



Augmented Virtuality based Interaction in Immersive Cinematic Experience

25 Feb 2015

Gun Lee

Immersive Cinematic Experience



IMAX 3D Theatre



Head Mounted Displays

Theatrical Group Experience → Interactive Personal Experience

Immersive Cinematic Experience

- 360 panoramic movies
 - Panorama camera and HMDs becoming more affordable

IC Real Tech Allie Pro/Home/Play



Gyroptic 360cam



360 fly



Richo Theta



Samsung Project Beyond



Oculus Rift



Samsung Gear VR



OSVR



Google Cardboard VR

Immersive Cinematic Experience

- Zero Point – Condition One



Immersive Cinematic Experience

- South Africa Tourism - Visualize



Immersive Cinematic Experience

- VR Catwalk Frontrow – Topshop/Inition



Immersive Cinematic Experience

- Taylor Swift - UNSTAGED



Immersive Cinematic Experience

- Spotlight Stories – Google ATAP



Immersive Cinematic Experience

- Interstellar VR Experience



Immersive Cinematic Experience



Project Beyond, Samsung

Immersive Cinematic Experience



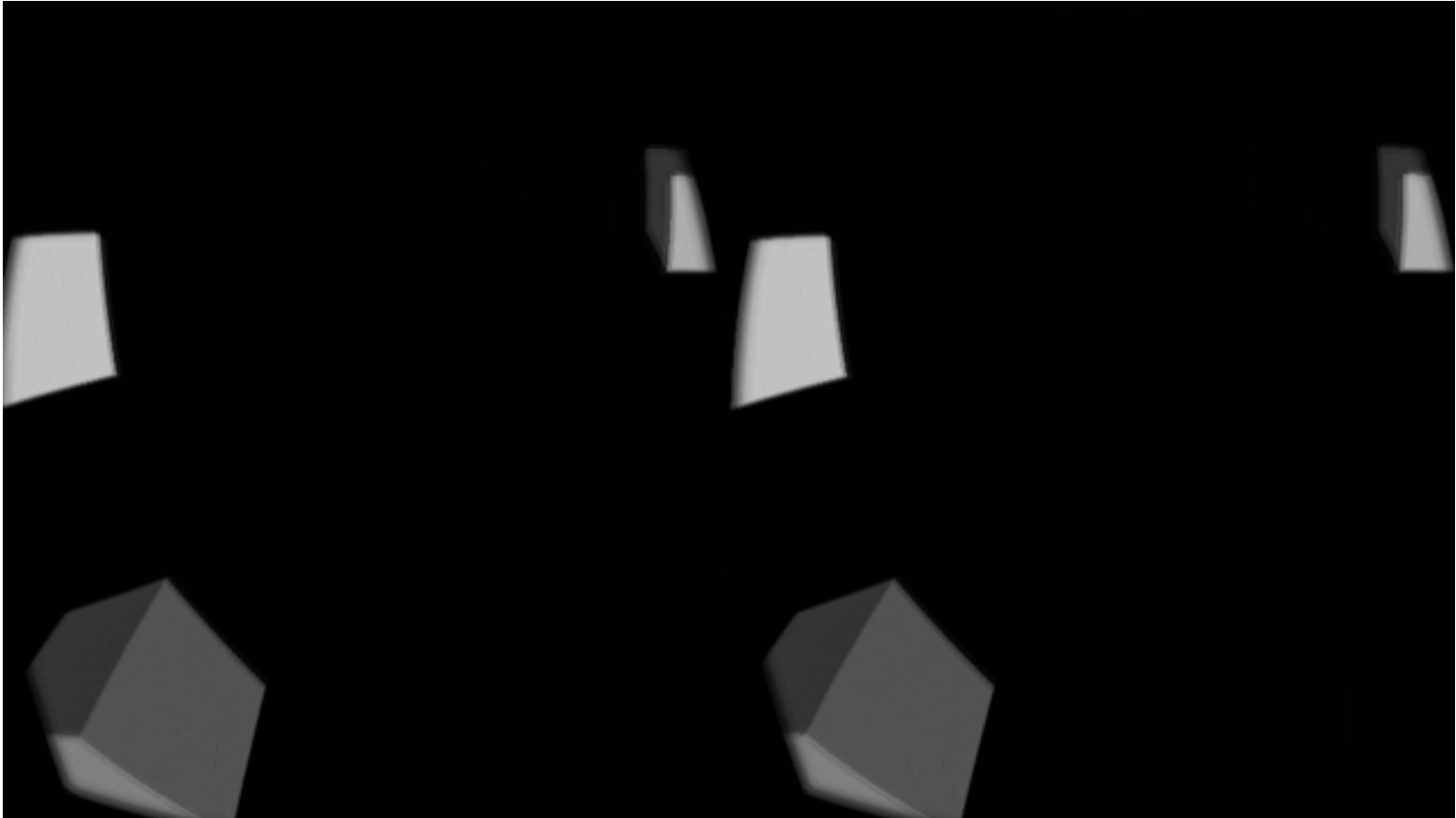
Project Beyond, Samsung

Where Did My Body Go?



