Keynote Lecture

An Image-Based Approach to Interactive 3D Virtual Exhibition

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Abstract. With the advance of 3D digitization and rendering technologies, interactive virtual exhibition can now be realized for applications such as virtual museum, virtual showcase, and virtual mall. There are two major approaches to implementing a 3D interactive virtual exhibition application. One approach is the geometry-based approach, which reconstructs geometric models for 3D objects by using laser scanners or other 3D digitization equipments. Another approach is the image-based approach, which renders the 3D object directly using a large set of pre-acquired images without reconstructing geometric models. While the geometry-based approach provides better interaction and smaller data size, its cost-effectiveness is not as good as the image-based approach. We have developed a new image-based approach to 3D interactive virtual exhibition based on a technique named augmented panoramas. With augmented panoramas, the 3D exhibition space is represented by panoramas and can be augmented by the 3D objects to be exhibited, which can be represented either by geometric models or by object movies. Compared with other image-based techniques, such as light field rendering, object movies have the advantage of being easier in image acquisition and rendering. Here, a major challenge for augmented panoramas is how to integrate two sources of 2D images, the panoramas and the object movies, in a 3D-consistent way. In Taiwan, with the support of National Digital Archives Program, we have designed and implemented a 3D stereoscopic kiosk system for virtually exhibiting 3D artifacts in the National Palace Museum, the National Historical Museum, and the Museum of the Institute of History and Philology, Academia Sinica. Also, we have built a few other interactive display systems, which will be shown in this presentation. For example, we shall show the Magic Crystal Ball, which allows the user to see a virtual object appearing inside a transparent ball and to rotate the virtual object by barehanded interaction. Our goal is to transform different concepts from movies and fiction into the development of a new medium for the users to access multimedia in an intuitive, imaginative and playful manner.

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