

Tavola: Holographic User Experience

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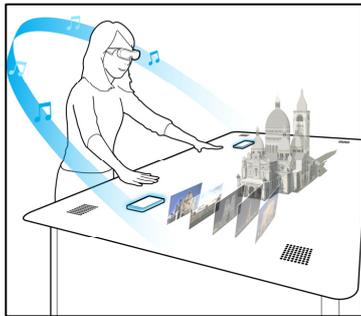
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1. Introduction

We demonstrate a new platform for holographic interactive 3D experience. New user experience includes holographic 3D visual and audio experience, natural free-space 3D interaction, and augmenting the interface of smaller devices (e.g. smartphones). The head tracking component is compact and non-intrusive to 3D glasses' appearance. Depth sensor based 3D hand and object tracking enables in-the-air dual hand 3D interactions. Hand tracking system and holographic visualization system are calibrated so user can directly interact with the virtual objects. And we created a set of easy and natural free hand interactions so that the system can have wide range of applications and usable by the general public.



2. System Overview

This new system combines a large 80" horizontal stereoscopic projection surface, 6DOF head tracking unit and 3D hand tracking unit to create a holographic interactive 3D experience.

The head tracking component is compact, and the method of instrument the glasses does not alter the appearance. Combined with stereoscopic projection surface, users can visualize holographic scenes and virtual objects above and below the surface. The 3D hand and object tracking component contains a depth sensor on top of the working area to recognize different hand / object shapes, and can track their positions in 3D. The system also contains 5.1 speakers embedded in the horizontal surface to create 3D sound experience.



The hand tracking system and the holographic visualization system are calibrated so user can directly interact with the virtual objects, and the display system can also augment physical objects placed on the surface.

3. Interaction

The interactions are designed to be easy, intuitive and natural so that the system is not only a virtual workspace, but also can have wide range of applications and usable by the general public. Users can interact by 3D in-the-air gestures and direct 3D manipulations. In addition to standard multi-touch gestures such as pan, zoom rotate, this system includes a set of natural 3D interactions including binary gestures, continuous gestures, virtual joystick, direct 3D manipulation, and physics based user interfaces. Using head tracking information, the system also gives visual and audio feedbacks based on where the user is looking at. The system can augment personal device to present richer UI and interaction. Personal device can augment the table by giving user visual and haptic feedback.



4. User Experience

The demo scenario allows users to take virtual tours of a city, experience 3D music hall, virtual shopping and dining; and multi-user collaborative scenario involving personal devices, such as manipulating personal device using the 3D interactive space and use personal device as virtual camera and make virtual bookmarks.

5. Conclusions

We propose this new platform for holographic and interactive 3D experience. With easy, intuitive and natural interactions the system is not only a virtual workspace, but also can have wide range of applications and usable by the general public. The potential applications include kiosks, virtual tourism, shopping, education, training, environment simulation, and data visualization.

References

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