Project Beyond, Samsung + Modified by the presenter

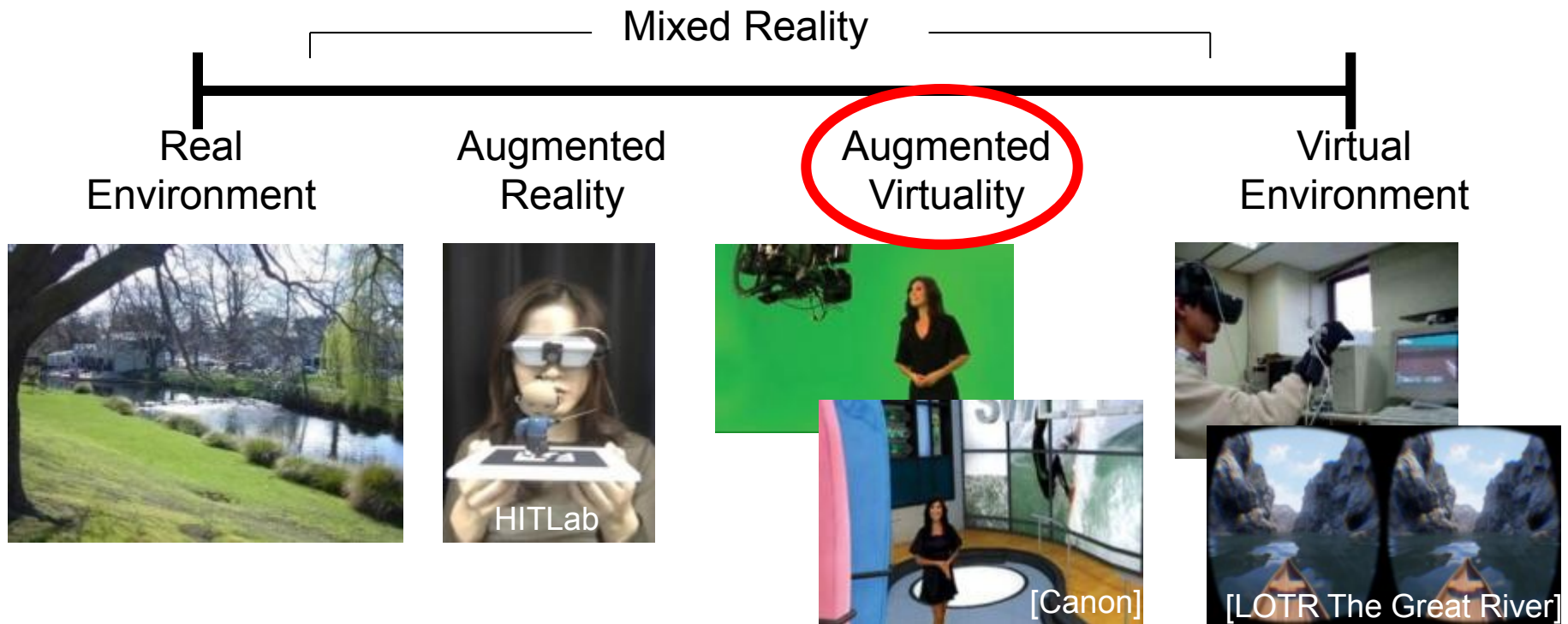
Where Did My Drink Go?



