity of the novel, story variants have to remain true to the overall plot, characters’ personalities and story genre. Some have argued that any modification would already violate the nature of the story; however this ignores the fact that, in the context we are discussing, interaction should be seen as a way to access one novel’s core properties through controlled exploration. Secondly, that user interaction can take multiple forms, from the user impersonating one of the story characters to him interfering by providing information or advice to one specific virtual actor. We need to introduce what is currently the central hypothesis of many Interactive Storytelling systems, namely that the formalisation of the baseline plot (i.e. the default story as originally described by its author) in a generative formalism (each narrative action being represented as a planning operator for instance, with its pre-conditions and consequences) is the necessary and sufficient condition for the system to generate story variants.
Non-linearisation as Digital Preservation

We can consider digital preservation from two complementary perspectives: one concerns the preservation of content, and the other the specific modes of user access that are made possible by the preservation approach. On the first aspect, a novel’s content is still too often reduced to its textual properties: in reality, this ignores that plot structure or the cast of characters are also essential elements, normally only accessible through literary criticism.

The interactive remediation of a novel or a theatre play relies on an explicit formalisation of plot structure (or characters’ intentions depending on the IS paradigm adopted), hence promoting a more sophisticated description of cultural content, which will also support different modes of exploration and discovery. Representing plot structure is not incompatible with the digitisation of text itself: in particular in the virtual remediation of plays, the original text can be preserved in its entirety. On the second aspect, interaction enables the user to explore the structure of the narrative itself: the same mechanism supports a more user-friendly or entertaining approach, as well as more sophisticated access to the actual structure of literary works.

Narrative and Plot Representation

The creation of a virtual interactive piece from a novel or a theatre play comprises the following steps: i) the representation of the baseline plot actions, or the baseline characters’ motivation as a set of Planning operators, ii) the creation of a virtual stage corresponding to the backdrop of the narrative, iii) the creation of 3D characters’ models which will support real-time animation, iv) the definition of 3D animations that can be mapped to each of the narrative actions (described as part of step i)) and v) the association of text to specific actions, for instance for dialogue between characters (such text can be displayed as subtitles or uttered using a Text-To-Speech system). Figure 1 displays an example of narrative action representation in the standard PDDL planning format. Mechanisms for user interaction may be embedded in the process: for instance physical interaction with the virtual stage objects is automatically taken into account by actions requiring these objects as resources (as part of the definition of iv)). In a similar fashion, speech understanding (on the user side) can be used to modify action representations by adding further information.
Immersion and Storyworlds

Previous work on virtual heritage has considered both immersive and non-immersive (e.g., desktop) versions of virtual reconstructions. In a similar fashion, immersion may not be an absolute requirement to explore classical novels via interactive narratives: we have for instance developed both desktop [5] and immersive [3] versions of Madame Bovary (Figure 2). Obviously immersion offers additional perspectives when the backdrop for the novel can itself be assimilated to an heritage site: this is for instance the case where reconstructing scenes from the city of Venice as part of the stage for The Merchant of Venice (Figure 3).

RESULTS

We have developed Interactive Narratives for two literary works: one novel, Madame Bovary (G. Flaubert) and one play, The Merchant of Venice (W. Shakespeare). Both have been produced as immersive as well as non-immersive (desktop) versions. In the case of Madame Bovary, we have used scholarly material related to Flaubert’s own drafts [6] of the novel to produce the underlying representation of the characters’ psychology [5] on which the interactive narrative is based. The system allows to explore a key stage of the novel, and impersonate one of its characters (Rodolphe), giving an insight into the characters’ psychology as the author intended it.

The Merchant of Venice is particular in several respects, one of the lesser known works of Shakespeare and one of his two plays (with Othello) whose location is Venice, obviously a major heritage site. As a play, the interactive remediation provides a mechanism not only to digitize the plot but also the entire text, although it may be presented in a non-linear fashion depending on the story variants produced.

We have developed a system which is able to present story variants from the perspective of any of the two main characters (Shylock and Antonio), in a way which also addresses the play’s notorious controversies [4]. At the same time, we have recreated a virtual environment for the city of Venice whose topology corresponds to the needs of the play. It has been obtained from contemporary photographic material, by selecting buildings (and their photographic textures) matching the play’s historical period.
CONCLUSIONS

Virtualisation of cultural heritage does not merely attempt at preserving artefacts and content, but also at improving their dissemination and facilitating their access. In that sense, the work we have presented proposes to extend the field of virtual heritage to literature, whilst maintaining the same philosophy. Should this field develop, we would be expecting the greatest impact to derive from renewed interest and the improved accessibility of literary works, as well as the embedding of literary works into other forms of cultural heritage (the staging of plays in the city of Venice being only one illustration of this principle).

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References


