The IRIS Network of Excellence: Integrating Research in Interactive Storytelling

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Abstract. Interactive Storytelling is a major endeavour to develop new media which could offer a radically new user experience, with a potential to revolutionise digital entertainment. European research in Interactive Storytelling has played a leading role in the development of the field, and this creates a unique opportunity to strengthen its position even further by structuring collaboration between some of its main actors. IRIS (Integrating Research in Interactive Storytelling) aims at creating a virtual centre of excellence that will be able to progress the understanding of fundamental aspects of Interactive Storytelling and the development of corresponding technologies.

Keywords: Narrative Formalisms, Planning, Authoring Tools, Character Animation, Camera Control, Interactive Storytelling. Interactive Narrative.

1 Interactive Storytelling

Even though Interactive Storytelling (IS) can be traced back to early experiments with interactive cinema, the modern concept of IS has been formulated during the 1990s, through the work of Davenport [9], Nakatsu and Tosa [22] and the OZ project [2].

Yet, research in the field only developed over the last decade, in particular with the emergence of Artificial Intelligence techniques for story generation. The IRIS (Integrating Research in Interactive Storytelling) Network of Excellence is a new EC-funded initiative (under FP7's Intelligent Content and Semantics activities) whose work should commence exactly 10 years after the 1999 AAAI Fall Symposium on Interactive Narrative [18], which can be considered as a milestone in the emergence of the discipline. This Network brings together research institutions and individuals which have contributed to the development of this research topic. It aims at advancing the discipline by providing a more integrated approach to IS both in terms of theoretical foundations and in terms of technology development. In a sense, it is a natural follower of previous projects such as INSCAPE [38], which has played an important role in the development of this Conference, through its predecessors, the ICVS (2001-2007) and TIDSE (2003-2006) conferences. However, its specificity as a NoE is to advance knowledge in the discipline itself, rather than promote a specific approach or develop a specific technology.

2 State-of-the-Art and Open Challenges

Rapid progress over the past ten years has materialised in the development of several Research prototypes [1] [4] [6] [10] [16] [17] [20] [23] [24] [28] [30] [33] [37]. A number of key concepts have emerged as central to IS, amongst which narrative control [32], duality between character and plot [19], the potential of Planning techniques for action generation [34] [36]. In addition, there has been convergence in the recognition of open problems and challenges for the development of IS systems:

- **Relations between Action generation and Staging**
  The various "Story Engines" developed in IS have mostly focussed on action generation using AI techniques (Planning being the dominant one). The development of principled relations to the actual staging of such actions (their visual presentation [8] [15]) has been somehow neglected.
- **Relations between Narrative Formalisms and AI techniques**
  References to narratology abound in IS research (see [5] for a review), but do not always translate into the actual implementation in particular at the level of AI formalisms.
- **Authoring**
  Authoring is now considered a central problem for IS [13] [21] [25] [26] [27] [38], and the development of authoring tools a major condition for the success of IS technologies. The challenge for authoring is to evolve from proprietary solutions attached to specific IS systems.
- **User Interaction for Interactive Storytelling**
  IS requires the integration of story generation and natural user interaction mechanisms. Many systems incorporate natural language processing or dialogue in search of natural interaction [4] [6] [20] [28] [33]. However, most of the effort remains dedicated to story generation, perhaps in the hope that IS could directly benefit from progress in multimodal interfaces, and some more situated interaction research is certainly needed.

- **Evaluation Methodologies for Interactive Storytelling**
  Whilst there have been some considerations on measuring technical performance and scalability [7] [20] (also for authoring [3]) and on high-level properties of the narrative such as suspense [35], there are so far no established methodologies to evaluate the "quality" of an Interactive Narrative.

Of these challenges, we shall briefly discuss two, which, in our view, have not received sufficient attention to date.

3 Computational Narratology

The theoretical foundations of IS are comparatively less advanced, and most of the above concepts have emerged as empirical findings in the development of the above prototypes and associated experiments. Despite the identification of Narratology [29] and Narrative formalisms [5] [11] as a potential theoretical background, their role in IS is largely underspecified if compared to the role of Linguistics for Computational Linguistics and Natural Language Processing; in other words, whether IS can be grounded in Computational Narratology is still a matter to be explored. Narrative Formalisms can influence all aspects of IS, from story generation to story presentations. They can influence the definition of AI formalisms for story generation, whether these are based on planning or not. Understanding narrative formalisms also helps story presentation through aspects such as camera placement: to a large extent, film idioms [8] popular in camera control correspond to empirical narrative formalisms and could benefit from a more fundamental analysis. Ultimately narrative formalisms can support unified representations for narrative actions which are also important for authoring and even the definition of software architectures (for instance providing principled interfaces between action and virtual actors' animation).

4 Evaluating Interactive Storytelling

While there is strong tradition in the social sciences and the humanities to investigate readers' (and, more recently, viewers') experience of and response to conventional linear stories such as novels, short stories, or movies, user-centred research on IS is not a well-established field. A few research units worldwide run studies on the systematic measurement of user responses to video games. Some small scale pilot studies have been published on user reactions to dedicated IS environments, mostly for the purpose of specific system optimisation or the initial demonstration that a given application 'can work' (e.g., [1] [14]). However, the methodologies applied (also in video game research) are highly diverse, and there is not much practical experience with effective measures for system evaluation in IS available. While the first evaluation issue relates to general system usability, target audiences and the question which kind of people are likely to select and enjoy a given IS environment, the second issue reflects the 'entertainment value' or enjoyment of the experience delivered by the system. Enjoyment is a highly complex experiential state with a

variety of manifestations (e.g., exhilaration, suspense, pride) and numerous determinants attached to both the system delivering the experience and the person confronted with the system [31]. To evaluate whether a given IS system achieves a satisfying level of enjoyment in users from defined audiences, it is thus necessary to specify in advance the kind of experiential quality a system shall deliver. Consequently, experimental exposure studies with control groups can apply appropriate enjoyment measures and reveal the entertainment-related capacity of the system.

5   Conclusions

Besides the joint research that will take place within IRIS, the Network plans to develop activities to the benefit of the larger IS Research community. It will endeavour to disseminate theoretical results, technological components and data, for instance evaluation methodologies, comparative formalisations of plots, and various corpora (for instance of interaction data).

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