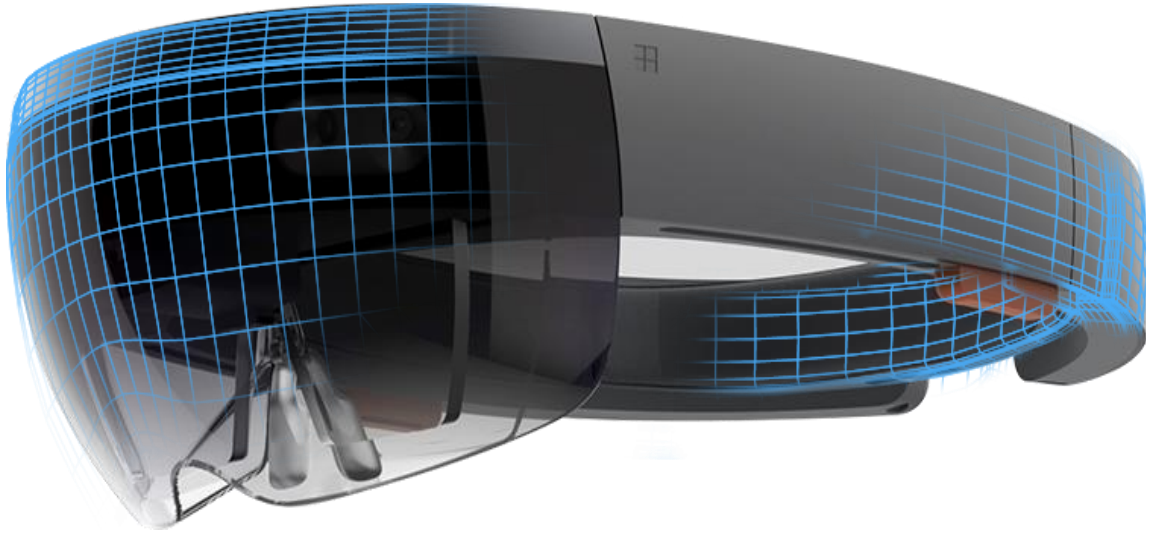
Digital Reality Spectrums and Deep Dive into Mixed Reality Development

Abhijit Jana

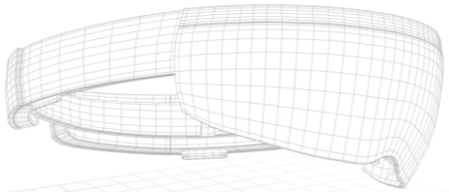
Consultant | Microsoft

Blog : http://abhijitjana.net | Twitter: @abhijitjana

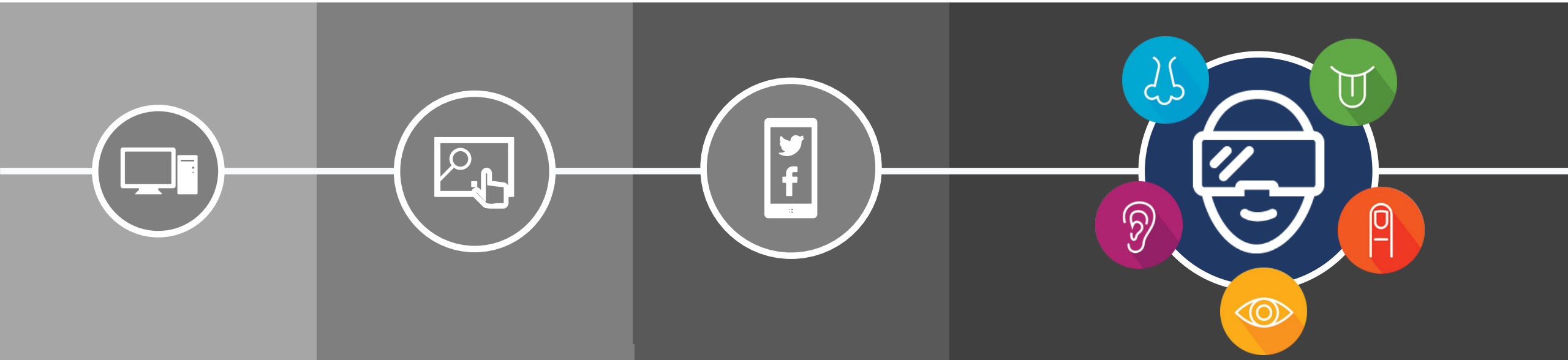


Objective

- ✓ Understand Digital reality spectrums
- ✓ Virtual Reality(VR) /Augmented Reality(AR) / Mixed Reality(MR)
- ✓ Windows Mixed Reality & Microsoft HoloLens
- ✓ Building a Mixed Reality application with HoloLens
- ✓ Building connected scenarios with HoloLens
- ✓ References for further learning



User Interaction Models Over Times



1980s: **PC**

- Desktop

1990s: **Internet**

- Search
- User “visits” websites

2000s: **Mobile**

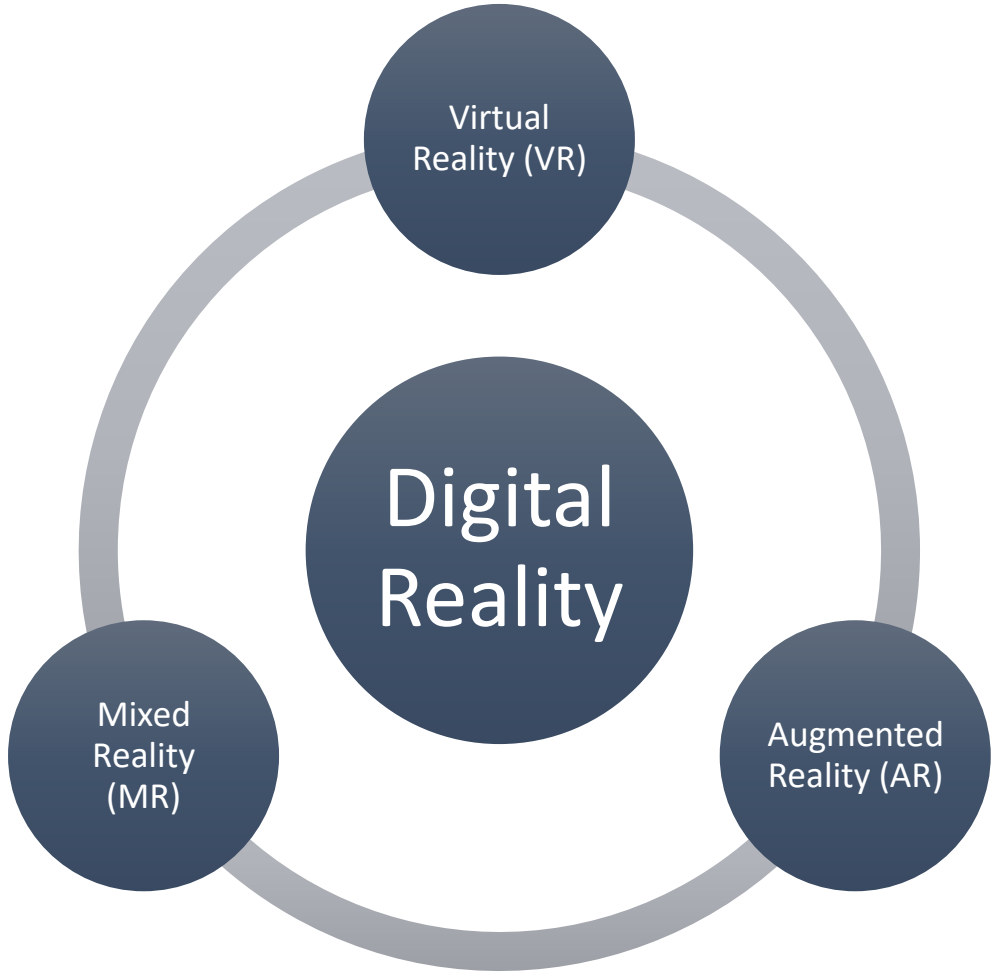
- Social
- User download apps from App Stores

