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Towards video-based immersive environments.

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Summary: Video provides a comprehensive visual record of environment activity over time. Thus, video data is an attractive source of information for the creation of virtual worlds which require some real-world fidelity. The paper describes the use of multiple streams of video data for the creation of immersive virtual environments. We outline our multiple perspective interactive video (MPI-Video) architecture which provides the infrastructure for the processing and analysis of multiple streams of video data. Our MPI-Video system performs automated analysis of the raw video and constructs a model of the environment and object activity within this environment. This model provides a comprehensive representation of the world monitored by the cameras which, in turn, can be used in the construction of a virtual world. In addition, using the information produced and maintained by the MPI-Video system, our immersive video system generates virtual video sequences. These are sequences of the dynamic environment from an arbitrary view point generated using the real camera data. Such sequences allow a user to navigate through the environment and provide a sense of immersion in the scene. We discuss results from our MPI-Video prototype, outline algorithms for the construction of virtual views and provide examples of a variety of such immersive video sequences.

Classification: H.5.1
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