

Challenges in Development and Design of Interactive Narrative Authoring Systems, a Panel

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Abstract

There are several types of interactive narrative systems that have been developed in recent years. Narrative based games and simulations contain stories and interactions that are designed by human authors. AI based intelligent story generation systems have algorithms that construct narratives automatically from domain descriptions and communicative goals provided by human authors. Drama management systems manage user interaction based on strategies provided by human authors. Narrative based simulations have author specified rules for event instantiation and interaction. While a significant amount of research has been carried out in each of these forms of interactive storytelling, the authoring tools and the authoring process has received less attention. This objective of this panel is to motivate discussion on understanding the process of authoring interactive narratives, review state-of-the-art authoring paradigms, and extract practical requirements and common evaluation strategies for authoring tools.

Introduction

Authors and developers of interactive storytelling systems (Medler and Magerko, Pearson and Laird, Donikian and Portugal, Carbonaro et. al., van Velsen, Jhala et. al.) face several challenges during the design of such systems. Interactivity brings about a branching story structure and issues of author control v/s user control of the storyline. Declarative representations of intelligent story directors do not intuitively convert to the game engine's procedural execution environment. Content from diverse media types needs additional integration and management support. Evaluation of current authoring systems is difficult due to varied approaches and different underlying representations for story generation and execution.

Scope and Context

It has been identified that development of authoring tools is a challenging problem both for designers of interactive environments and for researchers involved in development of novel artificial intelligence tools and techniques for interactive narrative generation and management (Medler

and Magerko, Pearson and Laird, Donikian and Portugal, Carbonaro et. al., van Velsen, Jhala et. al.). Most authoring tools cater to specific narrative representations and often need author's familiarity with the underlying algorithms and execution environments. Due to the complexity of the authoring process for interactive scenarios it is important to abstract out specifics of the underlying algorithms and environments and focus on just the creative process of narrative construction. For AI approaches that automatically construct narrative, the authoring tools need to support specification of story domain and communicative goals. In simulations, more emphasis is placed on user driven content creation. Existing and widely used systems such as Semi Autonomous Forces systems (SAFs) e.g. ModSAF, OneSAF and OOS are perceived to be almost exclusively a set of interfaces to manage complex simulations. Most users (authors) do not see the interface as a separate entity that is many times less complex than the model it drives. Ironically, in applications of such importance, the user is usually left out of the equation and the interfaces are useful but not perhaps appropriate. In the current research that goes beyond the raw simulations, and where the work is expanded with various new kinds of AI, immersive environments and user interaction of cinematic proportions, we need to re-evaluate what we provide users in terms of content creation and management. Roughly speaking we can divide authoring research into the following categories:

1. **Cinematic Authoring**, training and automated teaching systems are more and more using immersive 3D environments for the delivery of complex social lesson materials. For the creation of these systems novel authoring tools are needed that use knowledge from traditional storytelling media such as film and television to allow professional narrative experts to create appropriate content
2. **Environment Authoring**, for systems that rely on rapidly changing immersive 3D oriented training systems. For example, those applications in which

real-world data is used to prepare military personnel for the deployment into an unknown environment will need smart tools to quickly provide the correct simulation resources.

3. **Character Modeling**, in high-fidelity training applications, whether it be strategy training aides, meeting and negotiation systems or even math trainers that use a simulated mentor, virtual humans are becoming more and more prevalent and responsible for teaching core courses. Novel authoring tools are needed to provide training developers and teachers with the ability to adjust the training application to new contexts not previously anticipated by training designers.
4. **AI Authoring**, this includes the authoring of current research systems in AI as well as the traditional simulation models residing in such applications as SAFs, etc. For tutoring systems this includes expert and student models as well as any AI driving the simulation in which the tutoring system resides.

Discussion Panel

To outline appropriate and organized future research directions in authoring we propose a discussion panel for the 2009 AAAI Spring Symposium. This panel will evaluate, highlight and elaborate on their experiences with authoring systems for simulations, training applications and interactive narrative systems.

It is our belief that bringing together experts from not just authoring in a narrative context but also those working in authoring for automated tutoring systems and interactive training applications will help further refine and define the field. We strongly believe that authoring paradigms and interface issues from related fields are needed to paint a fuller picture of the issues at hand.

The panel will be formed by 5 panelists from varied backgrounds representing different aspects of authoring interactive narratives. The panel will constitute 2 Researchers from the intelligent storytelling community with experience in authoring systems, 0 or 1 researcher from serious games/training simulations background with experience in authoring tools research/development, 1 or 2 game industry professionals with experience in industry tools for authoring interactive narratives, and 1 professional writer with interactive storytelling authoring experience.

Discussion Questions

Authoring research has either not caught up with other basic research or has not been targeted properly. Either way, there exist one or more gaps that prevent many more mature AI driven systems to be enriched by allowing end users to modify and create new materials and system's

data. This begs the question: what are the obstacles and bottlenecks in authoring research. Perhaps there are stumbling blocks that can be overcome with a directed research effort not currently underway. Perhaps this effort is at this point ill-defined but can become better understood through a panel of a diverse set of experts. Instead of listing what we believe are stumbling blocks and requirements we will let the panel address these issues and instead only provide a framework for discussion that outlines the current problems and thrusts in authoring research.

