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# Demonstration: The Interactive Drama *Façade*

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**Abstract**

*Façade* is an artificial intelligence-based art/research experiment in electronic narrative - an attempt to move beyond traditional branching or hyper-linked narrative to create a fully-realized, one-act interactive drama. You, the player, using your own name and gender, play the character of a longtime friend of Grace and Trip, an attractive and materially successful couple in their early thirties. During an evening get-together at their apartment that quickly turns ugly, you become entangled in the high-conflict dissolution of Grace and Trip's marriage. No one is safe as the accusations fly, sides are taken and irreversible decisions are forced to be made. By the end of this intense one-act play you will have changed the course of Grace and Trip's lives - motivating you to re-play the drama to find out how your interaction could make things turn out differently the next time.

## Technical Description

*Façade* exhibits technology and design innovations in three key areas: autonomous characters who tightly coordinate their activities to achieve dramatic effects; a dynamic story line that changes in response to player interaction without using discrete branch points; and a natural language understanding system that enables the player to communicate using open-ended dialog (Mateas and Stern 2004a, 2004b, 2000).

For character authoring we extended Hap (Loyall 1997) to develop a new real-time character authoring language called ABL (A Behavior Language), a reactive planning language designed specifically to support personality rich believable agents. Current character authoring approaches tend to use scripting languages, often state-machine based (e.g. UnrealScript), to control the playback of animation assets, and achieve basic event-driven reactivity. Such languages tend to be close to the "physics" of the character, providing programmatic control over the detailed sequencing of animation necessary to achieve character effects such as running, fighting, and falling (e.g. tween from running to falling, cycle falling animation, on impact tween from falling to impact, play impact). Scripting languages tend not to provide any special language support for higher-level character behavior, such as the pursuit of longer-term goals, mixing together the parallel pursuit of multiple goals, and maintaining and querying a complex memory (rich state). ABL abstracts above scripting languages to provide higher-level support for the mental and emotional life of characters. Specifically it offers first-class support for the creation of sequential and parallel behaviors that are reactive in immediate, varied and fine-grained ways, so as to respond convincingly and satisfyingly to the user's moment-by-moment interaction. Behavior state is maintained not with a traditional finite state machine, but with an active behavior tree that supports reflection. Additionally, through joint goals and behaviors, ABL provides support for tightly coordinating teams of characters. On the design side, during the course of authoring the characters for *Façade* we developed a number of key idioms for using ABL. As an example, one such idiom is to organize conversational behaviors into canonical conversational sequences that are modified in response to player interaction by meta-behaviors that reorganize, add and delete conversational goals from the canonical sequences.

In *Façade* the smallest story units are dramatic beats; we take the notion of dramatic beats from the theory of dramatic writing (McKee 1997). We developed a custom Beat Description Language for describing and sequencing beats. The system contains a large pool of beats; any one playthrough of *Façade* only involves a subset of these beats. The beat description language allows us to describe the various story situations (including story history) in which a specific beat should be chosen (with certain probabilities). Associated with beats are beat-specific ABL behaviors that tell the characters how to perform the beat. *Façade* can be thought of as a character-centric simulation world in which the rules of the simulation change beat-by-beat (every minute or so) as the story unfolds. The simulation nature of *Façade* gives it moment-by-moment responsiveness to a wide range of player actions while frequently changing the rules of the simulation (in a manner determined by what's happened so far) gives the experience long-term story structure. One of the design challenges of *Façade* was figuring out how to decompose our story into a collection of re-sequenceable (i.e. usable in many different orderings) beats where sequencing strongly depends on player interaction.

To maximize player agency we have chosen to allow open-ended natural language dialog rather than using dialog

menus or some other finite choice-based mechanism. Obviously we have not solved the problem of deeply understanding arbitrary natural language. Rather we have developed a custom language for writing natural language understanding (NLU) rules that map patterns text patterns into a small set of approximately 30 dialog moves (discourse acts) such as agree with Trip, praise Grace, or ask about and object (e.g. a painting). Our rule language supports writing hierarchical rules that combine the results of lower-level rules into a final interpretation. This supports robust parsing that does take account of total sentence structure (not just keyword matching) without requiring input utterances to exactly match these forms (like the rigid parsing, for example, in text-based interactive fiction). We have also developed a rule-based decision framework for representing different conversational contexts and responding to the same dialog move (e.g. agree with Trip) differently as a function of the current context. Among the authoring and design challenges on the NLU side of the project was developing a set of dialog moves that are broad enough such that a huge range of possible input utterances can be mapped into them, but specific enough that the characters' responses to these moves are both dramatically interesting and make sense given the text typed by the player.

## Related Work

Influential systems from other researchers include the Carnegie Mellon Oz Project (Bates 1992, Loyall 1997, Weyrauch 1997), the Synthetic Characters Group at the MIT Media Lab (Blumberg and Galyean 1995), the Improv Project at the NYU Media Research Lab (Perlin and Goldberg 1996), and the projects of USC's Institute for Creative Technologies (Swartout et al 2001).

*Façade* builds significantly upon the previous work of the authors. Stern's AI-based virtual character commercial/art project *Babyz* (Stern 1999, 2003), which along with *Dogz* and *Catz* (Stern, Frank, Resner 1998) have sold over 2 million copies worldwide, was a strong influence on *Façade* both in terms of interaction design and AI architecture. Mateas' AI-based ideologically-biased documentary history generator *Terminal Time* (Mateas, Vanouse, Domike 2000), exhibited at several international art venues, was a precursor to *Façade* in terms of its narrative intelligence-based architecture (Mateas and Sengers 2002), sophisticated knowledge representation, and expressive language-oriented authoring environments.

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*Façade* Project Page: www.interactivestory.net