

WYSIWYR

What You See Is What You Reconstruct!

POSTECH

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When you visit a model house...

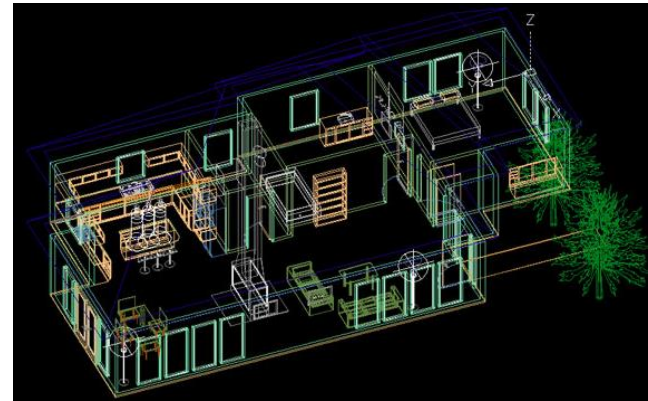


At night...



We can help you!!

- Real-time 3D reconstruction and structure understanding of large scale indoor environments



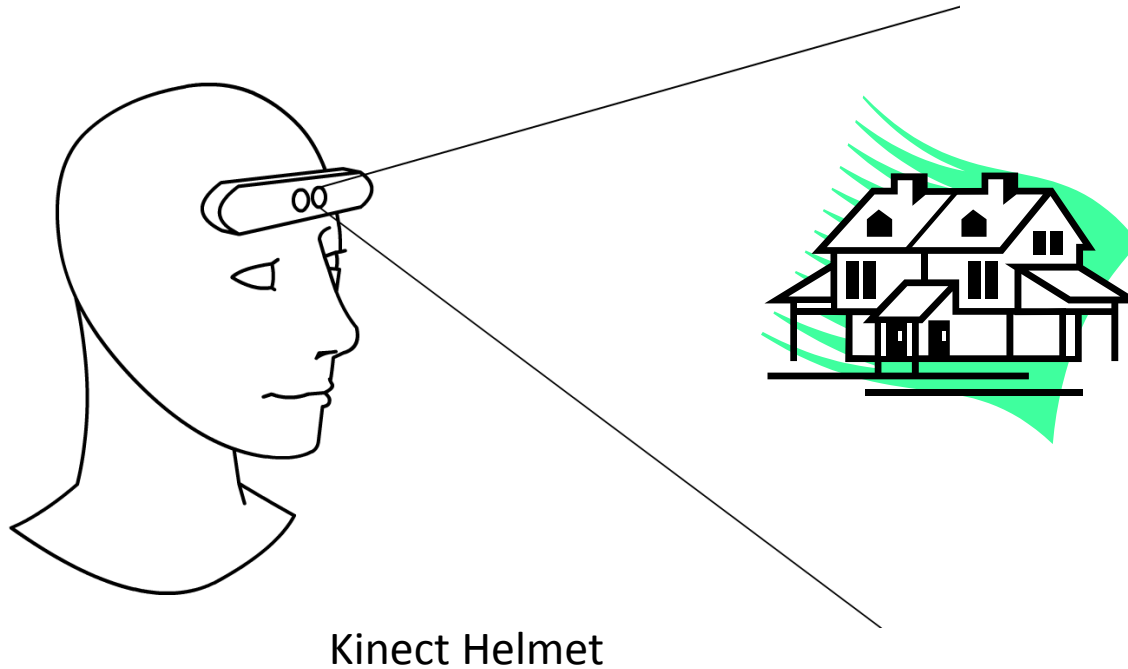
Microsoft Kinect!

- Real-time capture of RGB & depth images



Kinect Reality

- Real-time view-oriented 3D scanning
- Users can reconstruct 'what they see' using **Kinect helmet** in real time
- **WYSISWYR = What You See IS What You Reconstruct!**



