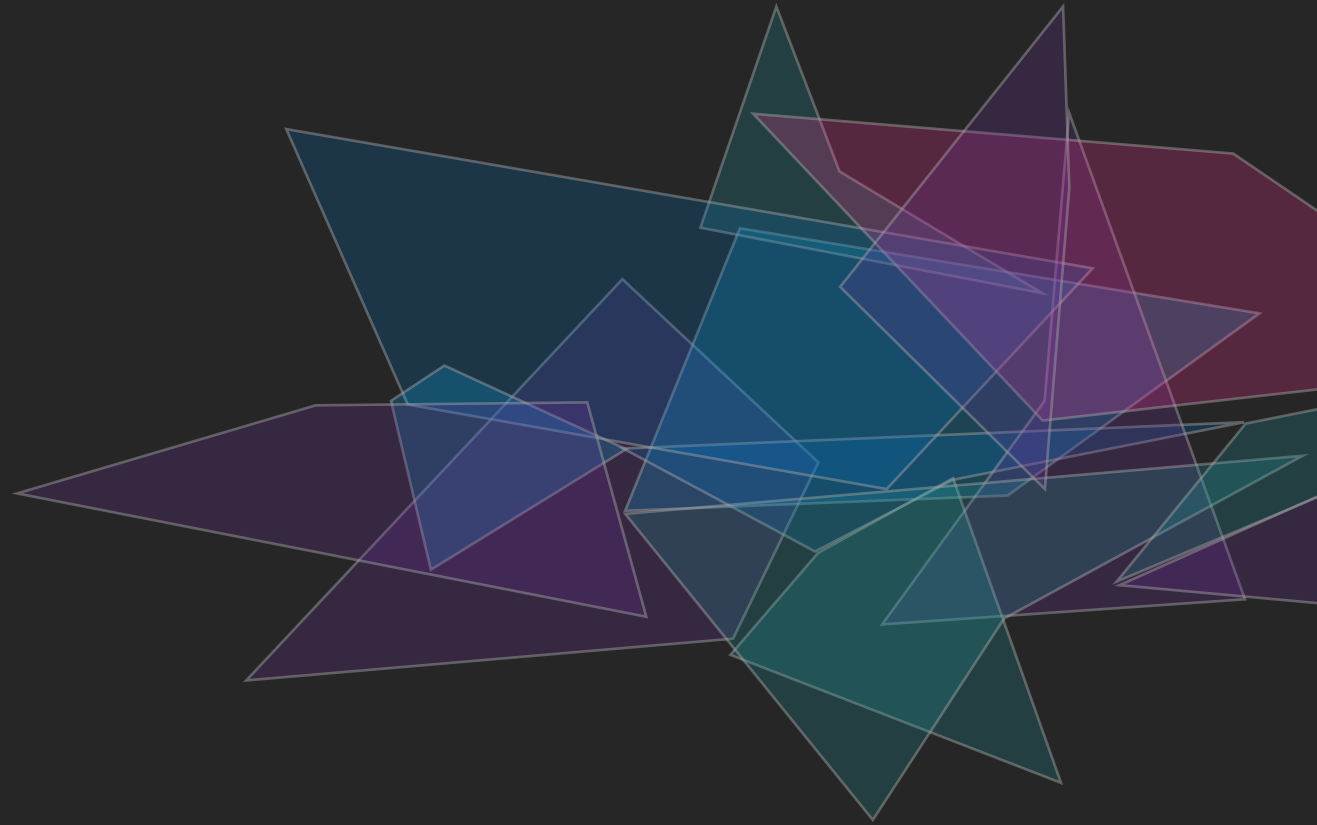


Designing for Mixed Reality





박동윤 (Yoon Park)

Principal UX Designer

Mixed Reality Design & UX Research

Microsoft

1998 고려대학교 전기전자전파공학부

2005 삼성전자 정보통신총괄 통신연구소

2007 SADI 커뮤니케이션디자인

2009 Parsons School of Design, MFA Design & Tech

2010 Typography Insight 등 다수 iOS 앱 출시

2011-12 '도전! 아이폰 프로그래밍' 출간 (2011, 2012)



Typography enthusiast. Published many iOS apps and wrote iOS programming book.





박동윤 (Yoon Park)

Principal UX Designer

Mixed Reality Design & UX Research

Microsoft

Microsoft (2011-현재)

2011-14

- **Windows Apps**

MSN News, Sports, Money, Weather for

Windows 8 / Windows Phone / iOS / Android / Windows 10

2015

- **Windows Bridge for iOS**



Lead designer - MSN Money, Sports, Health & Fitness for Windows 8, Windows Phone 8, iOS, Android, and Windows 10.

