

§2. Development of Verbal Interface to Control Virtual Objects in CompleXcope

Tamura, Y., Kageyama, A., Sato, T.

One of the most practical benefits of utilizing a virtual reality system in science is to make it possible to percept a really tangled complex phenomenon in an intuitive way.

We have developed a virtual reality system called 'CompleXcope' as an important part of the man-machine interactive system for simulation ('MISSION'). This CompleXcope (Fig. 1) is designed so that not only three-dimensional objects but also an auditory environment can be represented.

As the simulation study progresses in accordance with the progress of supercomputer technologies, it becomes possible to simulate a tangled nonlinear phenomenon. The traditional 2D-visualization tool becomes a slow coach to grasp what is happening in the simulation of a complex phenomenon. The electronic environments surrounding computers have realized a commercial-based 3D (solid) virtual reality system such as "CAVE". This environmental condition has driven us to develop an integrated man-machine interactive system for promoting new frontiers of Simulation Science into which virtual reality system is integrated.

However, in the VR space also required is a conversation facility among plural researches that are working together for a simulation project. In the original system we had only one input device, which can operate virtual objects available. Moreover, since the function of buttons and joystick is different in any applications, the input device is inconvenient. We installed the Automatic Speech Recognition (ASR) system based on "JULIUS" (Japanese Dictation Toolkit developed by Continuous Speech Recognition Consortium)¹⁾. Fig. 2 shows the image of this system.

Fig. 3 shows the data flow of this system. As soon as an observer speaks, the ASR system recognizes what he said and sends verbal output data (such as "Move up", "Draw thermal data" and so on) to ASR server. In the ASR server, the verbal data is translated to VR command. This VR command is managed in the share memory server and any process (such as VR server) can use this data anytime. At last, this command is sent to VR space and the simulation data, visualized in the CompleXcope, is changed as the observer wanted to do.

By using this system, we can order orally the virtual environment without using the input device and control easily and intuitively.

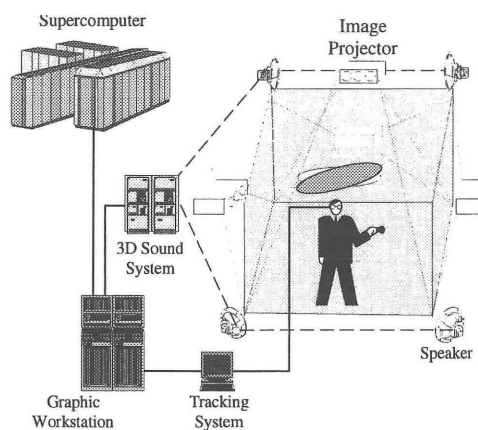


Fig. 1. CompleXcope System

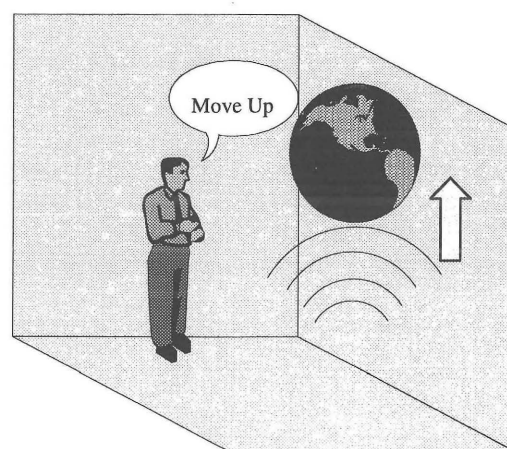


Fig. 2. Control Virtual Objects by Voice Input

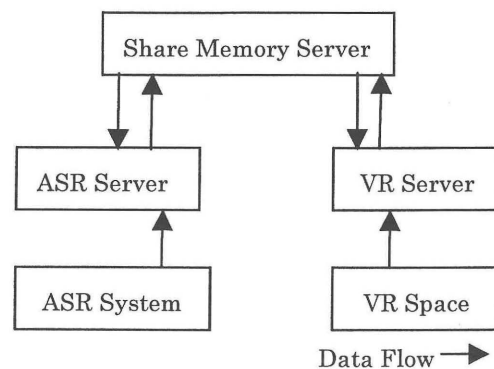


Fig. 3. Data Flow of ASR System

Reference

- 1) Kawahara, T. et al. : J. Acoust. Soc. Japan (E) 3 (1999) 233.