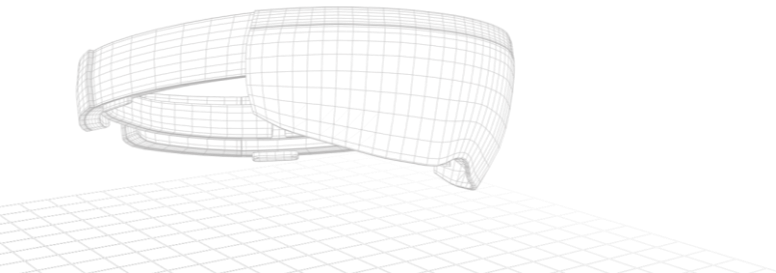
The future: **Immersive Computing**

- Natural language and interactions between people and technology
- Conversational canvas
- Bots
- Digital Realty

Digital Reality Spectrums

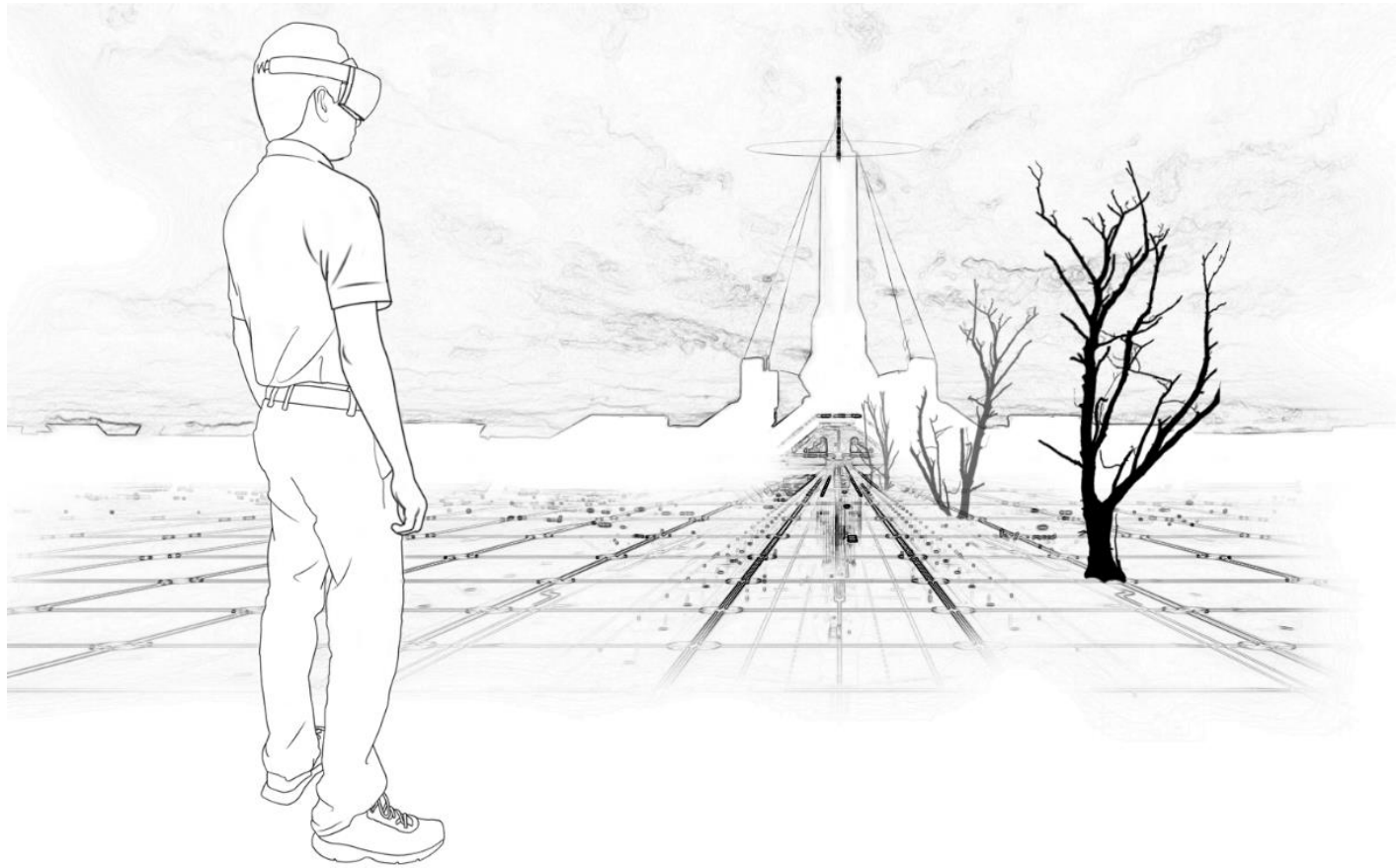
- Digital Reality brings the immersive experience
  - **Perception** of being **present** in a **non-physical world** or being **present in both physical and non-physical.**

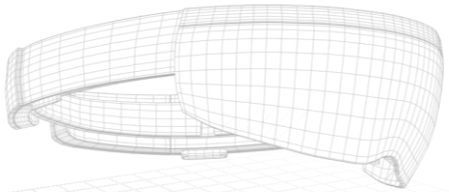




Virtual Reality (VR)

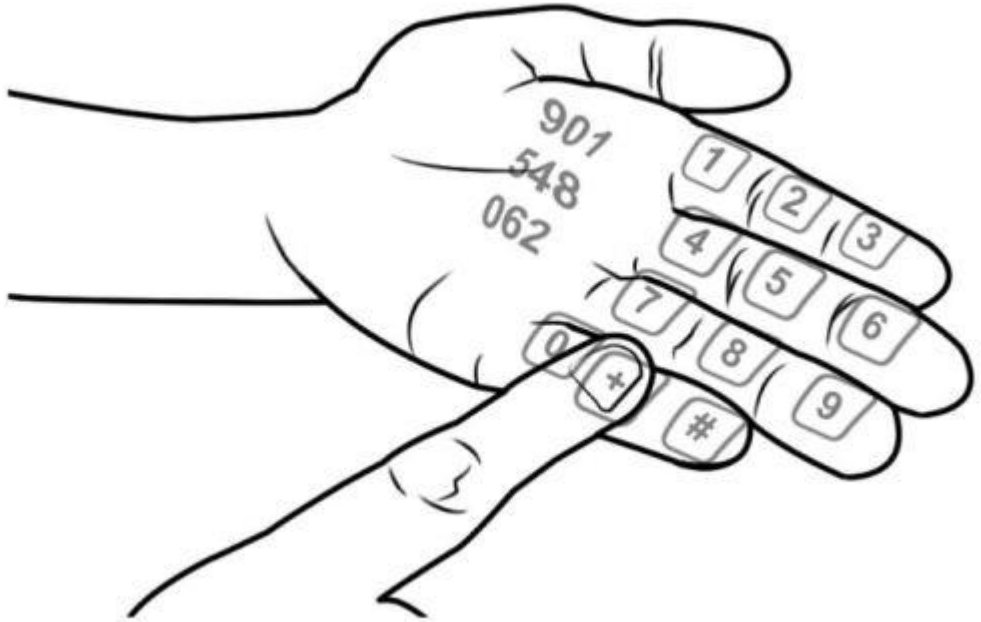
- It replaces the whole view with the simulated environment and totally disconnects you from the real world.

