

Statement of Research Interest

Research Area. I work in the area of digital interactive storytelling. Specifically, I design interactive drama platforms. In an interactive drama, the player assumes the role of a character and directs that character's actions in a virtual story world. The user experience is thus basically like playing a role-playing computer game. However, a key difference is that the resulting story is generated by the system at runtime. The best non-digital examples of this form are table-top roleplaying games (such as *Dungeons and Dragons*) and improvisational theater.

Generating the story at runtime is intended to overcome the essential paradox of interactive drama: authorial control versus player freedom. Most existing digital games provide either a scripted story or else an open world (or both, but without any strong integration between them). A scripted story—perhaps with a number of interesting choice points and multiple possible endings—allows for strong authorial control and high story quality. However, the player's options are limited to only those allowed by the author's script. An open interactive world allows the player to wander at will. While this may result in interesting experiences, these individual experiences rarely coalesce into a compelling story.

Artificial intelligence (AI) offers one possible solution to this tension. Instead of hand-authoring a limited number of storylines, an author can encode the rules for what makes a good story into an AI agent. Using these rules, this "drama manager" agent can then monitor the events of the story world and respond to the player—mostly through the actions of non-player characters (NPCs)—in order to shape the events into a coherent story. This may seem like a fairly simple task at first glance, but it involves a number of formidable AI problems, such as extrapolating the story-level significance of "physical" events in the world, planning and managing the interactions of multiple NPCs, and deriving and encoding executable rules for generating good stories.

Why Interactive Drama? Developing an interactive drama is a significant technical challenge. It relates to a many other AI domains, including computer-based creativity, story generation, automated information extraction, natural language processing, and believable conversational agents. It requires deep reflection into how we as humans convey and understand stories. The resulting adaptive experiences could be valuable as serious games used for teaching or training purposes.

However, my primary reason for working on interactive drama is that I think games can be a new medium for significant creative expression. In nearly all traditional narrative forms, the audience is a passive recipient. While they may empathize strongly with the story's characters, they are always separate from them. In an interactive drama, the audience can become those characters. They face choices and experiences that they might never see in their own lives, but those choices still become their own to make. There is an intense immediacy possible here: an exploration of the *self* rather than simply an observation of and empathizing with the *other*.

Previous Research. I began my research in this area by exploring the basic underlying rules of narrative and improving upon an existing theoretical framework for conceptualizing interactive narrative (Tomaszewski & Binsted 2006).

My first attempt at designing an interactive drama platform was based on the work of Vladimir Propp. Propp was a folklore morphologist who, in 1928, documented a simple narrative structure common to dozens of Russian folktales. Propp's work was seen by many early interactive drama researchers as an easy design starting point. However, I eventually realized that such a Propp-based approach would fail to achieve the full potential of interactive drama (Tomaszewski & Binsted 2007).

I designed another platform called Marlinspike. This system works by building a story piece-by-piece using a number of customizable pre-authored story segments called scenes. Marlinspike selects the

next scene to play by using the improv theater technique of reincorporation. This technique assumes that you can build a coherent story as-you-go if you continue to refer back and build upon earlier events. I proposed that selecting the next scene that reincorporated more of the story so far—particularly more of the player's significant past actions—would produce more coherent stories and give players a greater sense of agency regarding their ability to impact the direction of the story.

To test this hypothesis, I wrote a short prototype game, *Demeter: Blood in the Sky*. To focus my efforts on the AI rather than game engine details, I wrote *Demeter* as a text-based interactive fiction (IF) game.

My results were somewhat inconclusive. When compared to selecting randomly from the currently playable scenes, the reincorporation rules did lead to marked improvements in Marlin'spike's internal story structure. However, my survey measures did not detect a corresponding variation in end-users' experience of either story coherence or player agency. (Tomaszewski & Binsted 2008; 2009; Tomaszewski 2011; 2011).

