

Statement of Research Interest

My primary research interest lies in artificial intelligence, with emphasis on interactive story generation and intelligent user interface. For the last eight years, spanning both my PhD program in Computer Science at NC State University and my subsequent research at Samsung Advanced Institute of Technology (SAIT), I have focused my research extensively on AI. For my dissertation I developed and evaluated a system to create suspenseful stories using a planning technique. My projects at SAIT involve story authoring tools in a 3D graphic environment and user assistive agents using AI machine learning techniques.

My previous and current research projects are as follows:

Computational Models of Narrative Generation: I have investigated computational models of narratives for suspense (Cheong and Young, 2008a; Cheong and Young 2006b). In my dissertation, I presented a framework that creates a suspenseful story using the concepts that a) the reader's suspense level is affected by the number of solutions available to the problems faced by a narrative's protagonists, b) story structure can influence the reader's narrative comprehension process, and c) the reader's planning-related reasoning process can be modeled by AI planning techniques. I have implemented a system and conducted empirical studies which showed that my system performs as well as a human storyteller in generating suspenseful stories.

Warning Generation: The needs for intelligent user interfaces to support human users are rapidly expanding with the fast growth of wireless devices and embedded systems. While generating instructions that provide the user a sequence of actions to achieve his goal has been widely researched, generating prohibitive instructions that warn him of harmful or undesirable actions has received little attention. To address this gap, I designed and implemented a computational system (Cheong 2004) for warning generation in a task-oriented domain. The fundamental hypothesis of this research is that a set of problematic plans reasoned by the user to perform her specific task can be characterized by a set of their common features. These features can serve as the essential content of warning instructions.

Game Experience Summarization: I designed a framework (Cheong and Young, 2006a; Cheong et al., 2008c) that abstracts narrative from an individual's gaming experience. The core idea of this approach is to identify important events from a given story plan that contains the story's causal structure; and construct a coherent story from those events. This summary can be replayed for the game player's own enjoyment, or make a source for a qualitatively strong story. I believe that games are not the sole source of stories. In fact, other kinds of digitally recorded forms (e.g., text and video clips) can be transformed into a good story with the extension of my presented system.

Interactive Story Authoring Systems: The advances in computing technologies enable the computer users to create and share their own stories with the community at large. However, it is still regarded as complicated and laborious to author interactive narratives, where a story adapts as the user interacts with it. To this end, my team at SAIT designed a pair of authoring tools (Cheong et al., 2008b) viewing the process as two separate stages: content creation and interactivity creation. The content creation authoring tool allows the user to control characters, props, cameras, lighting, and music for constructing each scene. Then, the interactivity creation authoring tool enables the author to fabricate scenes into an interactive story. We developed the content creation authoring tool in a 3D environment in 2008.

Interactive Story Representation and Applications: Two main approaches have been employed to construct interactive narrative: a) conditional branch techniques and b) planning techniques. Each approach offers its own benefits. The conditional branch techniques allow the author to manually create tightly-plotted interactive contents; however, the author needs to specify every possible connection between the contents while considering the player interaction. The planning technique can automatically create a story plan to achieve a specific goal when an initial setting and domain knowledge describing the story world are given. Since the system can adapt the initial story as the player interacts with it, the author only needs to build the domain knowledge which consists of story events each of which contain preconditions and effects. However, this technique does not guarantee the player a good story experience. As an attempt to combine the advantages provided by each technique, my colleagues at SAIT and I designed an interactive story structure (Cheong et al., 2008d) that incorporates the planning formalism into the conditional branch techniques. In addition, my team explored the use of interactive stories in various domains and detailed a method (Min and Cheong, 2009) to generate privacy-safe personalized advertisements using interactive story structure.

Intelligent User Interfaces: Due to the limited screen size of mobile devices, there has been growing interest in intelligent, adaptive interfaces that can supply the user with the services she wants on time with minimal user interruption. Therefore, my research team and I have investigated AI machine learning, inference techniques, and computational models of intention for proactive service provision. We designed a framework for recognizing user intention and are in the process of obtaining patents for it. We engineered an ontology and rule-based knowledge for implementing a context-aware system in order to save energy consumed by customer electronics in home settings. As a further step, we plan to integrate emotional aspects in our framework for natural interaction.

As described above, I have consistently dealt with numerous issues in digital storytelling, discourse and intelligent user interface. I have acquired knowledge in narrative and discourse generation from academia. My current work at SAIT concentrates on the provision of assistive services in response to the user's practical needs. I will continue my research on AI for developing intelligent agents and future storytelling in various environments including games, robots, and mixed-reality.

References

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