

Response to Bernstein and Greco's "Card Shark" paper
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Bernstein and Greco's proposed systems, *Card Shark* and *Thespis*, push interactive narrative in a direction similar to the design goals of *Façade*, my current collaboration with Michael Mateas [4, this volume]. This convergence is exciting and interesting to me because Bernstein and Greco's jumping-off point is hypertext literature [2], whereas I am building upon work on AI-based animated virtual characters [6, 7]. Although Bernstein and Greco push strongly against the vision of the Holodeck and its reliance on "unlimited computing power", I believe their approach shares something with AI-based approaches to interactive story. Likewise, aspects of my practice have fundamental similarity to that of hypertext authors, even though I use AI-based tools.

Façade is an interactive drama in which a single user, playing the Guest character, and two real-time animated virtual characters, Grace and Trip, perform a story about a married couple about to split up. From a first-person point-of-view the player types text to speak and gesture, and uses the arrow keys and mouse to navigate and use objects in a 3D world. The virtual characters speak with digital voices and express emotion and personality through animation [3].

Both *Thespis* and *Façade* are making unexpected, "exotic" departures from their respective fields. On the spectrum between hypertext and the Holodeck, *Thespis* offers hypertext rich in character; *Façade* offers an animated virtual world rich in dialog and introspection. Just as Bernstein and Greco are careful to point out about *Thespis*, *Façade* is not a game, it is not about realism. It is drama. The goal is not to "win" but to experience a compelling story, which in *Façade*'s case does not have a happy ending. And although we employ AI techniques, we too are only after the *appearance* of intentionality and individuality -- the core tenet of the believable agent approach to artificial intelligence [1]. *Façade*'s simple models of psychology, emotion and language understanding are customized to the requirements of our story; they are no more than sophisticated ways of keeping track of the story state that matters *theatrically*. That is, we are using AI techniques for artistic purposes; we are not creating realistic cognitive models.

With any interactive work the author shares control of the narrative sequencing with the reader / player. An important feature of *Thespis* is that the author additionally shares control of the narrative sequencing with the system itself, *Card Shark*. That is, instead of carefully placed links the author can be assured the reader will see and choose from, there is now a much larger "tangle" of links that the author must trust *Card Shark* (with her guidance) to pick among and offer the reader. I found it interesting to discover that the rules that *Card Shark* uses to make its decisions and the particular way its story nodes are structured and annotated are akin to the AI system that controls the story sequencing in *Façade*.

In our attempt to make a story interactive, we've found the devil is in the details of exactly how you deconstruct the story's content into pieces (or more specifically, a hierarchy of pieces), and how to build a system that integrates the player's interactions into the reconstruction -- the performance --

of those pieces.

Bernstein and Greco propose cards, each containing a brief, focused passage of text, annotated with constraints on the context they can be used, and modifications it makes to the reading context. The cards are played out using a simple set of rules by a single reader (*Card Shark*) or potentially by multiple readers (*Social Shark*). They say, “Rather than create complex actors, we create simple automata that say interesting things about important matters.”

We’ve found that an effective way to create complex actors is in fact to carefully combine layers of simple automata. *Façade*’s architecture is a hierarchy of layers of automata, each representing a subset of the story content at different granularities. Each layer runs in parallel and can modulate the performance of the layers below. (Hierarchy of representation is powerful technique commonly used in AI.) At the bottom-most level are short animated *actions* with pieces such as hand motions, facial expressions and walk steps. The next level up contains *behaviors* with pieces such as walking from place to place, acting nervous, and crying. The next level up contains story *beats*, which are clusters of dialog akin to the cards in *Card Shark*. Finally the top most level contains *scenes*, which are large collections of beats.

Like *Card Shark* cards, *Façade* story beats are annotated with preconditions and effects. The *Façade* beat manager runs a set of rules that decides which beat to play next, by searching for authored story beats with preconditions that match the player’s current interactions and the story memory (what has happened so far). When multiple beats are available to play at any one time, the system may look at the effects of each beat and choose the one that best matches the dramatic arc the author is trying to achieve.