Quick Switch, Leap Motion

Reality-Virtuality Continuum

- P. Milgram *et al.* 1994



Capturing the Real World

- AR Rift



Concept Scenario



Concept Scenario



Concept Scenario



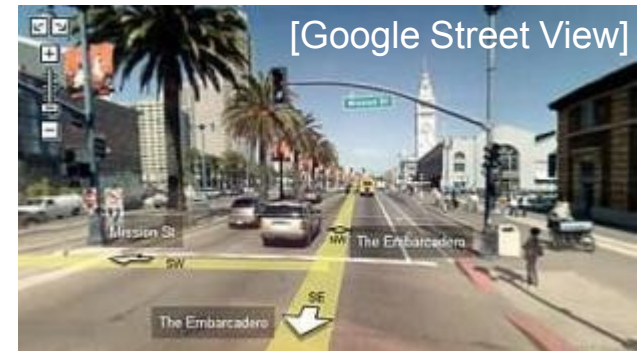
The Environment

- Real-time 3D Rendering
 - Higher degree of freedom (e.g. viewpoint, animation)
- 360 (Stereo) Panoramic Movie
 - Capture the real world scene
 - Higher Quality rendering from 3D model



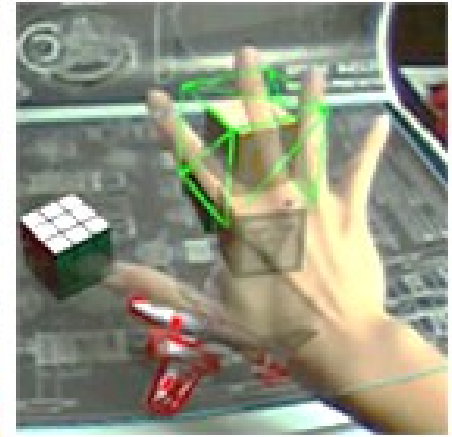
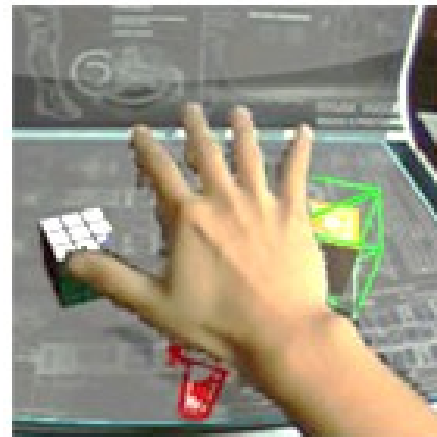
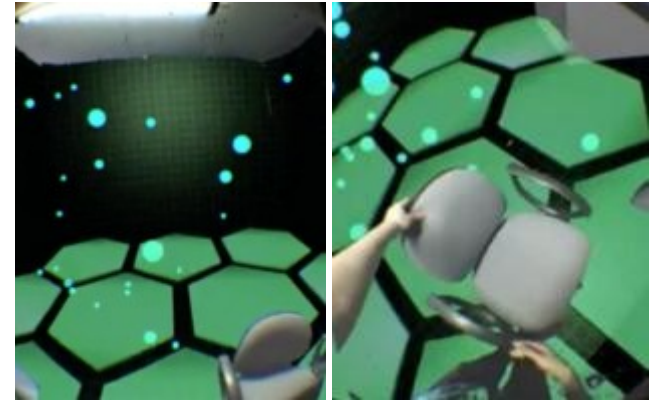
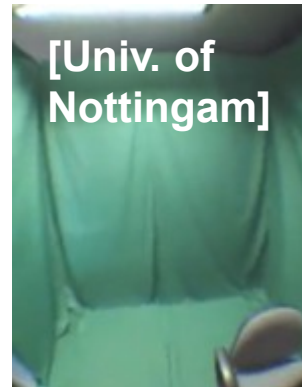
The Environment

- Non-linear playing of panoramic movie
 - View navigation
 - Animation
 - Video Texture [Schödl et al. 2000]
 - Infinite non-linear loop of video

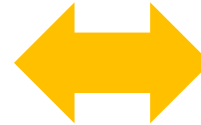
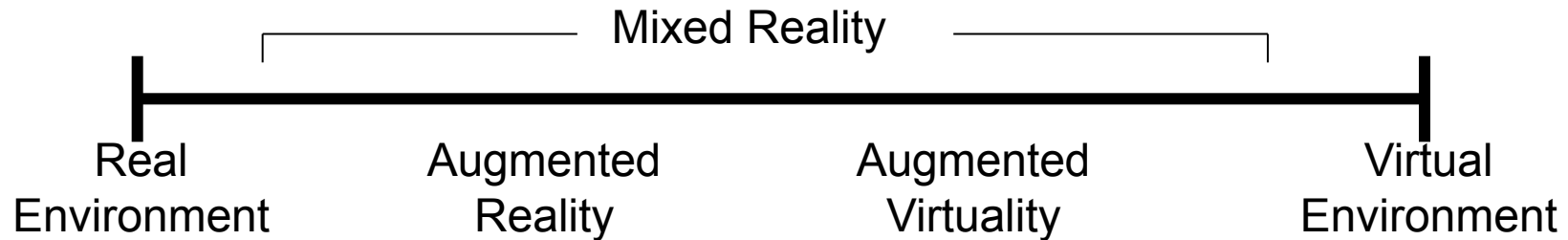