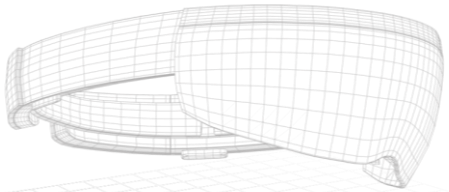




Augmented Reality (AR)

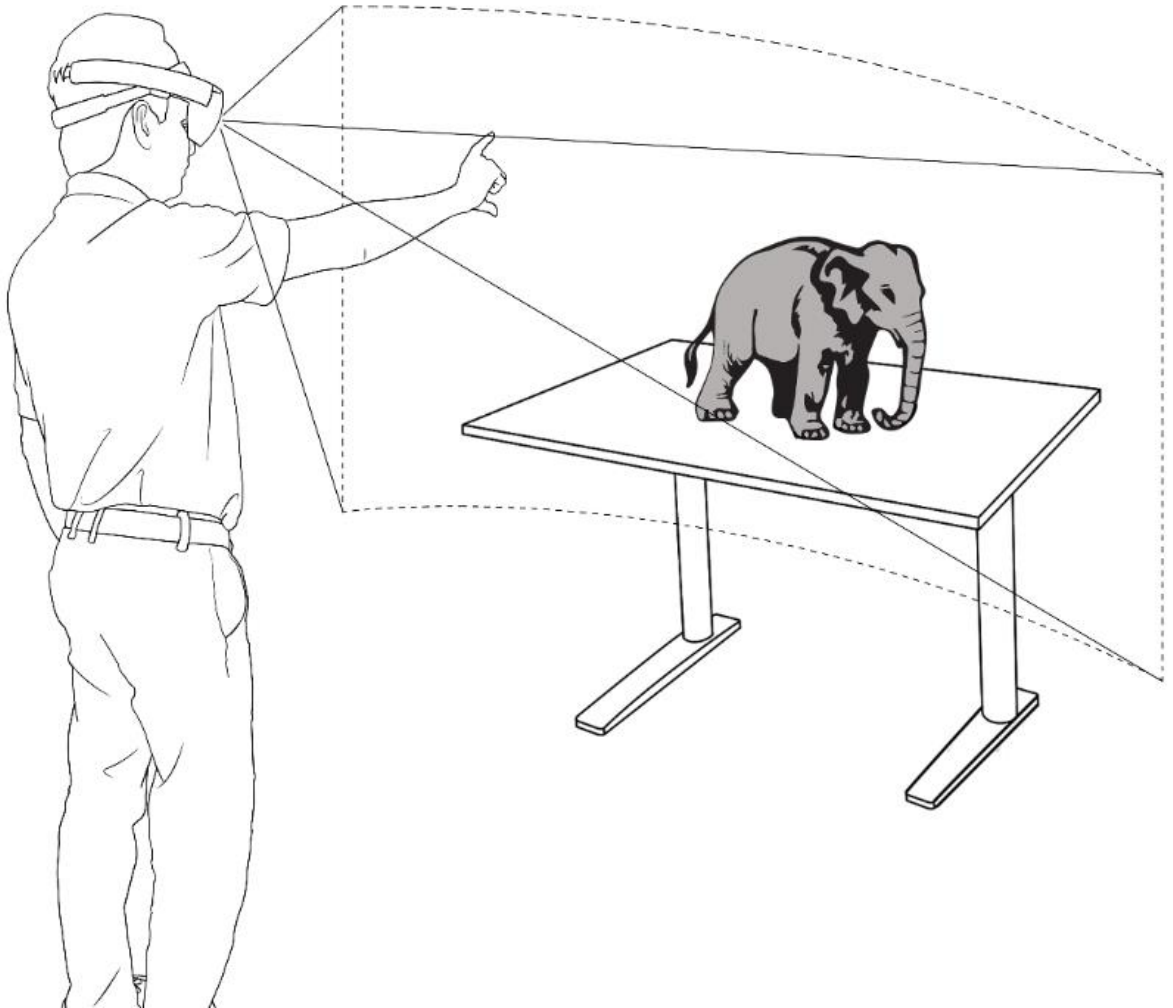
- It enhancements the real environments with digital objects. Digital content such as text, 3d objects or other graphical information's are overlaid over the original surface.

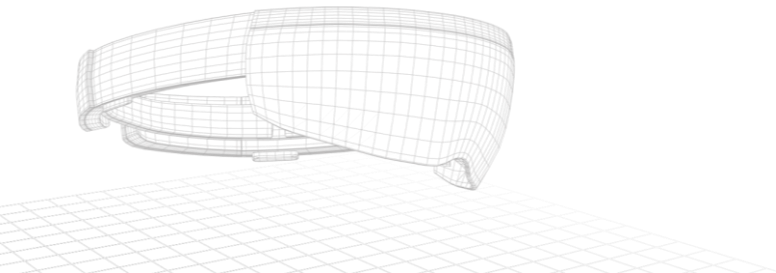




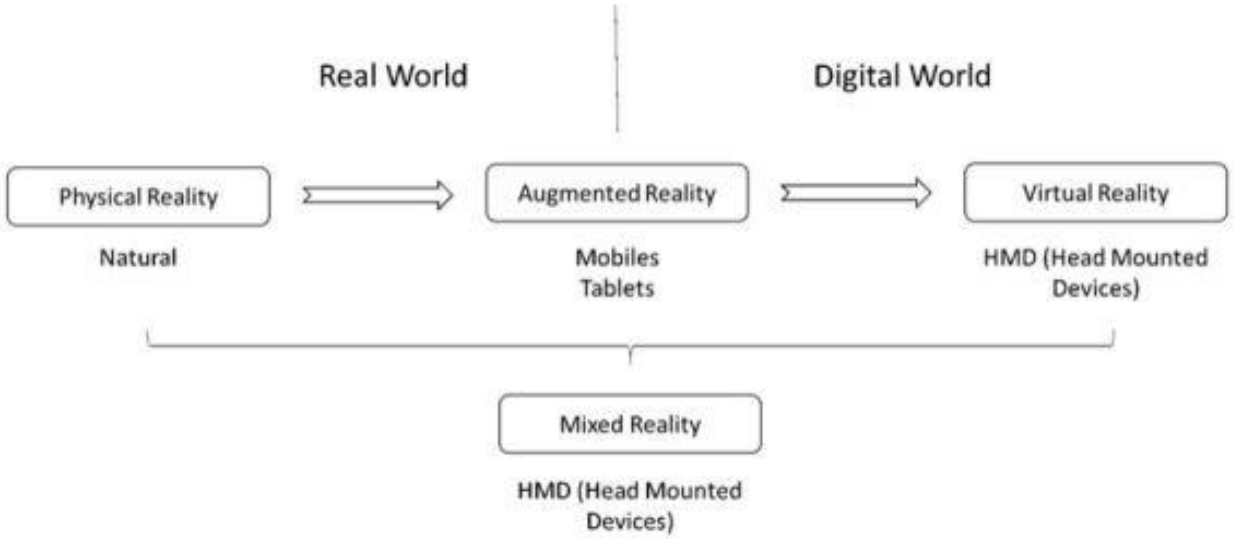
Mixed Reality (MR)

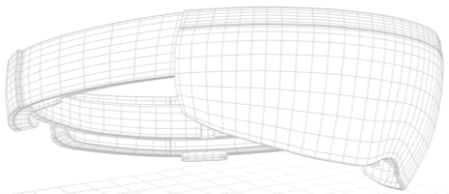
- It's like blending digital objects and physical object, and you can interact with both.