Kinect Helmet w/ HMD

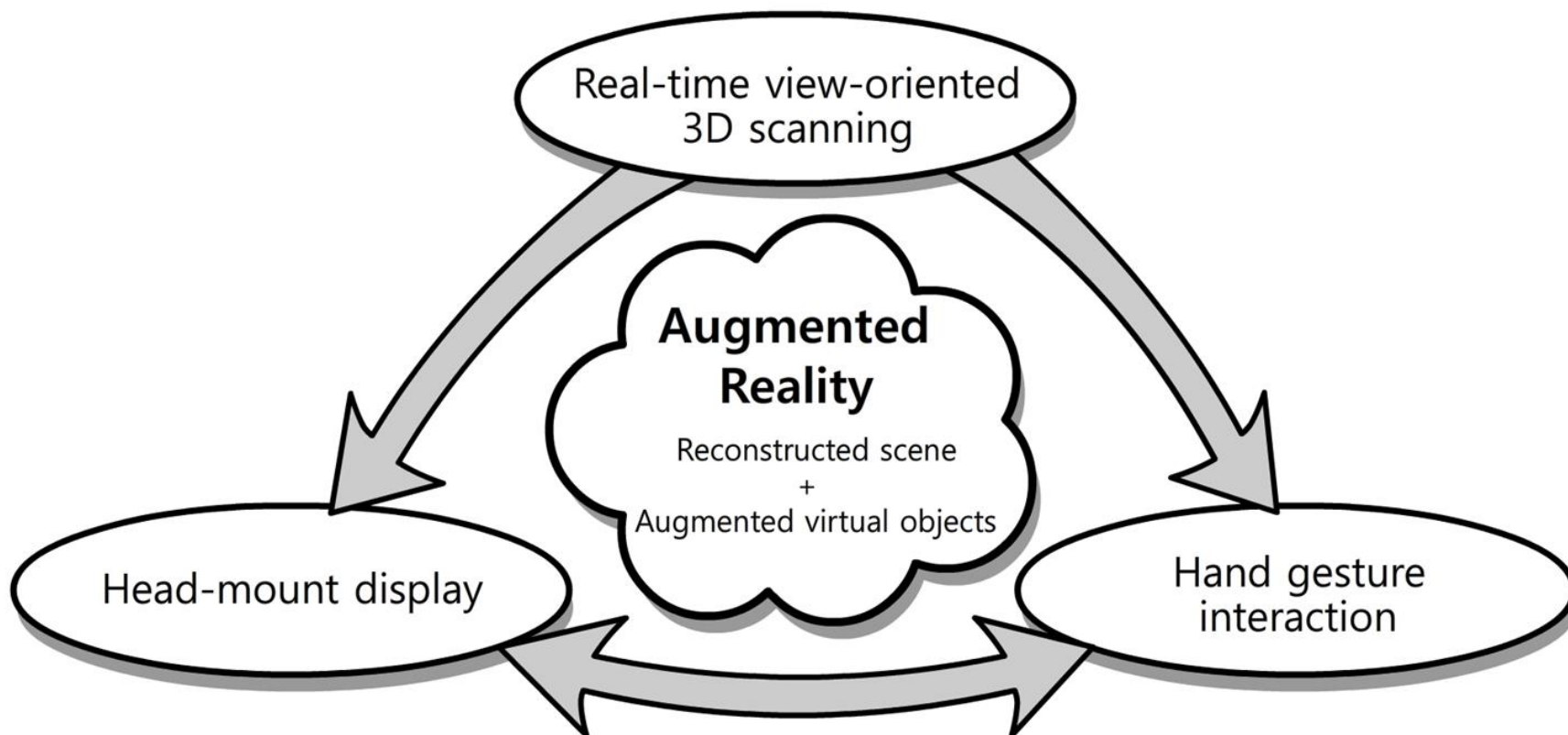
- Safety helmet with MS Kinect
 - View oriented 3D reconstruction
- Head Mounted Display (HMD)
 - Display of 3D reconstruction result
 - Augmented Reality with RGB image from Kinect



