

Towards an Intelligent Storyboarding Tool for 3D Games

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ABSTRACT

We present an intelligent storyboarding tool that takes as an input abstract annotated action specification to generate camera actions and geometric constraints for executing as a dynamic storyboard.

Categories and Subject Descriptors

I.2.8 Artificial Intelligence, I.3.3 Computer Graphics

General Terms

Algorithms, Human Factors

Keywords

Intelligent user interfaces, Virtual cinematography.

1. OVERVIEW

Storyboarding tools enable authors/designers of cinematic narratives in games to organize and evaluate their ideas quickly when making production decisions. Cinematographers have identified a number of cinematic idioms (stereotypical ways of filming actions) for effectively conveying the underlying narrative. Researchers have adopted these idioms and photographic composition rules such as The Rule of Thirds in building cinematography systems for 3D virtual environments.

The trend in recent research (e.g. [2], [3], [4]) has been to place the virtual camera in a scene so that it frames the subject(s) in a way that closely matches the idiomatic shot. Consequently, less effort has been directed towards informing the selection of a particular idiom with abstract parameters that reflect the storyteller's motivation or mood. Further, these approaches have not provided well-defined translation schemes linking abstract specification of camera directives, such as chase-sequences, with low-level geometric constraints that are enforced by the cinematic rules. Our approach facilitates the abstract reasoning about camera actions for rhetorical coherence of narratives translated into geometric constraints

for taking advantage of geometric composition rules for visual storytelling.

We are constructing an interface for automatic construction of dynamic storyboards that uses an XML based input scheme specifying action sequences and abstract camera directives. These directives are translated into geometric constraints on the position and motion of a camera for each corresponding camera shot in a sequence. A geometric constraint solver uses the abstract parameters to generate and rank candidate shots, returning the best matched shot. Our system then presents the resulting sequence of shots as a dynamic virtual storyboard. Our interface is designed to facilitate the exploration of creative new cinematic expressions for narratives in dynamic 3D virtual worlds.

Given a sequence of character and camera actions in a story generated either by a human author or an AI planning system like [1], the storyboarding tool makes decisions for the composition of each shot at two levels. At the top level the abstract camera specifications, in addition to the annotated information about the scene is used by a translator to generate geometric constraints. A geometric constraint solver then satisfies these constraints for composing the shot.

A sequence of story actions that includes annotated actions representation is given to the system, which is translated into a sequence of camera constraints. The constraint solver then computes a camera shot for each frame in the virtual storyboard.

2. SUMMARY

We are currently making improvements to the implementation of the storyboarding tool, including the underlying algorithms to connect it directly on an existing commercial game engine. This work was supported by NSF CAREER award #0092586.

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A version of this paper appears in the Proceedings of the
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