Compact Real-Time Modeling of Seated Humans by Video Sprite Sequence Quantization

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Video sprites are a powerful method for real time modeling of dynamic real world scenes. A video sprite is acquired inexpensively with a video camera and rendered efficiently by texture mapping to provide, albeit from a limited range of viewpoints, a believable visual depiction of the captured scene. However, even with compression, video sprites are data intensive, which is a disadvantage in the context of distributed applications with limited bandwidth between acquisition and rendering sites.

We describe a method for compact real-time modeling of seated humans suitable for applications such as teleconferencing and distance learning. The method takes advantage of the limited number of significant body positions a participant can assume in such applications. The participants are modeled with upper-body video sprites. A database of representative video sprite sequences is pre-acquired, is organized in a binary tree based on shape, and is pre-uploaded to each remote rendering site. At run time, for each input sprite, a closely matching sprite is located in the database and the index of the matching sprite is sent to the rendering site. When a participant has to be rendered in detail, the head region of the input sprite is identified and is sent to the rendering site. The method drastically reduces the amount of data that needs to be sent to the rendering site by replacing the bulk of the input sprite with a two-byte index.