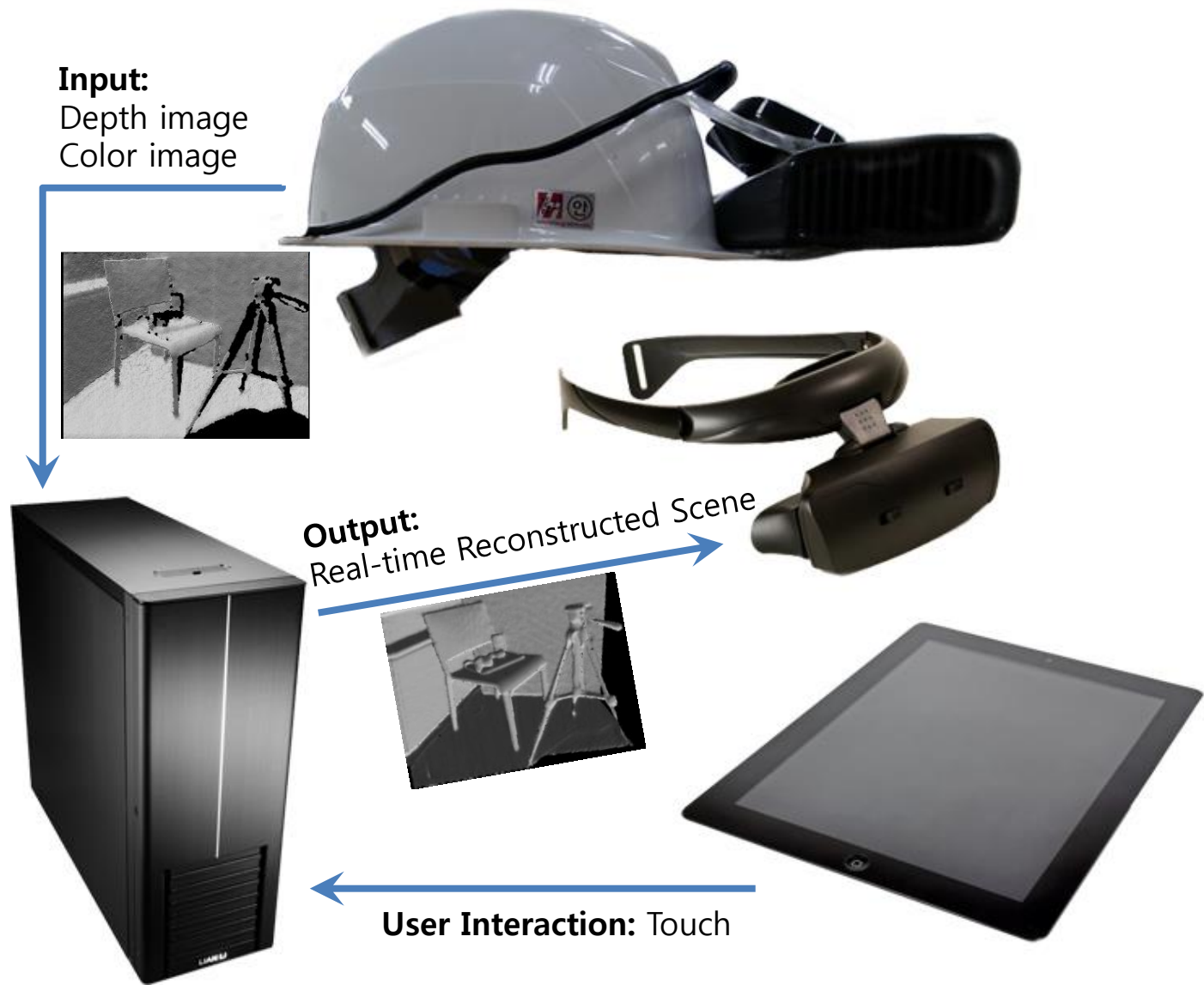
Overall Structure of Kinect Reality

Kinect Reality

= Augmented Reality + Real-time view-oriented 3D scanning + HMD + Hand gesture interaction



