GW SCHOOL OF ENGINEERING & APPLIED SCIENCE

Augmented and Virtual Reality

CSCI 3907/6907

Spring 2022

Lecture 9

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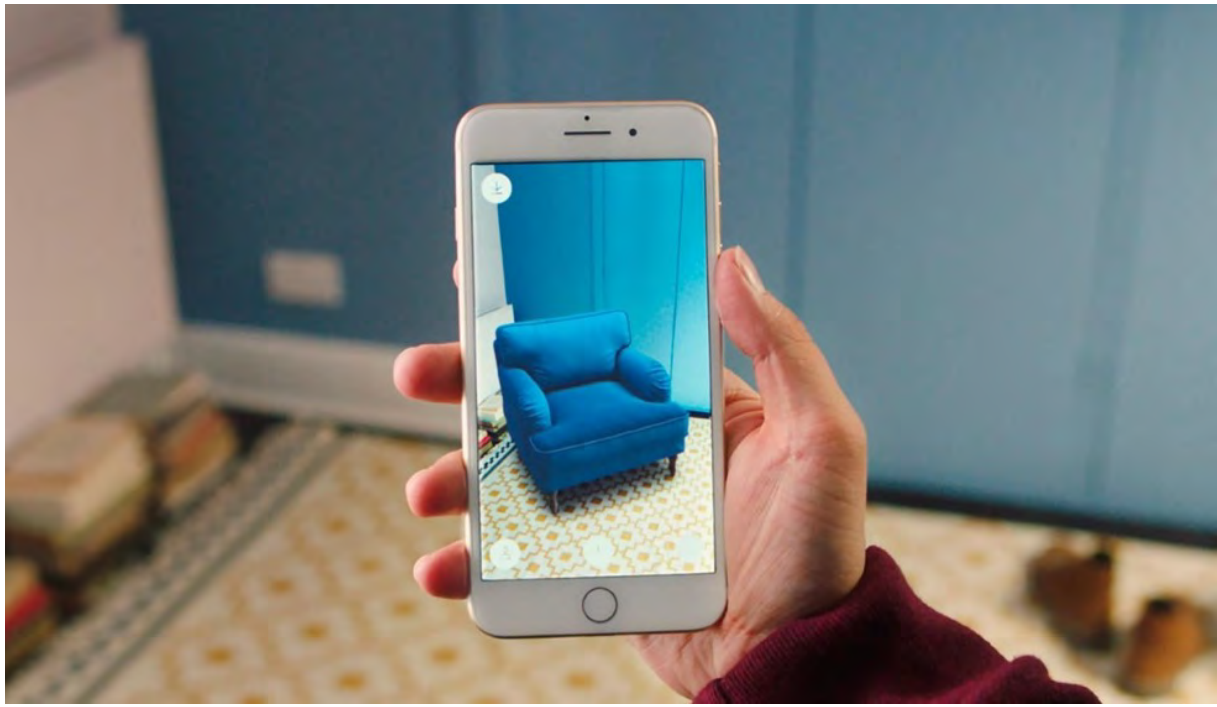


What is Augmented Reality (AR)?

Azuma‘s AR Definition

- Combines real and virtual
- Interactive in real time
- Registered in 3D

Photo: Microsoft

Ronald T. Azuma, “A Survey of Augmented Reality“
In Presence: Teleoperators and Virtual Environments 6, 4 (August 1997), 355-385

Holodeck: An ideal AR system

Star Trek Voyager Holodeck

https://youtu.be/OjuptfaTqyo

An ideal AR system would have the capability of creating life-like 3D augmentations that convincingly populate actual physical spaces.

AR designers might choose to have the augmentations appear as distinct from reality, but they would certainly appreciate the possibility of creating virtual content that is seamlessly integrated with existing physical reality.

Mobile AR Playground

A Tour of AR Apps developed by GWU CS Students

https://hubs.mozilla.com/cbtfc9w/spring-2021-main-hall

Commercial AR Apps

JFK Moonshot: An Augmented Reality Experience

https://apps.apple.com/us/app/jfk-moonshot/id1460242290

https://play.google.com/store/apps/details?id=com.jfk.moonshot&hl=en_US&gl=US

IKEA Place (available only on the App Store for iPhone and iPad)

https://apps.apple.com/us/app/ikea-place/id1279244498

Wayfair App

https://www.wayfair.com/the-wayfair-app

Mobile AR Playground

WebAR

Requirements: Mobile Browser. No App Required.