VR / AR / MR

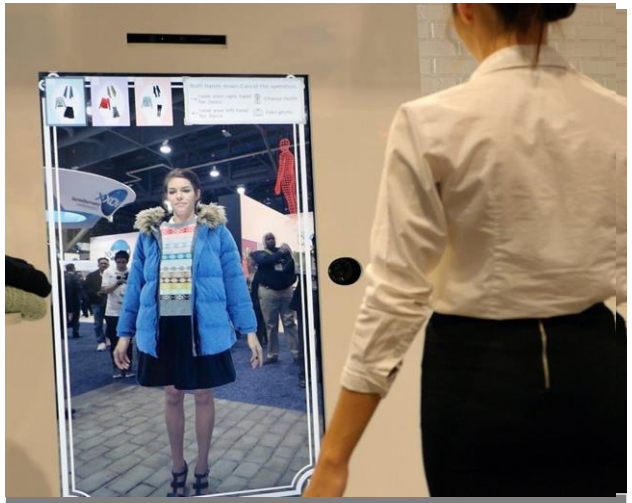

Real World
Digital World
Physical Reality
Augmented Reality
Virtual Reality
Natural
Mobiles
Tablets
HMD (Head Mounted Devices)
Mixed Reality
HMD (Head Mounted Devices)



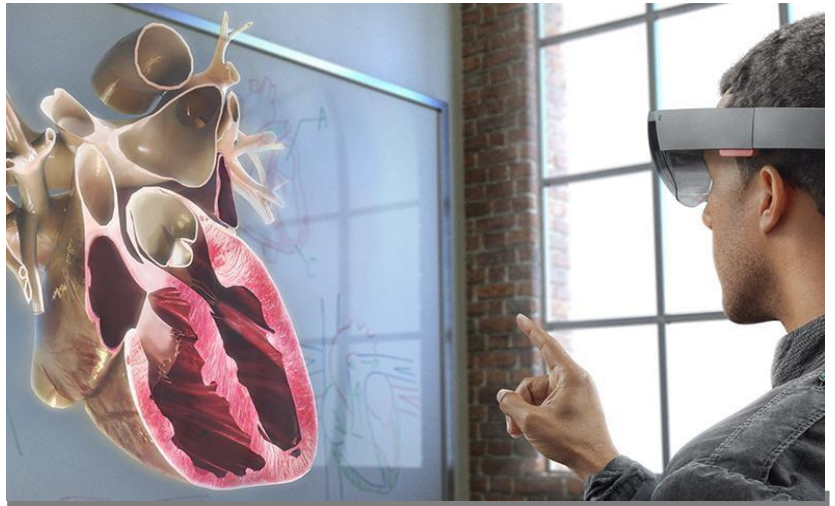
Revolutionizing industries with Digital Reality

Education

Manufacturing



Retail

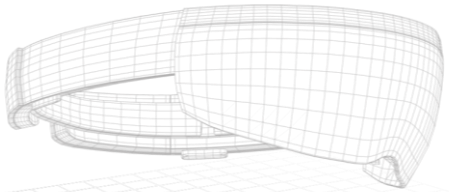


Healthcare

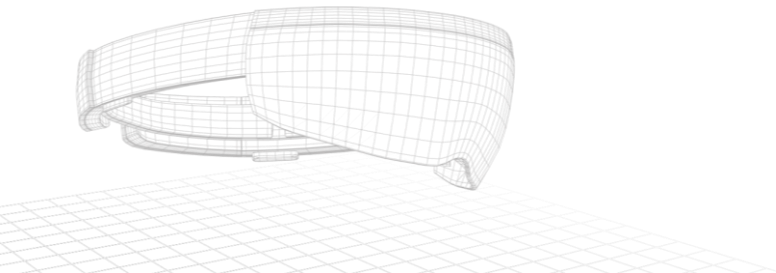
Training

Images are representational purpose. Only

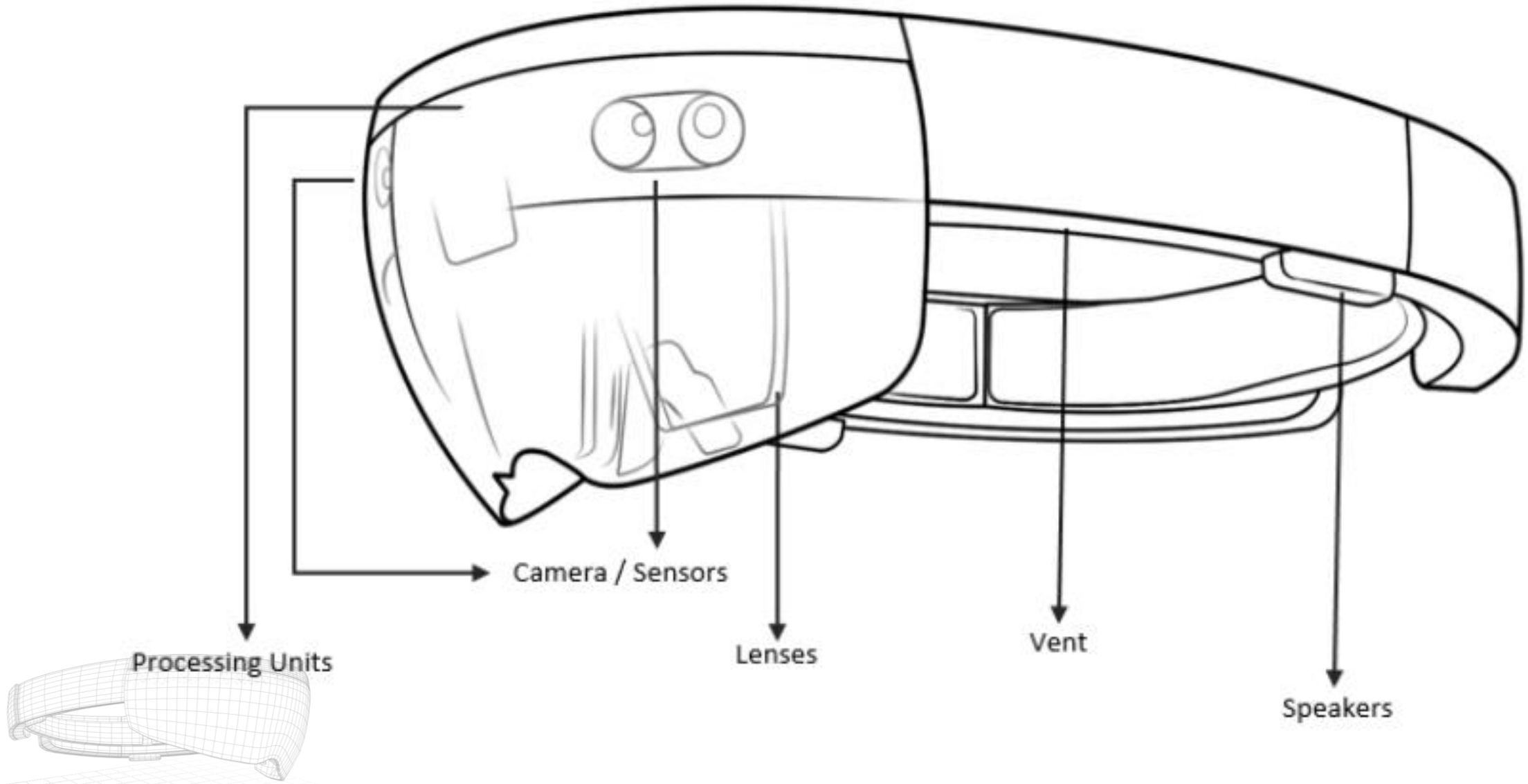
Virtual Reality	Complete Immersive experiences that replaces the real world
Augmented Reality	Overlay the digital information into the physical world around us.
Mixed Reality	Mixed 2D and 3D Virtual objects in to real space and interact with them