Prototype System of Kinect Reality

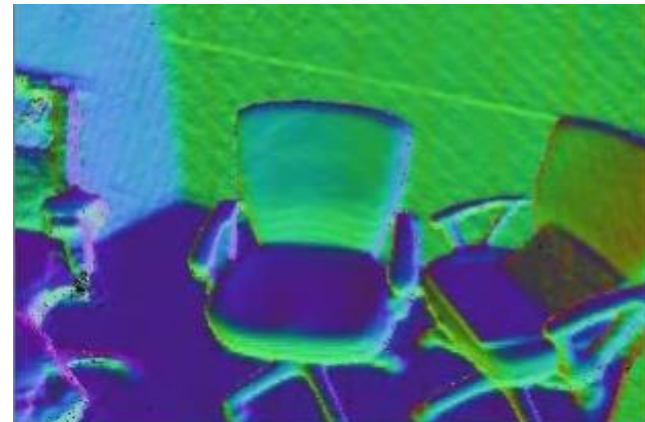
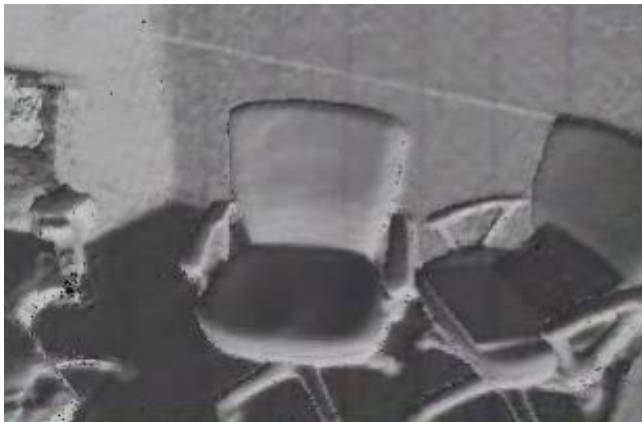
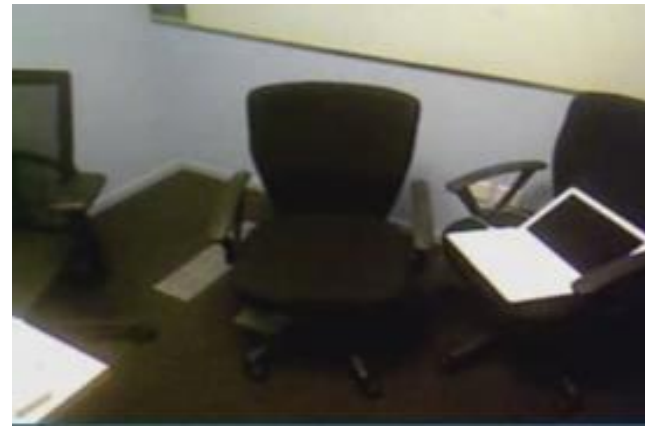


- **Real-time 3D scanning**
 - Efficient handling of scanning noise and reconstruction errors
- **Light-weighted polygonal representation**
 - Compact representation for large-scale indoor scenes
- **Scene structure understanding**
 - Registration and merging of locally scanned geometry
- **User interaction**
 - Tablet, hand gesture interface

RGB image + Depth data processing!

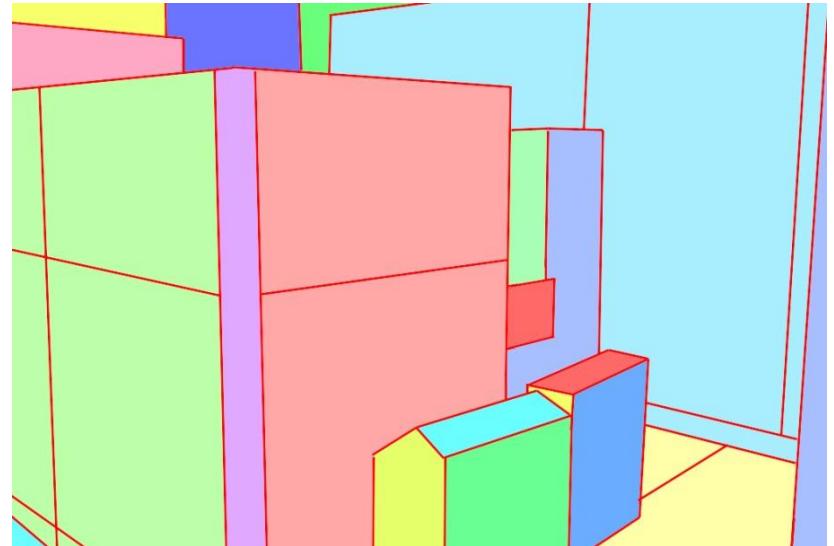
Real-time 3D Scanning

- KinectFusion
 - Computation and memory intensive processing for a small region
- Efficient and robust tracking and processing of RGBD data