2016 - Present

- **HoloLens / Mixed Reality**

Developer Experience / MRTK / Open-source projects



HoloLens & Windows Mixed Reality



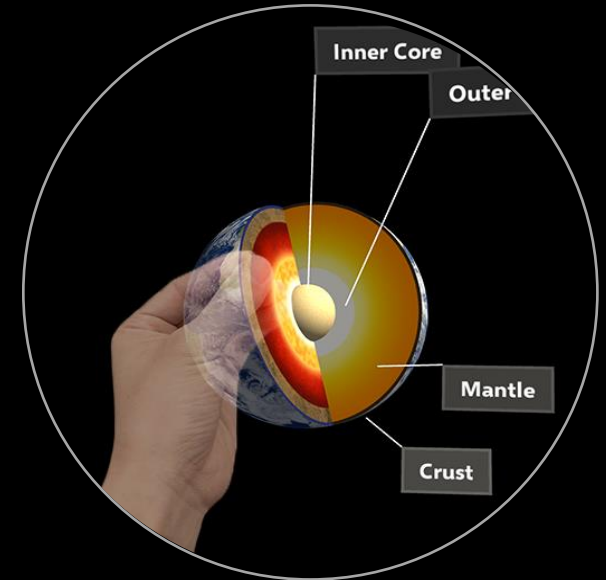




**My Mixed Reality
Journey**



**Mixed Reality
& Metaverse**



**UX Building Blocks
& Tools for Mixed Reality**



본 발표의 내용은 발표자의 개인작업과 실험 및 의견이
포함되어 있으며, 공식적인 마이크로소프트의
입장이나 의견을 대변하지 않습니다

TYPE IN SPACE FOR HOLOLENS 2

Type

My Mixed Reality in
Journey Space



GREEN BAY PACKERS

TOP STORY

Big game Green Bay study

ESPN 15 HOURS AGO

Green Bay - miracle if C up in the G anytime so come forth

Poten figure much

FOX NEWS 2 HOURS AGO

This, from a NFL's worst The Eagles Ravens sco and the Pa

Record 3-3 Home 2-1 Away 1-2

BING FINANCE

MARKET >

DOW S&P 500 NASDAQ Russell 2000

Open 13,423.84 Day Range 13,423.76 - 13,556.37

Previous Close 13,424.23 52-Week Range 11,231.60 - 13,661.90

▲ 13,551.78 +127.55 +0.95%

10/15/2012 12:00 PM • DOW: 13,386.93

Day Week Month 1 Year

Tuesday, October 16, 2012 4:02 PM
Time zone is EDT (UTC-04:00)

Last Updated Tuesday, October 16, 2012 5:02 PM. Quotes delayed. Market data by Morningstar.

WATCHLIST >

MSFT Microsoft Co
▼ 29.49

MMM
▲ 94.23

BA
▲ 73.48

XOM Exxon M
▲ 92.38

CHELSEA

Rank in Premier League 1

Bing Sports 10:15

NFL scoreboard top stories sta

SEPTEMBER 5

BAL 5:30 PM DEN

SEPTEMBER 8

NE 10:00 AM BUF

SEA 10:00 AM CAR

CIN 10:00 AM CHI

MIA 10:00 AM CLE

TOM BRADY

PLAYER BIO

QUARTERBACK

Age/HT/Wt 35 / 6' 4" / 225 lbs
Birthdate 8/3/1977
Birthplace San Mateo, CA
School Michigan
Drafted 2000 - Rd 6
Experience 13th Season
Salary \$7,775,000

COMPARISON

QB RATING

Brady 97.2
League Average 86.0
League Leader 105.4

TOUCHDOWNS

Brady 10
League Average 7
League Leader 16

YARDS

Brady 1,845
League Average 956
League Leader 1,845

2012 SEASON/CAREER

COMP	ATT	YARDS	TD	INT	RAT
2012	357	243	5	564	1,845
CAREER	3,557	243	5,964	1,845	41,824

GAME LOG

DATE	OPP	COMP	ATT	YARDS	TD	INT	RAT
10/14/2012	@SEA	L 23-34	36	58	395	2	79.3
10/7/2012	@WAS	W 31-21	23	31	323	1	104.6
9/30/2012	@BUF	W 52-28	22	36	340	3	120.1
9/23/2012	@BAL	L 30-31	28	41	335	1	101.2
9/16/2012	@ARI	L 18-20	28	46	316	1	79.6

Bing Finance 10:22

market

DOW

▼ 15,466.60 -52.14 -0.34%

NASDAQ ▼ 3,650.84 -14.93 -0.41%

S&P 500 ▼ 1,691.46 -5.91 -0.35%

FTSE 100 ▼ 6,511.21 -93.00 -1.43%

DAX ▼ 8,260.48 -39.25 -0.47%

MICROSOFT CORPORATION

KEY STATISTICS

	MSFT	S&P 500	Industry	ORCL	VMW
Stock Price	29.49	-	-	31.87	90.76
Market Cap	247.23B	13,802.02B	493.65B	153.58B	38.71B
Return %	-11.1	-18.6	-7.4	-8.1	-14.9
Earnings per Share	2.00	-	-	2.02	1.75
Dividend Yield %	2.74	2.00	1.69	0.77	-
Forward Price/Earnings	8.83	-	-	10.29	28.01
Analyst Consensus Rating	Outperform	-	-	Outperform	Outperform
Debt to Equity	0.17	0.79	0.23	0.31	0.08
Net Margin %	23.03	8.43	22.95	27.55	18.21
Revenue Growth %	5.40	-	-	4.21	31.84
Return on Equity %	27.51	14.41	23.77	24.16	15.82