Windows Mixed Reality
&
Microsoft HoloLens



What's Inside the device



HoloLens Interaction Model

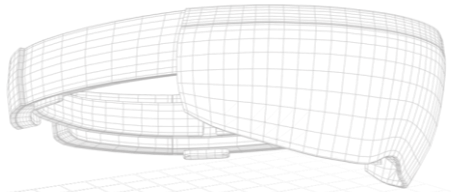
Gaze

Gesture

Voice Recognition

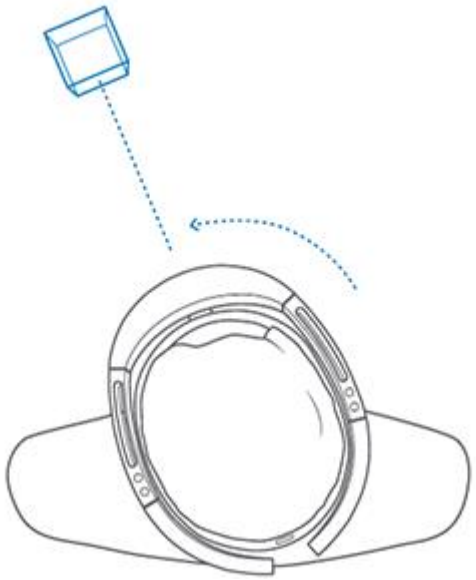
Spatial Audio

Spatial Mapping

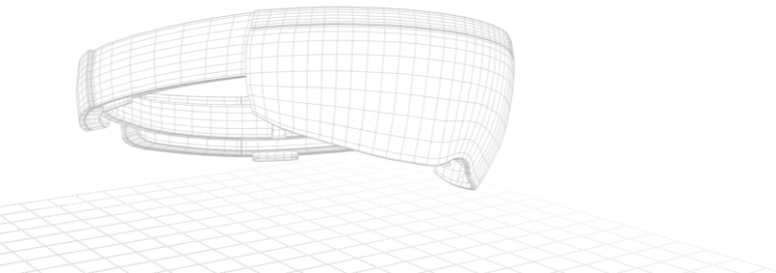


HoloLens Interaction Model

Gaze

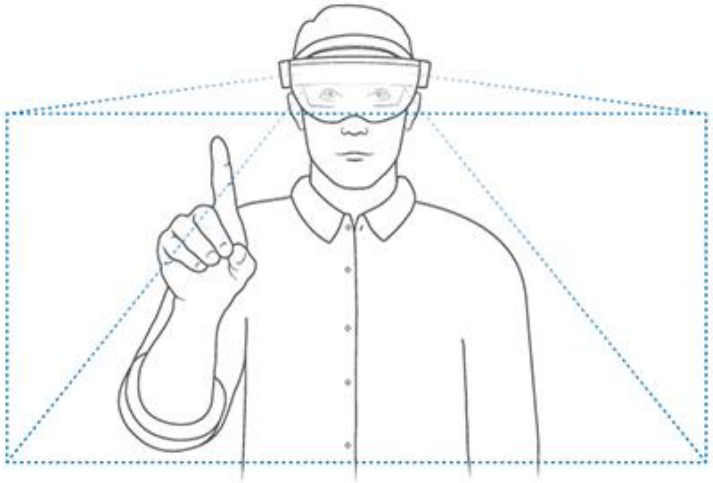


- ✓ Cursor Indicates the Gaze Direction.
- ✓ Raycast determines point of attention.
- ✓ Cursor can hug surfaces it intersects.
- ✓ Cursor can be temporarily hidden.



HoloLens Interaction Model

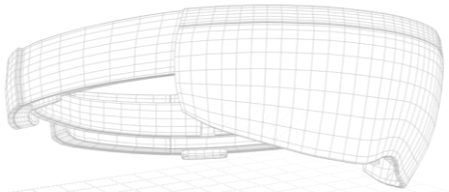
Gesture



Bloom

Air Tap

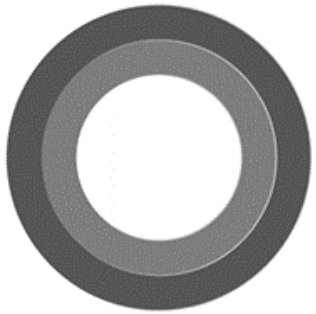
Tap / Hold



HoloLens Interaction Model

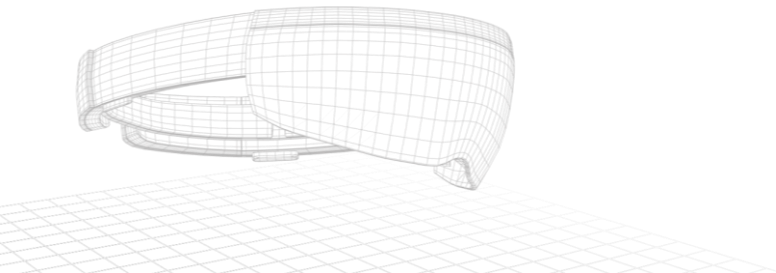
- ✓ Use your voice to do many of the same things you do with gestures on HoloLens
- ✓ Use default commands (like "Select" and "Place")

Voice Recognition



Hey Cortana

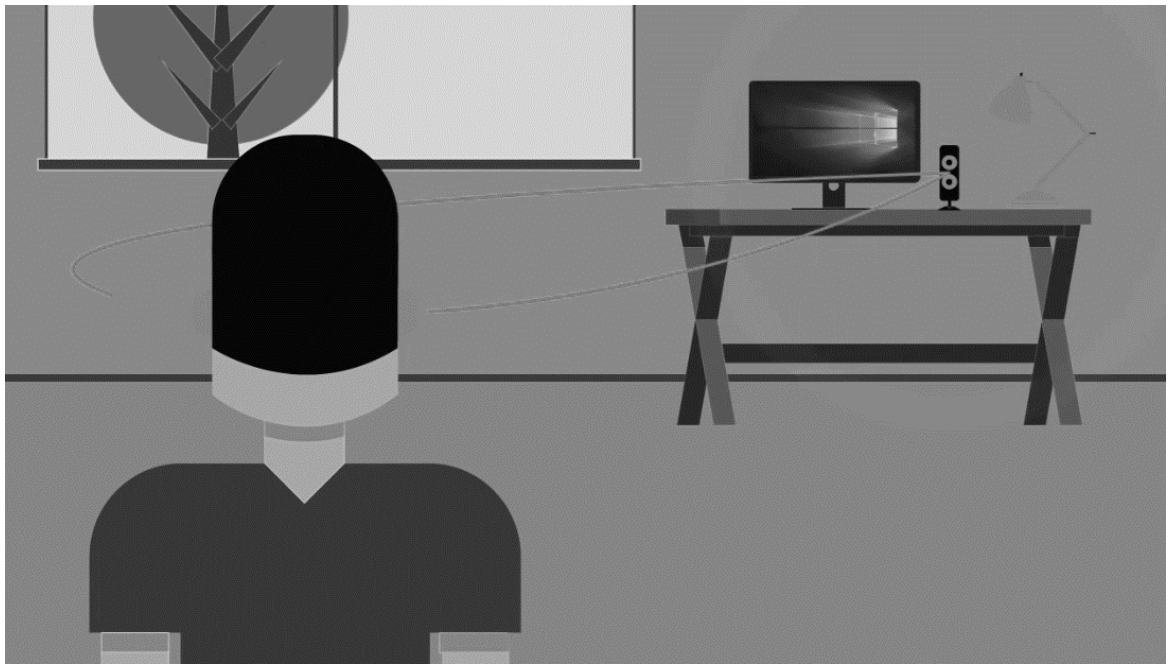
- ✓ Increase the volume.
- ✓ Decrease the brightness.
- ✓ Shut down.
- ✓ Restart.
- ✓ Go to sleep.
- ✓ Mute.
- ✓ Launch <app name>.

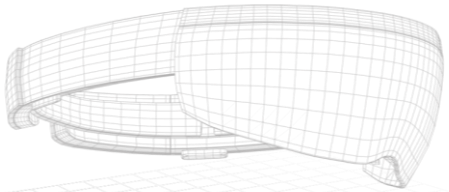


HoloLens Interaction Model

- ✓ We use Spatial audio to expand the mix reality experience beyond our visual senses
- ✓ Speakers in HoloLens uses HRTF(Head related transfer function) to simulate 3D sound using direction, distance, and environmental simulations.

Spatial Audio





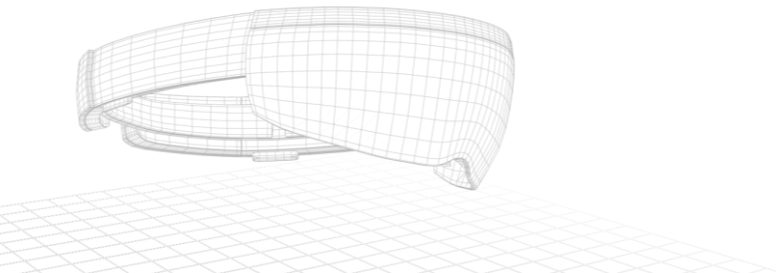
HoloLens Interaction Model

- ✓ Spatial mapping provides a detailed representation of real-world surfaces in the environment around HoloLens.
- ✓ This allows developers to mix holograms into the world around you.

