

## Hiroshima University Hospital — User Experience of HoloeyesXR VR/MR Service For Medical Treatment

### Introduction

Hiroshima University Hospital introduced HoloeyesXR virtual reality (VR) service for medical treatment in April of 2018, using VR imagery for pre-surgery simulations and for training young physicians. This

advanced treatment service uses a VR viewer to display patient information in 3D. Here's a report on how this revolutionary technology is being used.

### Holoeyes XR Site

HoloeyesXR service uses a VR device available on the open market to view 3D data created from CT and other medical images. This cloud-based service was developed by Holoeyes Co., Ltd. Users registered on the Holoeyes XR site can upload their medical image data to the site, where VR application data will be generated.

To view the VR images a VR compatible Windows PC or VR goggles are needed. The images can then be viewed in 3D by installing the VR data generated on the HoloeyesXR site in the VR goggles. Use of the Microsoft HoloLens allows viewers to see 3D holograms (3D) models floating in the air in what is known as mixed reality (MR).

### How It's Being Used At This Hospital

At the beginning the hospital used a VR-compatible Windows PC and VR goggles, and later added two MR HoloLens units. At present they are using these tools for pre-surgery simulations of lumpectomies in their plastic surgery department and for training young physicians. One of their radiological technologists in the image diagnosis section is in charge of device management and data generation.

At the image diagnosis section requests are received from the patient's physician. The patient's data is converted into 3D VR/MR form at the hospital's image processing workstation. This 3D image is then exported as an STL file and STL data is created for recording. To view VR images using different colors for bones, arteries, tumors, etc., a segmented STL file is created.

After logging in to the Holoeyes XR site, follow the steps on the screen to record the STL data and request an application for viewing the data in VR, and a VR application will be completed in only about 10 minutes. The application data can then be downloaded and installed in a VR device for viewing by the physician.





## Merits & Demerits

The main merit of viewing patient data in VR/MR is that it dramatically improves the understanding of the location and positioning of items of interest when compared with viewing 2D images on a monitor, and this information can be easily shared with other doctors. This reduces risk during surgery and is very effective in

teaching young and less-experienced physicians.

A demerit would be the complexity of using the various equipment required to create and record the STL files. However, when considering how rapidly IT technology is developing, these issues should be solved before too long.

## Conclusion

The hospital has been using VR for more than six months and expects to be using VR/MR soon for medical treatment area in the near future. Thereafter, various other uses for this interesting

technology other than plastic surgery will also be studied. We expect to see further developments of this revolutionary medical communication technology, as well as in its software and hardware.