XR Online Platform
Towards More Realistic Online Meetings

Nov 18
Tomohiro Fukuda  Osaka University
Future Meeting Style? Venice Biennale 2006
Remote conferencing while sharing 3D virtual space

2010-2012
[different places & same time]

Lei Sun, Tomohiro Fukuda, Bernd Resch
A synchronous distributed cloud-based virtual reality meeting system for architectural and urban design
Frontiers of Architectural Research, 3(4), 2014, pp. 348-357

2011.11.16
Forum8 Int’l VR Symposium Tokyo
Towards a variety of online social and economic activities

- Adapting to new lifestyles
  - remote
  - non-face-to-face
  - contactless

- Improving quality of online service
  - high capacity
  - low latency
  - multiple simultaneous connections

- XR online communication platforms for F8VPS:
  - Investigating features in existing platform
  - Development of a real-time remote sharing system for real objects
Development of a Mixed Reality System for Real-Time Remote Sharing of 3D Real Objects
3D Remote Sharing of the Real Objects
Using real-time point cloud on mixed reality

RGB-D Camera
PC
Router
Optical See-through HMD

Real objects
Site A

Sender and scale model
(Creating point cloud stream)

RGB-D Cam
PC
HoloLens (MR)
Receiver

3D Virtual object of Real one
Site B

Tomohiro Fukuda, Yuehan Zhu, Nobuyoshi Yabuki
Point Cloud Stream on Spatial Mixed Reality: Toward Telepresence in Architectural Field
36th eCAADe Conference, 2018, 727-734
View from MR user
Interactive Remote Collaboration Method for 3D Physical Objects Using Real-time Point Cloud Segmentation and Mixed Reality

1. Collision detection with the viewpoint cursor by meshing the real space using SLAM
2. The receiver can dynamically observe the assembly of the building block model by the sender.
3. The receiver can assemble the virtual building block model and place it on the real plane.

Daichi Ishikawa, Tomohiro Fukuda, Nobuyoshi Yabuki
A mixed reality coordinate system for multiple HMD users manipulating real-time point cloud objects
38th eCAADe Conference, 2020, 197-206
A Remote Sharing Method of 3D Real Objects with Instance-segmented 3D Point Cloud Acquired in Real-time

3D Real Objects

Depth Image

Create a point cloud by merging segmentation & depth images

XYZ Data

RGB Image

Instance Segmentation Image

Segmentation Data

RGB Data

Site A

Site B
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12th VR Summer Workshop
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