Through this panel we hope that the following discussion topics are highlighted and elaborated on by the panel for the community to determine the direction of research and development of novel authoring paradigms. We hope to highlight the following issues in authoring research:

- **Unique challenges for design of authoring tools for interactive narrative:** How is authoring for story and training applications different from those systems designed for traditional AI (programming) and simulation systems (SAFs). This discussion is centered around three specific topics: representation, interface design and execution environment integration. We expect to get specific requirements for various approaches represented in the panel and their expectations from authoring tools.
- **User's and their expectations from authoring tools:** What do people who manage complex content expect from authoring tools? And how does that differ per content type. For example, what do content providers have in common that provide written content from those that create 2D and 3D art, or even those who define and manage audio, camera shots and even lighting setups?
- **Evaluation of authoring tools and their role in evaluation of interactive narrative:** Besides the actual design and implementation, we see more and more that authoring applications are not well evaluated or included in experiments. The authoring part is usually seen as an 'add-on'. How can we change this perception and when we do run experiments what should be our focus. This discussion would focus on evaluation of authoring tools across usability, expressivity, and extendibility.

Related Work

In the area of authoring for narrative oriented applications (with a strong bias towards AI) similar combinations of tools exist (Baecker, 1996) (Robertson, 2004), but none integrate the tools into a configurable workflow, meaning

that they can't easily adapt to new research. Some more recent applications originating in the research community do allow traditional media types to be combined with novel abstract action sequences using XML documents but these systems either do not provide an intuitive mechanism for content providers to access the materials (Bulterman, 2005) (Drapeau, 1993) (Gebhard, 2003) or they do not allow non-traditional actions such as character animation or camera actions to be used (Bailey, 2001) (Harada, 1996) (Ueda, 1991). More importantly it is very rare for tools to breach the gap between multiple domains and integrate various context specific editors into one unified integrated development environment.

Conclusion

From the discussion, we intend to get future directions and critical requirements. Furthermore we hope to glean a path forward to best leverage funding opportunities. Perhaps during or through the proposed panel a number of collaborations can be established that aide in mapping authoring research problems to novel target domains. More importantly, we hope to uncover the important questions researchers will have to ask when starting or continuing authoring research. Above all we hope to uncover knowledge from various experts who might not otherwise be in a situation to share experiences.

References

- (Baecker, 1996) Baecker, R., Rosenthal, A. J., Friedlander, N., Smith, E., and Cohen, A.: A multimedia system for authoring motion pictures. In: Proceedings of the Fourth ACM international Conference on Multimedia (1996)
- (Bailey, 2001) Bailey, B. P., Konstan, J. A., and Carlis, J. V.: DEMAIS: designing multimedia applications with interactive storyboards. In: Proceedings of the Ninth ACM international Conference on Multimedia (2001)
- (Harada, 1996) Harada, K., Tanaka, E., Ogawa, R., and Hara, Y.: Anecdote: a multimedia storyboarding system with seamless authoring support. In: Proceedings of the Fourth ACM international Conference on Multimedia (1996)
- (Ueda, 1991) Ueda, H., Miyatake, T., and Yoshizawa, S.: IMPACT: an interactive natural-motion-picture dedicated multimedia authoring system. In: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems: Reaching Through Technology (1991)
- (Medler, 2006) Medler, B. and Magerko, B. Scribe: A General Tool for Authoring Interactive Drama. 3rd International Conference on Technologies for Interactive Digital Storytelling and Entertainment, 2006. Darmstadt, DE, pp. 139-150.
- (Robertson, 2004) Robertson, J. and Good, J.: Children's narrative development through computer game authoring. In Proceeding of the 2004 Conference on interaction Design and Children: Building A Community (2004)
- (Bulterman, 2005) Bulterman, D. C. and Hardman, L. Structured multimedia authoring. In: ACM Transactions on Multimedia Computing, Communications and Applications (2005)
- (Drapeau, 1993) Drapeau, G. D.: Synchronization in the MAestro multimedia authoring environment. In: Proceedings of the First ACM international Conference on Multimedia, (1993)
- (Gebhard, 2003) Gebhard, P., Kipp, M., Klesen, M., and Rist, T.: Authoring scenes for adaptive, interactive performances. In: Proceedings of the Second international Joint Conference on Autonomous Agents and Multiagent Systems (2003)
- (Pearson, 2004) Pearson, D.J. and Laird, J.E.: Redux: ExampleDriven Diagrammatic Tools for Rapid Knowledge Acquisition. Behavior Representation in Modeling and Simulation Conference, Arlington, VA, 2004.
- (Donikian, 2004) Donikian, S. and Portugal, J.N.: Writing Interactive Fiction Scenarii with DraMachina. In the Proceedings of the Technologies for Interactive Digital Storytelling and Entertainment: Second International Conference, pages 101112, Darmstadt, Germany, 2004. Springer Berlin / Heidelberg.
- (Carbonaro, 2005) Carbonaro, M., Cutumisu, M., McNaughton, M., Onuczko, C., Roy, T., Schaeffer, J., Szafron, D., Gillis, S. and Kratchmer, S.: Interactive Story Writing in the Classroom: Using Computer Games. International Digital Games Research Conference, Vancouver, CA, 2005.
- (van Velsen, 2008) van Velsen, Martin, Narratoria, an Authoring Suite for Digital Interactive Narrative. in Proceedings of the FLorida AI Resarch Society Conference - Special Track on Games and Entertainment, Coconut Grove, FL, 2008.
- (Jhala, 2008) Arnav Jhala, Curtis Rawls, Samuel Munilla, and R Michael Young, Longboard: A Sketch Based Intelligent Storyboarding Tool for Creating Machinima, in Proceedings of the FLorida AI Resarch Society Conference, 2008.