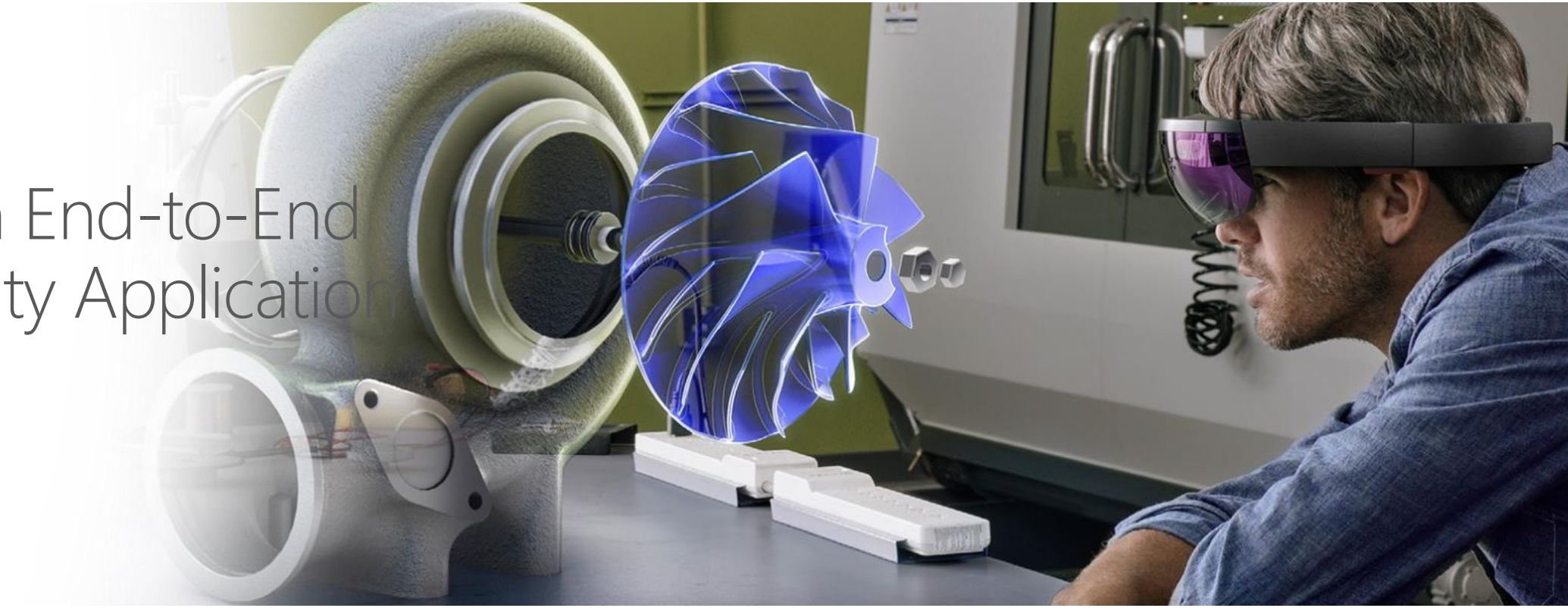
Spatial Mapping

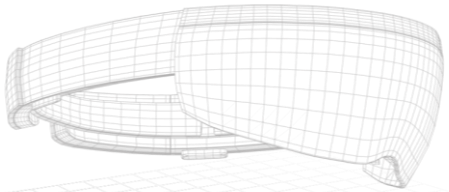
We use Spatial Mapping for following purposes

- ✓ Navigation
- ✓ Occlusion
- ✓ Physics
- ✓ Placement
- ✓ Visualization



Develop an End-to-End Mixed Reality Application

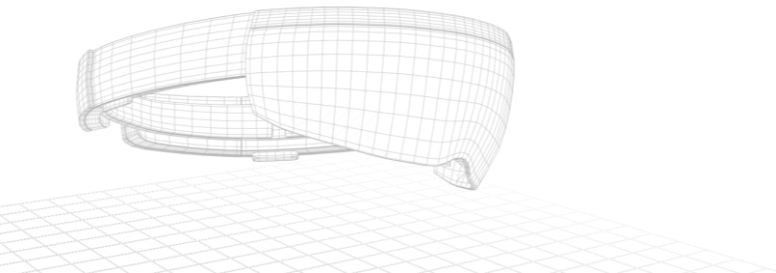




Developer Skill Sets

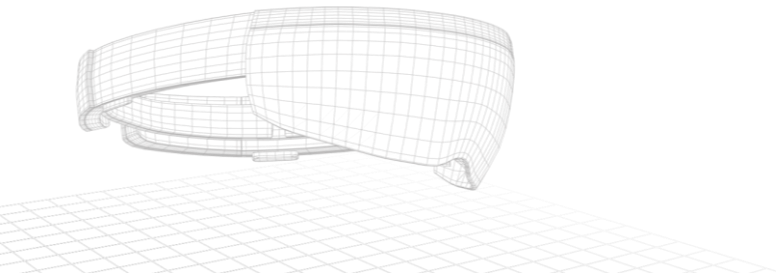
What do I need to know as a developer ?

- .NET
- Visual Studio 2015/2017
- Universal Windows Platforms (UWP)
- App development / C# and XAML
- *Unity 3D / 3D Modeling*
- *Building Games with Unity 3D*
- *Writing C# Script for Unity*

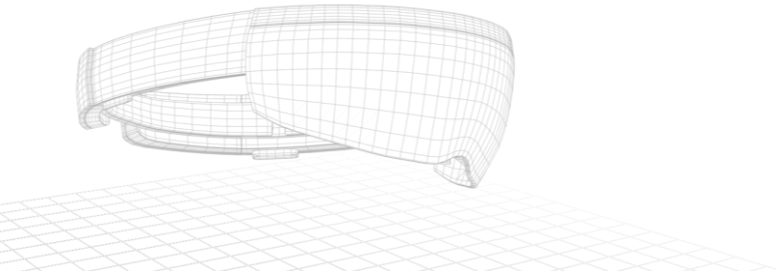


Setting up Development Environment

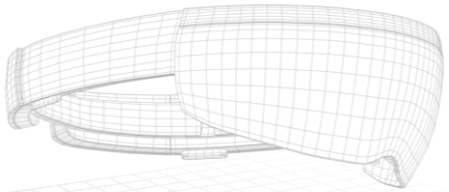
- Install Visual Studio 2015/2017
- HoloLens Emulator
- Unity3D
- HoloLens Device