Current Research. I found text-based IF to be a good platform for prototyping games. IF is a genre with a 40-year history, and it is capable of rendering a rich experience with few technical authoring requirements compared to a GUI gaming engine. However, modern users tend to be disconcerted by the command-line interface, and they have difficulty determining what actions are possible at any given time. Because I would like to continue to use IF as a development platform, I am currently implementing and evaluating Skald, an affordance-based point-and-click user interface for interactive fiction. Skald will be released as an open-source library that other developers can also use.

In addition, I am working on a follow-up study to re-examine my reincorporation hypothesis in a less-confounding context. Specifically, I plan to see if reincorporation leads to a greater sense of story coherence and player agency when used in a simpler choose-your-own-adventure game format.

Future Research. Complete, playable implementations are relatively rare in interactive drama research because they are so time-intensive to produce. As I found with my *Demeter* prototype, to test a small feature of a drama manager requires implementing a complete story world, characters, dialog, story events, narration, and a user interface. All of these components are intricately related and all contribute significantly to the final narrative experience. Although this complexity can unfortunately distract users from any single feature being tested, I still believe that any adequate evaluation of interactive drama requires a full system. To this end, my goal over the next two to five years is to develop a modular interactive drama game architecture for research and design (Midgard).

My intention is that I and other interested researchers can then use Midgard as a foundation for testing different components of the interactive drama experience. Skald, mentioned above, is the first component of this. I am also interested in exploring a rule-based—rather than object-oriented—approach to game world simulation. I believe this may make it easier to author and test game worlds. In particular, I think it may help authors manage and explore the complex web of the possible interactions between different game world objects. I also want to explore some other ideas I have for drama management that do not depend on reincorporation.

Collaboration and Funding. Due to my relative isolation in Hawai'i, I have mostly worked as a lone researcher so far. However, I am very open to the idea of collaboration. I believe my research could benefit by the involvement of someone with either with an AI background or with artistic interests, particularly regarding narrative, animation, or game programming. I also believe that assisting in the development of Midgard and the ensuing exploration of specific sub-problems in interactive drama generation would be an ideal opportunity for interested masters or advanced undergraduate students.

Other than conference trips, my research so far has not required funding. To date, I have seen this as an advantage. However, I am not adverse to seeking funding if the need arises.

Publications

- Tomaszewski, Zach. "[On the Use of Reincorporation in Interactive Drama.](#)" *Intelligent Narrative Technologies IV Workshop*. AIIDE. Menlo Park, CA: AAAI Press, 2011.
- Tomaszewski, Zach. [Marlinspike: An Interactive Drama System](#). Dissertation. University of Hawaii-Manoa, 2011.
- Tomaszewski, Zach, and Kim Binsted. "[Demeter: An Implementation of the Marlinspike Interactive Drama System.](#)" *Intelligent Narrative Technologies II: Papers from the AAAI Spring Symposium*. Technical Report SS-09-06. Menlo Park, CA: AAAI Press, 2009. pp. 133-136.
- Tomaszewski, Zach, and Kim Binsted. "[Marlinspike: An Integrated Approach to Interactive Drama.](#)" *Integrating Technologies for Interactive Stories: Papers from the INTETAIN 2008 Workshop*. Playa del Carmen, Mexico. 7th Jan 2008. pp. 29-33.
- Tomaszewski, Zach, and Kim Binsted. "[The Limitations of a Propp-based Approach to Interactive Drama.](#)" *Intelligent Narrative Technologies: Papers from the AAAI Fall Symposium*. Technical Report FS-07-05. Menlo Park, CA: AAAI Press, 2007. pp. 166-172.
- Tomaszewski, Zach, and Kim Binsted. "[A Reconstructed Neo-Aristotelian Theory of Interactive Drama.](#)" *Computational Aesthetics: Artificial Intelligence Approaches to Beauty and Happiness: Papers from the 2006 AAAI Workshop*. Technical Report WS-06-04. Menlo Park, CA: AAAI Press, 2006. pp. 103-106.