Mixing Real & Virtual Scenes

- Camera calibration
- Chroma keying
 - Skin colour
 - Green or Blue background
- Depth keying
 - Depth camera
- Semi-transparency



Transitional Interfaces



Transition btw. Real-Virtual



Transition btw. Real-Virtual



Transition btw. Real-Virtual



Transition btw. Real-Virtual



Transition btw. Real-Virtual



Transition btw. Real-Virtual



Transition btw. Real-Virtual



Beginning/ending, scene characteristic,
user's behavior, engagement, preference, ...



Concept Scenario



Concept Scenario

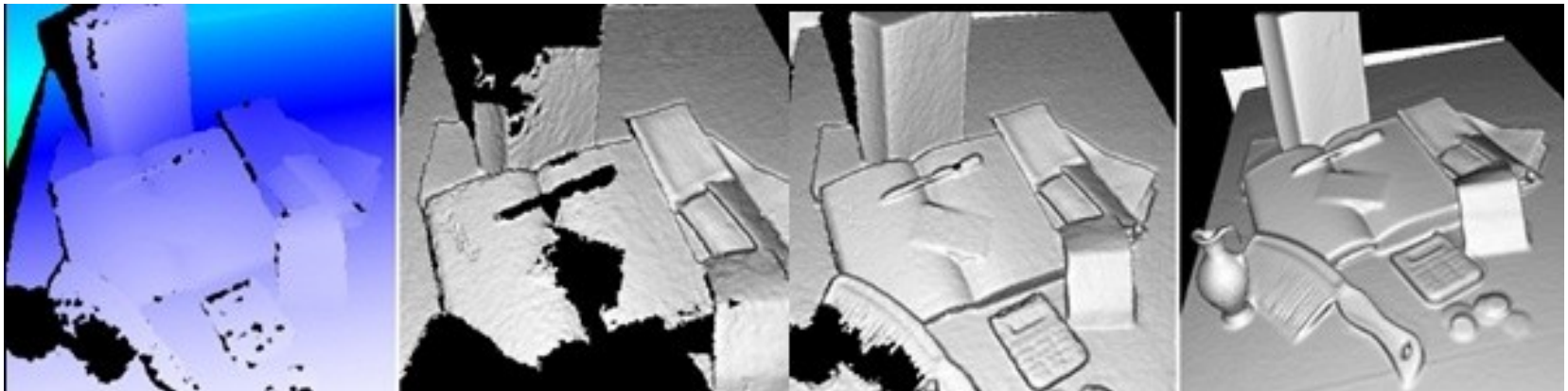


Concept Scenario



Mixing User's Environment

- Reconstruction and tracking of physical objects in user's environment
- Kinect Fusion
 - Integrating depth image into dense smooth 3D reconstruction



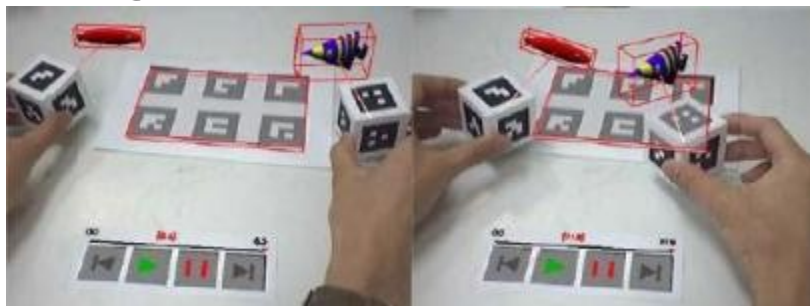
Mixing User's Environment

- Transforming user's env. to match movie theme



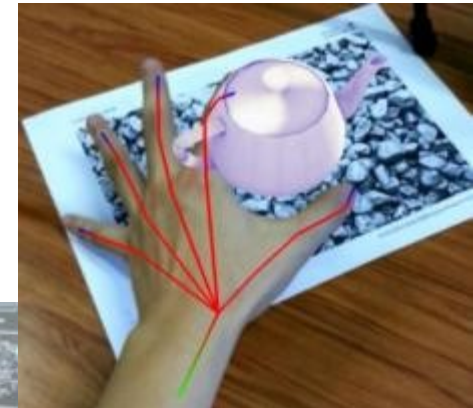
[Vuforia Smart Terrain]