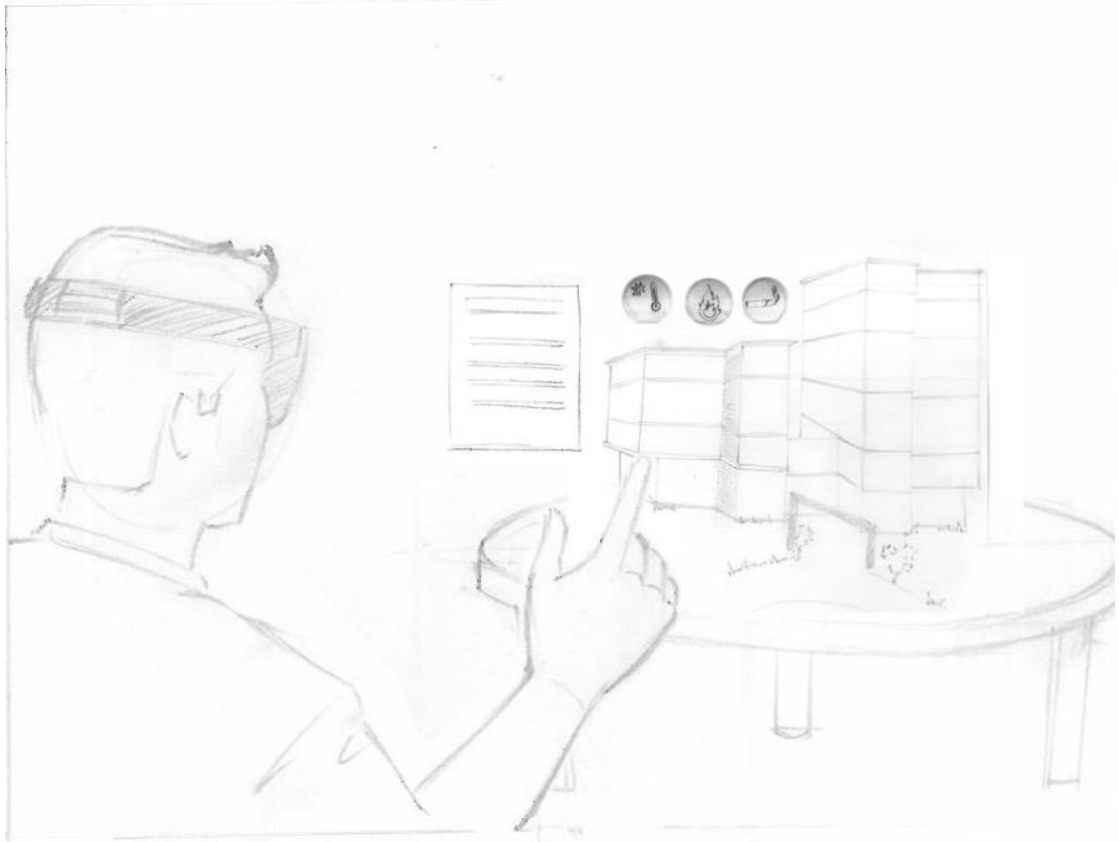
Demo : Building your first Mixed Reality Application – Step by Step

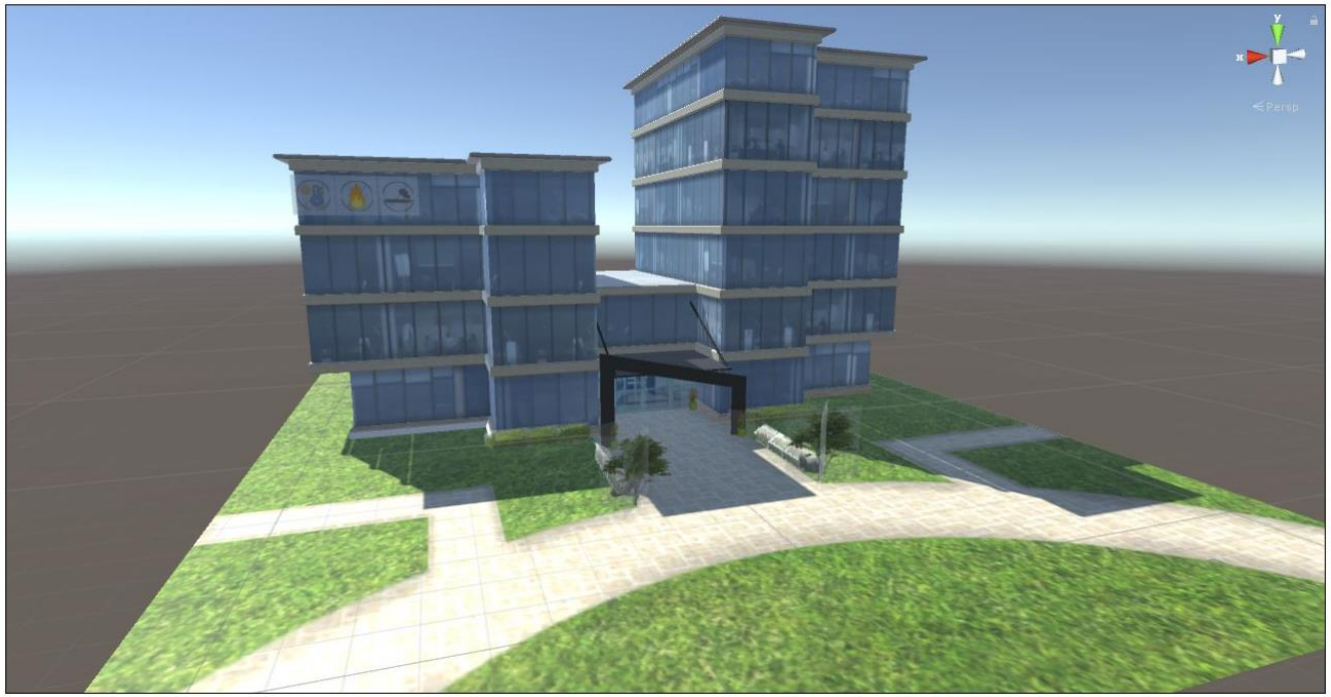


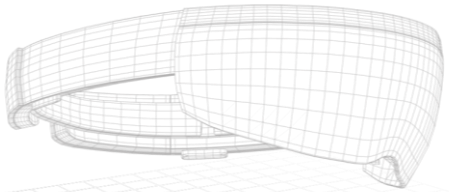
Demo : Connecting your Mixed Reality App with Azure



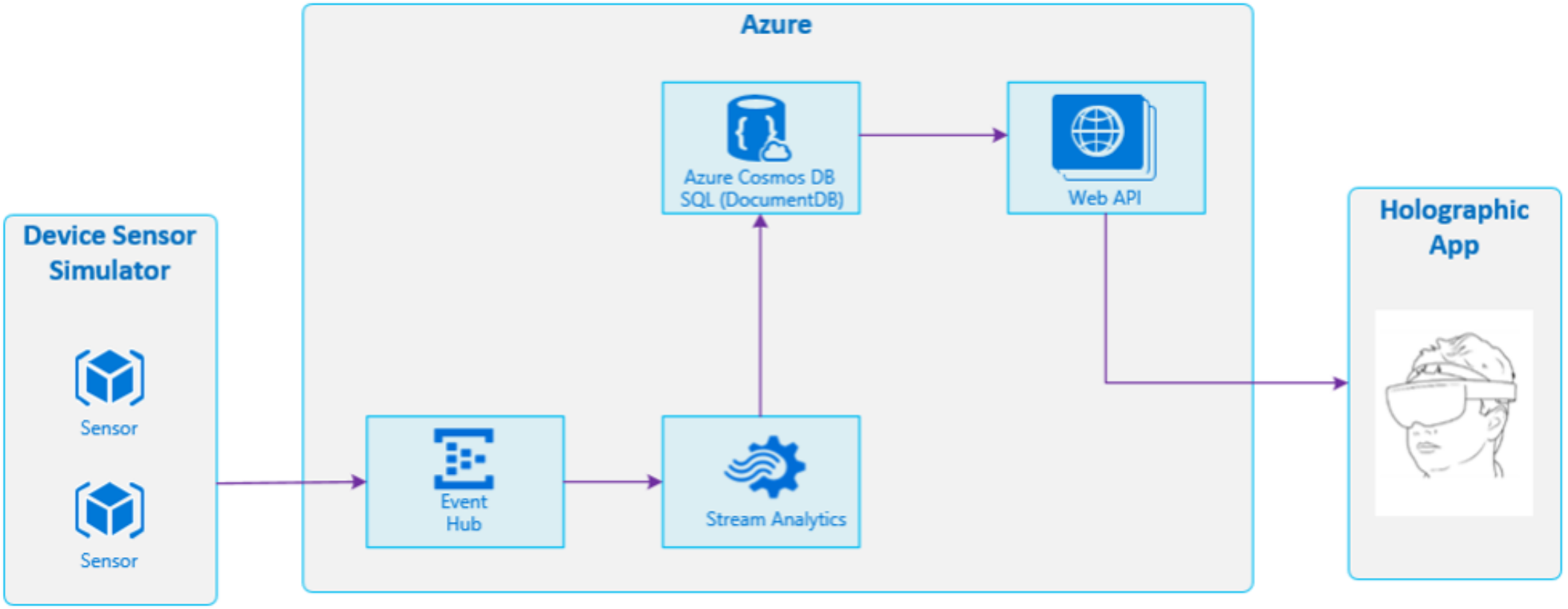
Mixed Reality & Enterprise Scenarios – Smart Building





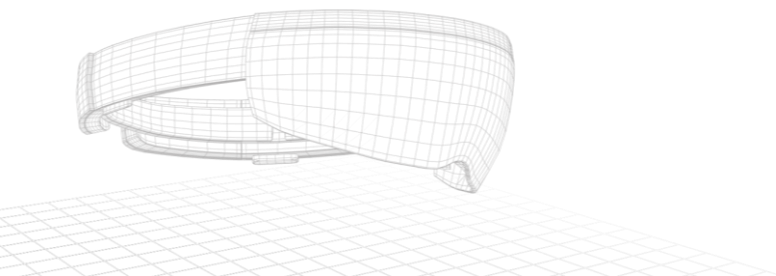


Mixed Reality Smart Building – Architecture



Add-on Demos..

