

CSE 190: Virtual Reality Technologies

LECTURE #20: IMMERSIVE MULTI-USER SYSTEMS

Announcements

Project 3

- Late submissions accepted until June 7th at 11:59pm

Final Exam:

- To be released Monday at 6pm PT on Canvas
- Submission deadline: Tuesday at 6pm PT

Today's VR app presentations:

- Trevor Hedstrom: No Man's Sky
- Osama Qarni: Beat Saber
- Jad Barrere: Graffiti Paint VR

Multi-User Scenarios

Presentation

- One presenter, many viewers
- Presenter may or may not see viewers
- Viewers may or may not see each other

Spectator VR

- One or more players/users/actors, many observers
- Actors likely don't see observers
- Observers don't see each other

Collaboration

- Multiple equally privileged users
- Everyone sees everyone

Altspace VR

Multi-user mode: Presentation,
Collaboration

- <https://www.youtube.com/watch?v=RtjDk8I3nE4>



facebook Spaces

VR is better with friends



Facebook Spaces

Discontinued in October 2019, to be replaced by Facebook Horizon

Multi-user mode: collaboration

- <https://www.youtube.com/watch?v=PVf3m7e7OKU>



Facebook Horizon

Announced for 2020

Registration for beta testing open now

<https://www.youtube.com/watch?v=Is8eXZco46Q>



Nvidia Holodeck



Presented May 2017

NVIDIA Holodeck™ is a virtual reality (VR) innovation platform that brings designers, peers, and stakeholders together from anywhere in the world to build and explore creations in a highly realistic, collaborative, and physically simulated VR environment.

<https://www.youtube.com/watch?v=goFZOTjCVFg>

TechViz

Founded 2004 in Paris, France

TechViz Collaborative, or VR teleconferencing, enables 3D real-time collaboration between co-workers in different locations, working on any 3D application (Solidworks, Navisworks, Creo, Catia...) and on any immersive system (Immersive Room, HMD, Powerwall...)

<https://www.youtube.com/watch?v=2wnLrkNTj1w>



**Instant VR
& Collaboration
Software**

Multi-User AR

DataCube

Publication presented at the Electronic Imaging Conference in January 2020

- Xie, W., Liang, Y., Johnson, J., Mower, A., Burns, S., Chelini, C., D'Alessandro, P., Weibel, N., Schulze, J.P., “Interactive Multi-User 3D Visual Analytics in Augmented Reality“, In Proceedings of IS&T The Engineering Reality of Virtual Reality, San Francisco, CA, January 30, 2020

Multi-user AR application for the Hololens

Visual data exploration for medical insurance data

Each user is equally privileged

Minecraft Earth AR

Presented at Apple Worldwide
Developers Conference (WWDC) in May
2019

<https://www.youtube.com/watch?v=RpGelzYSAnU>



Future Challenges

Reliable co-location of multiple users in same physical space for AR applications

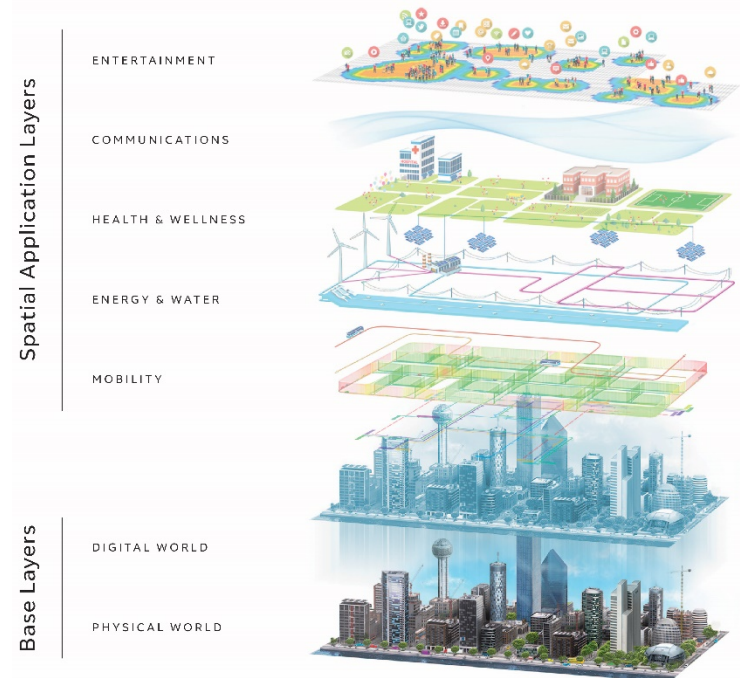
Network infrastructure for massively fully AR games like Pokemon Go

Next generation internet protocols for AR application with geolocated information layers

Photo-realistic AR:

- rendering quality
- field of view
- object anchoring in real-world

MAGICVERSE SPATIAL APPLICATION LAYERS



Thank you for a great quarter and good luck with your final exams!