Hyparlink

https://hyparlink.com/cicada

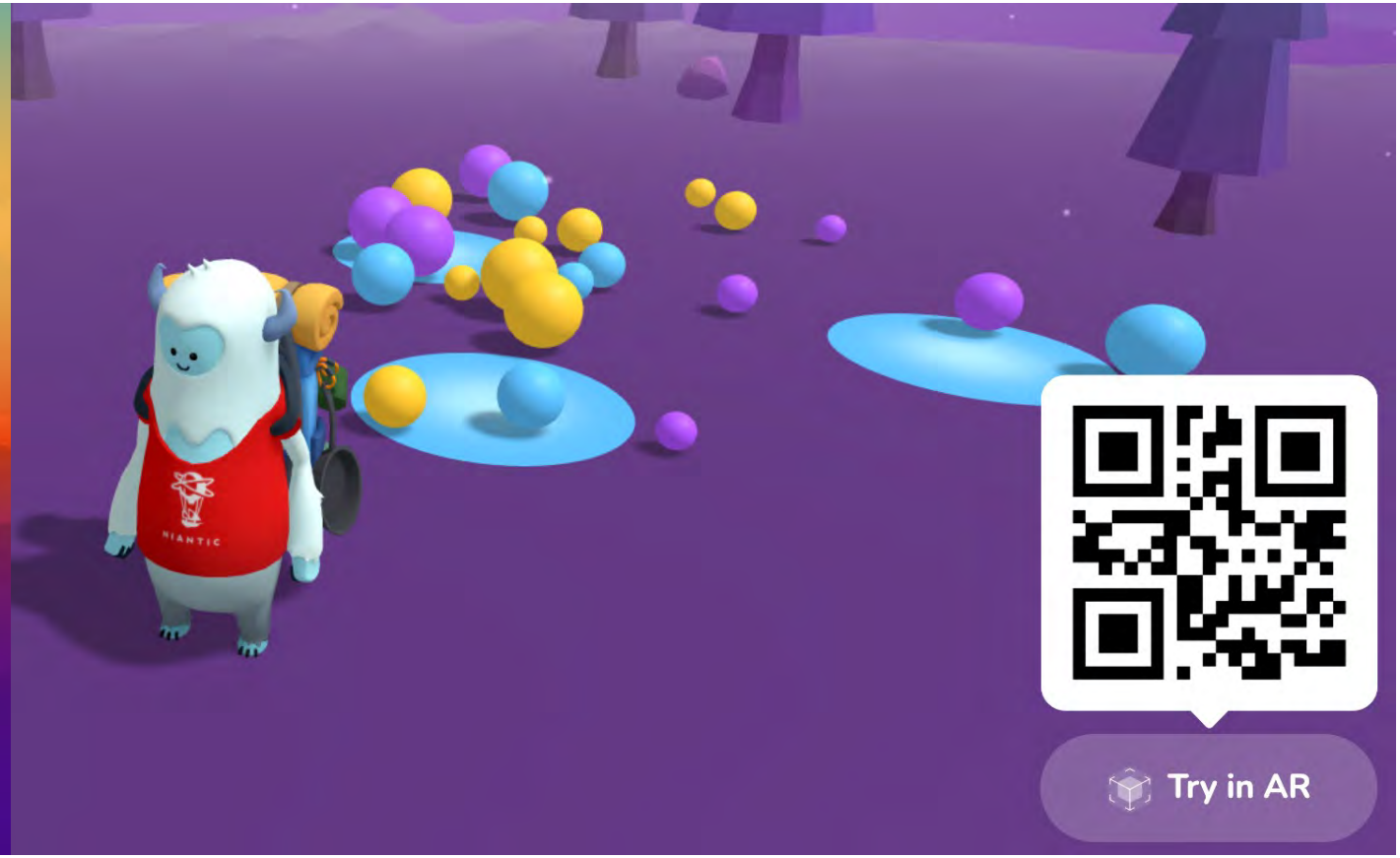
https://hyparlink.com/shoe

https://hyparlink.com/turtle

https://hyparlink.com/tesla

Mobile AR Playground

WebAR platform: [8thWall]



8th Wall is joining Niantic

https://8w.8thwall.app/welcome/

Mobile AR Playground

Mixed Reality

Reality Mixer (available only on the App Store for iPhone and iPad)

For capturing virtual reality games and applications in Mixed Reality.

Requirements: Oculus Quest/2 and iPhone and more

https://github.com/fabio914/RealityMixer

https://apps.apple.com/us/app/reality-mixer/id1539307552

AR Project – Part I

Self-Study AR Tutorial (Total 5 points)
Tasks:

Review UNITY AR development platform and select the AR SDK for the mobile device of your choice:

https://unity.com/unity/features/ar

ARKit for Apple iPhone
ARCore for Android

Enter your mobile device and development system in Google Sheet

https://docs.google.com/spreadsheets/d/1o4hEWz8ufiotcjflHSvtoIeDtKU2KNbavCy_oOs8jyU/edit?usp=sharing

AR Project – Part I

Self-Study AR Tutorial (Total 5 points)

Tasks (continued)

Self-study the LinkedIn Learning tutorial AR Development Techniques by Parth Anand on AR development on that mobile device and AR development platform.

AR Development Techniques 01: Basic Concepts

AR Development Techniques 02: Lighting and Physics

Due by 3/24 (2 points)

AR Development Techniques 03: Recognition and Tracking

AR Development Techniques 04: Advanced Techniques

Due by 3/31 (3 points)

AR Project – Part II

AR App Development (25 points)

TBD

References

"Augmented Reality with Unity AR Foundation" by Jonathan Linowes, 2021
(Available Online through the GW Library)

Handheld AR App Development with Unity
https://www.coursera.org/specializations/unity-xr