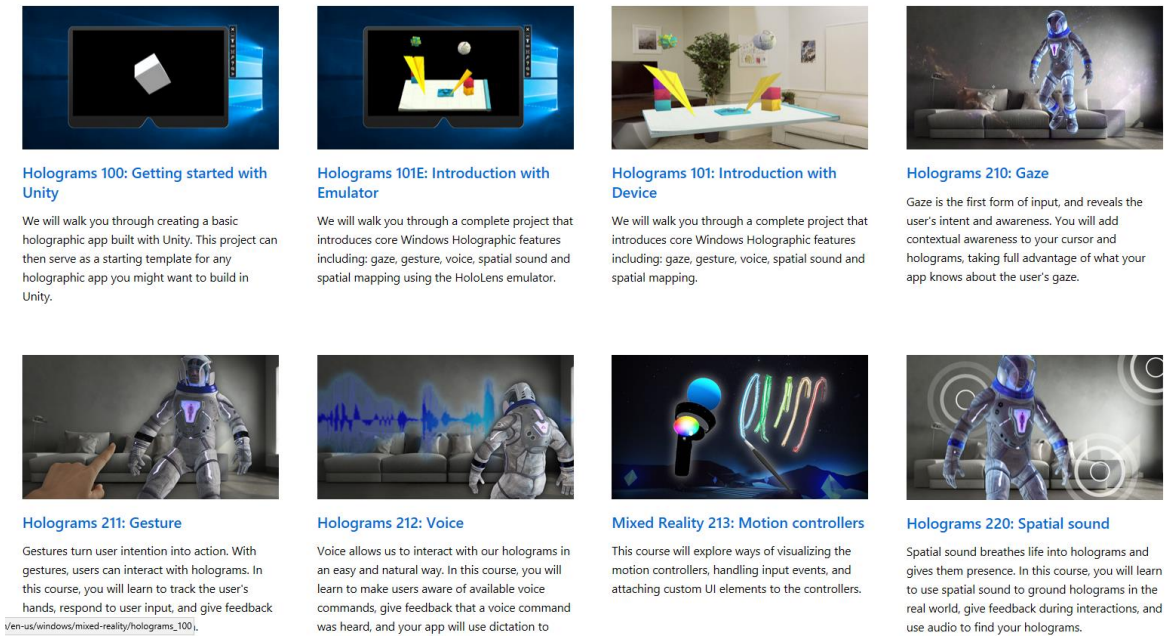
- ✓ Windows Mixed Reality Viewer
- ✓ Creating 3D Model using Paint 3D and using it in Mixed Reality

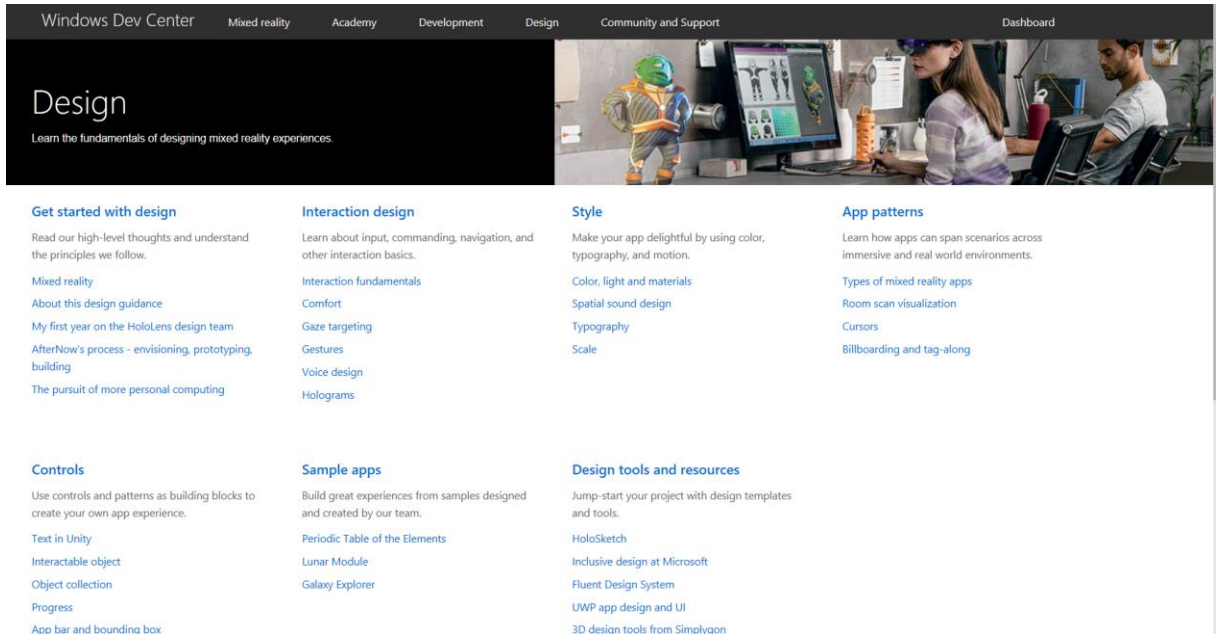


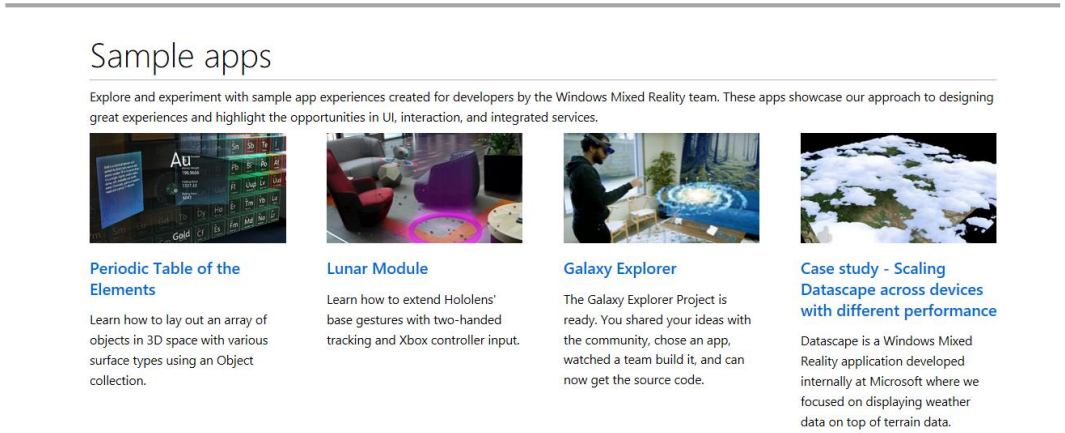
References and Further Study

https://developer.microsoft.com/en-us/windows/mixed-reality/academy

Holographic App Development Using Microsoft HoloLens







Thank You!

Abhijit Jana

http://abhijitjana.net

http://dailydotnettips.com

Twitter: @abhijitjana