Reports on the 2011 AAAI Fourth Artificial Intelligence for Interactive Digital Entertainment Conference Workshops

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■ *The Seventh Artificial Intelligence for Interactive Digital Entertainment Conference (AIIDE-11) was held October 11–14, 2011 at Stanford University, Stanford, California. Two one-day workshops were held on October 11: Intelligent Narrative Technologies, and Artificial Intelligence in the Game Design Process. The highlights of each workshop are presented in this report.*

Intelligent Narrative Technologies

Narrative is a pervasive aspect of human culture, one of the fundamental frameworks by which people view the world and comprehend their experiences. As computers and the Internet play an ever-increasing role in social interaction, education, and entertainment, they introduce novel opportunities for sharing, creating, and understanding stories. The last several years have seen growing interest and progress in computational approaches to narrative intelligence. New systems are increasingly able to organize and present information in a manner that leverages narrative techniques across a range of media. Additionally, the long-standing AI goal of narrative understanding — automatically finding narrative meaning from a set of facts — has seen new interest and urgency with the rapid growth of online knowledge and communication. Intelligent narrative technologies enable computational systems to communicate with human users in compelling and intuitive ways by utilizing peoples' inherent capacity for understanding stories.

The AIIDE workshop on Intelligent Narrative Technologies was the latest in a series of events designed to bring together AI researchers, narratologists, psychologists, artists, and industry practitioners to create a forum for discussing narrative intelligence in an interdisciplinary setting. The previous three gatherings were associated with the AAAI 2007 Fall Symposium Series, AAAI 2009 Spring Symposium Series, and the 5th International

Conference on Foundations of Digital Games (FDG 2010), respectively. This workshop included 11 long and short paper presentations and 7 spotlight talks for poster presentation.

Advances in interactive narrative was a major theme, covering two sessions about generating narratives in real time based on player input. Speakers gave special consideration to managing the players' experiences to provide stimuli for particular affective responses (such as increased engagement in the story). Several presentations were devoted to creating realistic nonplayer characters (NPCs) in games, and emotionally aware virtual characters in general. Narrative generation in its various forms was also represented, with emphasis on not only a story's plot and conflict, but also thematically important objects.

Another major theme was story annotation and analysis. Several presentations focused on collecting corpora of stories from users or from cultural sources, and extracting narrative-specific metadata (causality, spoken dialogue, verb frames, and so on) for purposes of visualization, regeneration into text, and other uses. In a panel discussion, workshop participants discussed the need for a coordinated effort toward building a large corpus of annotated narratives, in the spirit of linguistic resources such as the Penn Treebank and PropBank.

The workshop closed with a second panel that reviewed methods for evaluation, assessed prominent challenges facing the area, and looked ahead to identify innovations that will most advance the field of intelligent narrative technologies in the years to come.

The cochairs of the workshop were David Elson, Jonathan Rowe, and Emmett Tomai. The workshop's papers are available in AAAI Technical Report WS-11-18.

Artificial Intelligence in the Game Design Process

"Game AI" usually brings to mind the development of algorithms that drive the behavior of agents in a game's virtual world. In contrast with this tradition, this workshop focused on a different region of the intersection of AI and games: automation in the design process. Participants were asked to share their answer to the question of "How can retrieval, inference, knowledge representation, learning, and search loosen the bottlenecks in the game design process?" While AI techniques have previously been used to address game development concerns such as content generation and offline content analysis (such as precomputing navigation paths), this workshop aimed to provide the first forum for discussion that specifically foregrounded game design automation problems: human-machine cocreation of creating puzzles and maps with desirable properties, illuminating exploits in rule systems or mismatches between designer and player expectations through playtesting, and accelerating the feedback and design iteration cycle with incomplete prototypes.

The workshop attracted participants with backgrounds in procedural content generation for games, computational creativity, AI knowledge representation and reasoning, and both hobby and commercial game design and development. Through five paper presentations, a panel discussion, and an afternoon working session, two common themes emerged with overwhelming consensus.

The first theme centered on the idea that intelligent design automation should make exploring design spaces as easy and fluid as possible. This idea was crystallized in the character of a design buddy (a software agent) that would cocreate game content artifacts by filling in details or offering alternatives resulting from internalized test automation. This design buddy would intentionally bring some of the playfulness from games into the design process.

The other theme focused on getting feedback (for example, visualizing reachable areas of a map) from candidate designs, not after an exhaustive five-minute batch analysis, but with approximate results streaming in with live, 60-frames-per-second interactivity. In the afternoon working sessions, the participants broke into creative design teams that were tasked with proposing systems that could be reasonably developed with less than a year's effort that address one of the game design automation concerns raised in the previous discussion. Two of the three teams proposed a system incorporating this animation-rate feedback. One suggested depicting potential playthroughs of a platformer level by rendering thousands of tiny player-simulating agents traversing an in-design level. Another proposed generating graphical heatmaps (traditionally only prepared long after a game is deployed) for candidate levels through simulated play that would shift in response to live edits to the level and refine in detail with additional computation time.

The panel discussion, with representation from both academic AI and the game industry, ranged over a number of topics that have only the sparsest coverage in the existing literature: the potential for mixed-initiative design tools to help novice designers, the limits of automation as game design blends into art (a form of human-to-human communication), three Asimovian laws for game design automation robotics, and exploiting a machine's talent for quantity with a human eye for quality. The moderator's final question of how a "bicycle for the game designers mind" might appear greatly shaped the systems proposed in the subsequent working session.

Adam M. Smith and Gillian Smith served as cochairs of this workshop. The papers of the workshop were published as AAAI Press Technical Report WS-11-19.

David Elson recently defended his doctoral dissertation at Columbia University. He is now a software engineer at Google.

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