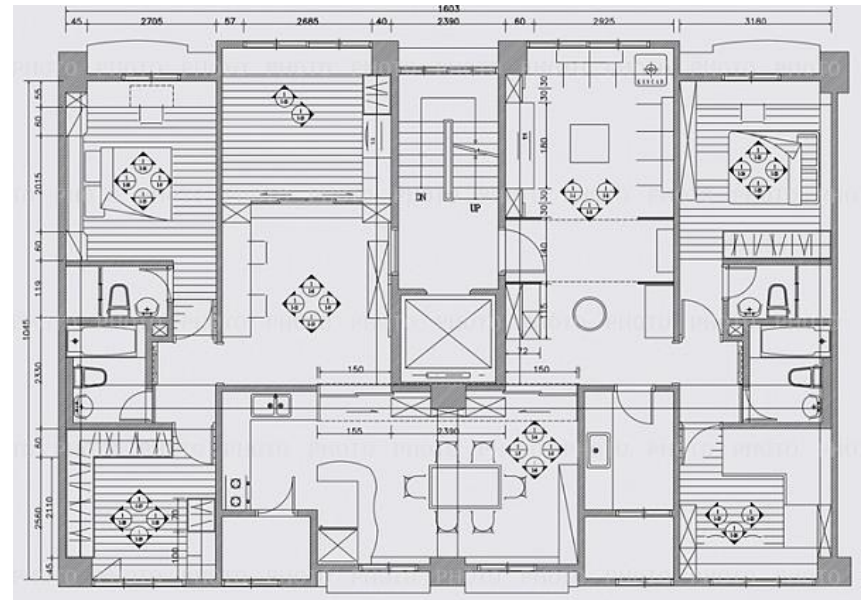
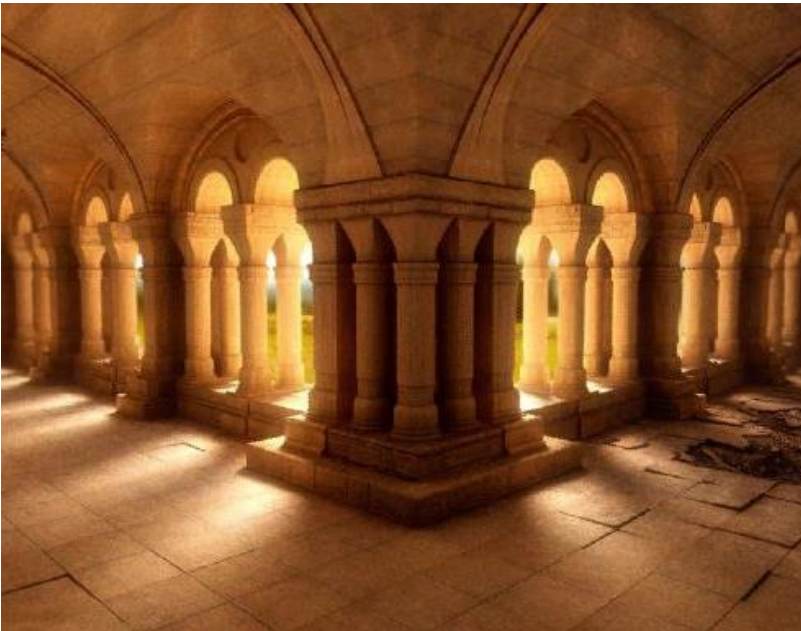
Light-Weighted 3D Representation

- Compact representation of scene structure and details
 - Noise filtered geometry & less memory usage
- Robust real-time plane detection from RGBD images
 - Simplified polygonal mesh + displacement map



Scene Structure Understanding

- High-level understanding of the scene structure from RGBD images
 - Local geometry from depth images
 - Registration and merging of local geometry using scene structure
 - Structural analysis , such as repetition and symmetry detection
 - Globally registered hierarchical scene representation