- Use of physical objects in user's environment as Tangible interfaces



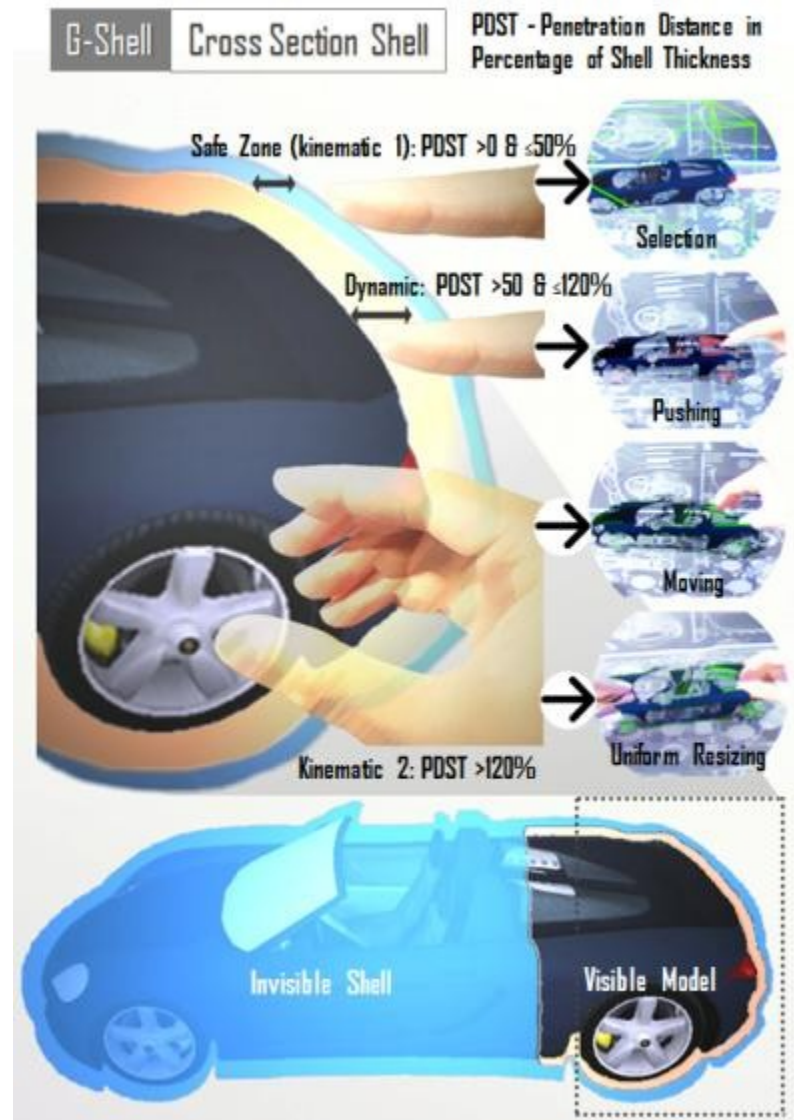
Gesture-based Interaction

- Unencumbered, bi-manual rich interaction
- Skeletal motion tracking
 - Kinematic interaction & Gesture recognition
- Hand volume reconstruction
 - Physical (dynamics) interaction
 - Voxels / Hand model fitting



Gesture-based Interaction

- Mixing Kinematic & Physical Interactions
 - G-Shell
 - Virtual shell that decides interaction mode based on penetration distance



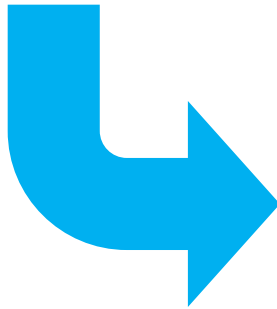
Concept Scenario



Other Topics

- Omni-stereoscopic panoramic video & audio recording + playing
- Movie (data) structure for supporting interactivity / non-linear story line
- Integrating Haptic interfaces, Photo-realistic rendering methods, and Photo-realistic avatars / virtual hands
- User evaluation
- Immersive Authoring/Editing
- Other sensory displays: Olfactory & gustatory

Conclusion



Thank you!

- **Contact**

- Gun Lee

- gun.lee@hitlabnz.org

- Mark Billinghamurst

- mark.billinghurst@hitlabnz.org

- **Website**

- <http://www.hitlabnz.org>