In systems like *Card Shark* and *Façade* the author starts with a large partial ordering of story nodes, a tangle. We’ve been discovering and struggling with how to author in this way. For our story we want the partial ordering to be as loose as possible to give the player as much agency as we can, while maintaining “coherence, causality and closure”, allowing us achieve the design goal of a quasi-Aristotelian story [4]. The tighter we make the partial ordering by “sculpting” the tangle, by using stricter preconditions on beats -- that is, the more we, as authors, take control of the sequencing -- the less freedom the system has to make its own decisions, and the closer to a hard-link hypertext structure the story becomes.

Bernstein and Greco are quick to make important distinctions between *Thespis* (player-as-minor-character) and traditional interactive fiction (player-as-protagonist). Perhaps there is a middle-ground between the two. Although not the central character, the interactor in *Façade* plays *herself*, using her own name, gender and ideally any backstory she wishes to bring to the experience. In order to ensure a high-quality dramatic experience, the computer characters are intended to be the most active and important characters. But we aspire for the player to become a major character. The system is designed to regularly offer her opportunities to significantly affect the progression of the story. She is a catalyst for affecting the other characters, with the potential for an internal progression of her own through her subjective experience of playing the story.

“Illusions that place the reader on stage necessarily founder when promised freedom of action is contradicted by the limitations of the simulated environment.” This is hard to accept. Is it hopeless

to give the player the freedom to say whatever she wishes, to freely express herself? I feel it is too soon to answer this as definitively and devastatingly as Bernstein and Greco do. Certainly this kind of freedom is the dream for many players and authors. Bernstein and Greco seem to think that because we cannot fully deliver on this expectation, that we should discard the approach all together. That's their choice, and their proposals are excellent alternatives. However this dream should not be abandoned because it is technically and artistically challenging to achieve. Instead let's try to work within the limitations of the technology, push on them, use them as artistic constraints. The player's expectations must be set at the appropriate level so she avoids struggling against a "necessarily recalcitrant world-model". Some of us believe that today's computational environment *can* in fact match at least *some* of our aspirations, and as technology inevitably improves over time, it will be able to match even more.

With *Façade* we are experimenting, walking up closely to this edge. By carefully choosing the context of our story, an apartment, we implicitly limit the interface to a finite number of objects and gestures. But, because we leave language wide open -- the player can type any dialog they want -- we are putting a lot of effort into "recovery" from situations where the system does not understand or have a specific authored response for what the player is saying. (Characters will *never* literally say, "I don't understand.") We feel there is a lot of room to experiment with scripting the interactor [5] to allow for the experience of freedom for the player, when the actual number of responses is necessarily finite. "I don't understand" is an inevitable position for the system to be in, but not an inevitable response.

"Even if we could experience *Hamlet* on the holodeck, it wouldn't work. Tragedy requires that the characters be blind..." I agree, it seems likely that certain types of stories such as traditional tragedy may not work as an interactive story, for the reasons Bernstein and Greco describe. Instead authors will need to tell the kinds of stories that do work interactively. *Façade* is a more open-ended, explorative, psychological situation. Is this drama anymore? We hope to understand this better once we get a chance to play with the finished work.

"*Card Shark* avoids this contradiction by foregrounding the familiar convention of reading and drama: we may *want* our favorite characters to prosper, but as spectators, we cannot choose the outcome. *Thespis* gives us a greater range of action and might offer us a chance to take a role, but that role is not central and our limitations are evident." That is both its strength and its weakness.

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2. Bernstein, M. *Patterns of Hypertext*. In *Hypertext '98*. 1998. Pittsburgh, PA: ACM.21-29

3. Mateas, M. and Stern, A. 2000. *Towards Integrating Plot and Character for Interactive Drama*. Working notes of *Socially Intelligent Agents: Human in the Loop*, 2000 AAI Fall Symposium Series. Menlo Park, CA: AAI Press.

4. Mateas, M. and Stern, A. 2001. *Towards Building a Fully-Realized Interactive Drama*. In

Digital Arts and Culture, April 2001, Providence, RI.

5. Murray, J. 1997. *Hamlet on the Holodeck*. Cambridge, MA: MIT Press.

6. Stern, A. 1999. *Virtual Babyz: Believable Agents with Narrative Intelligence*. Working notes of *Narrative Intelligence*, 1999 AAAI Fall Symposium Series. Menlo Park, CA: AAAI Press.

7. Stern, A. 2001. *Creating Emotional Relationships with Virtual Characters*. In *Emotions in Humans and Artifacts*, ed. R. Trapp. Publication forthcoming, MIT Press, 2001.