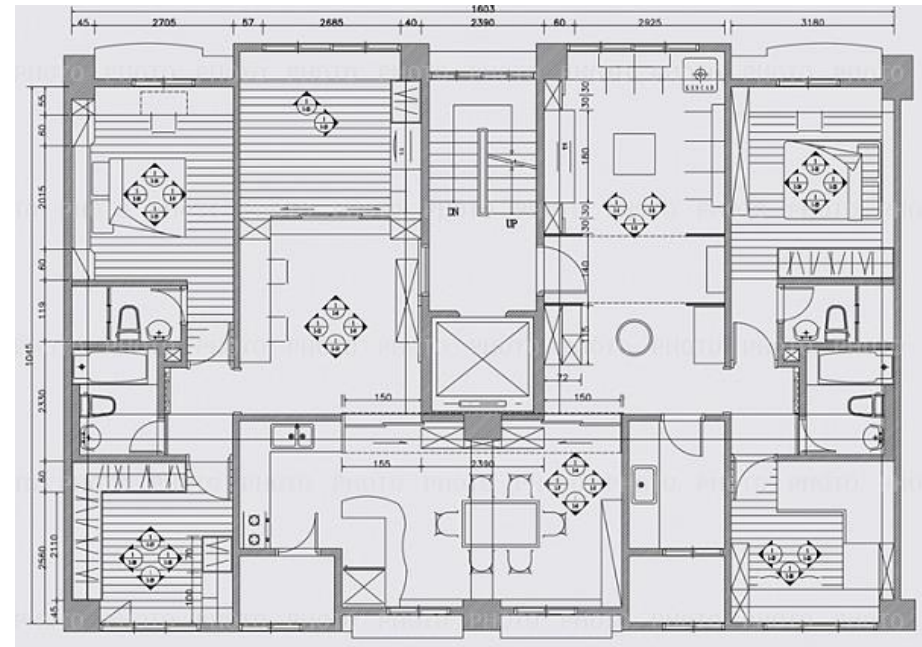
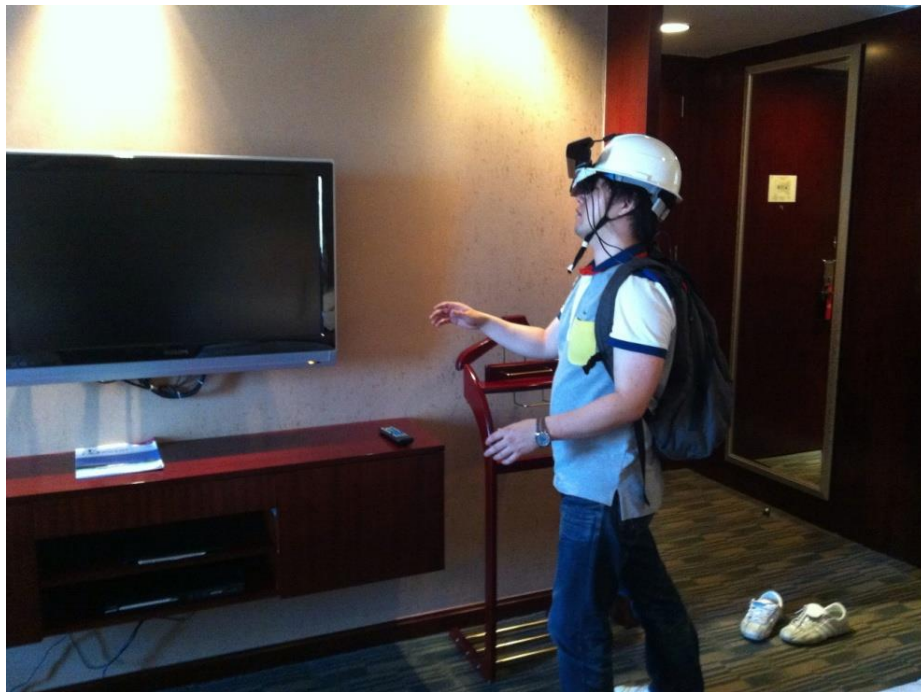
User Interaction

- User interaction using RGBD images
 - Hand gesture interaction using depth data from Kinect
 - Touch gestures on a tablet for user interaction (drawing)



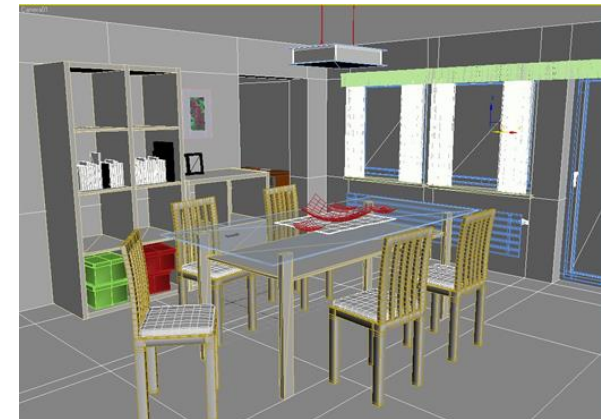
Ultimate Kinect Reality System

- **WYSIWYR** for interactive scanning of large-scale indoor scenes
 - Walk & Watch! Then... You will Get the (compact) Geometry!
 - Portable system w/ laptop & battery



Summary

- Kinect as real-time scanning device for RGBD images
 - **WYSISYR** for interactive scanning of large-scale indoor scenes
 - **Synergism** of RGB image and Depth processing
 - Effective and robust extraction of information for scene reconstruction!
 - Many interesting research problems!



Thank you!!

<http://cg.postech.ac.kr>