§33. An Alternative Reality System for Training

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i) Introduction Our purpose of this study is to construct an alternative reality system for helping training for beginners, especially, tasks which are performed while the operator sits and doesn't move around. Our alternative reality system provides "reality", not virtual reality.

ii) System configuration Many virtual training systems are proposed. Most of these systems are constructed using computer graphics (CG). However the user feels unnatural and doesn't immerse the virtual environment since it is difficult to reproduce "reality" in these systems. Our proposed system only provides real scene. This real scene means both the current real scene and the past real scene. Figure 1 shows concept of this system.
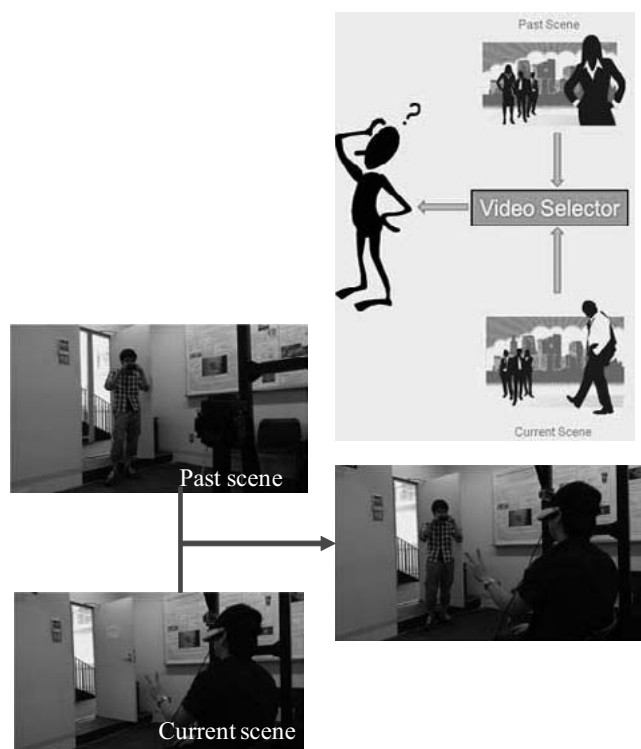

Fig. 1: Proposed system. By providing the past scene from the current user's eye position and user's eye direction, the user believes the provided scene is the current scene.

This alternative reality system consists of a head mounted display (HMD), a camera which displays the scene in front of the user, a headphone and a head tracking sensor. The user can switch the scene displayed in the HMD in Fig. 1. If the current scene is chosen, the scene captured by the camera in front of the user is displayed. And if the past scene is chosen, the recorded scene is provided to the user. However it is unnatural to provide a movie if the movie is recorded by general movie camera. Because the direction of the user eye and the camera is different. Therefore the past scene is previously recorded by a spherical imaging camera. This camera can take almost full sphere movies around the camera. The camera is located in the position where the user will sit when the movie is recorded. When the user choose the past scene, the head tracking sensor of the user measures the direction of the user and the image of the head direction is cut from the spherical image (Fig. 2). Finally, the cut image is displayed in the HMD.
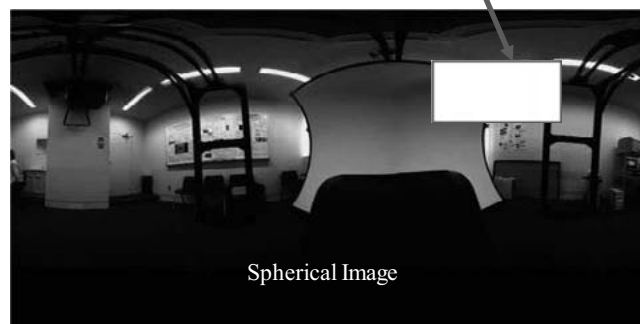

Fig. 2: Head mounted display with a camera and a motion tracking sensor and how to extract the scene for the HMD from the spherical image.

iii) Conclusion We propose an alternative reality system and show a basic system for training task. The advantage of this system is that the user can experience an expert model or reexperience what he / she did from any directions in many times. The user can easily immerse the past environment since the past movie is made from first person view.

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