COMPANY PROFILE

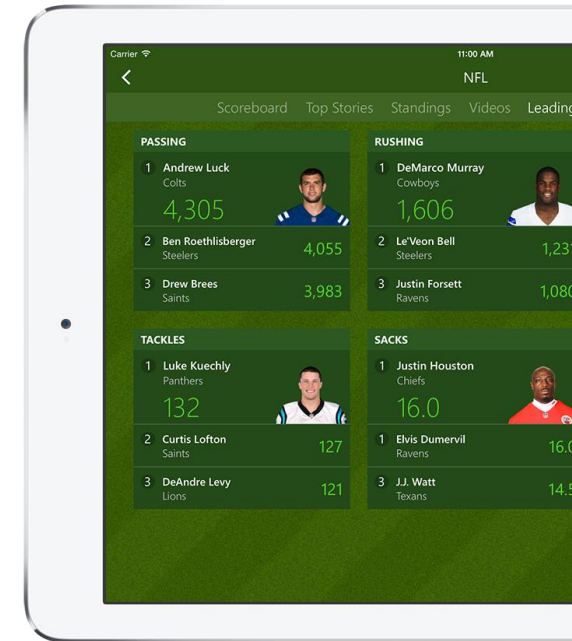
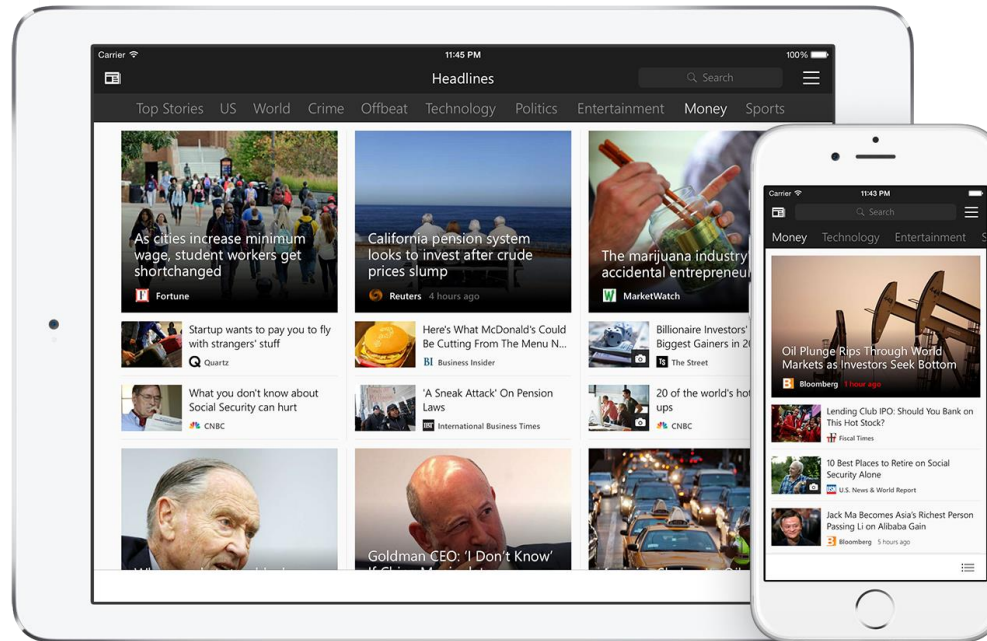
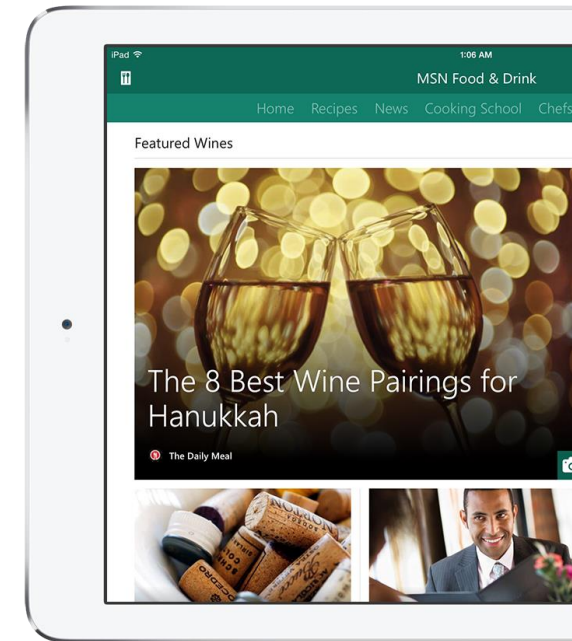
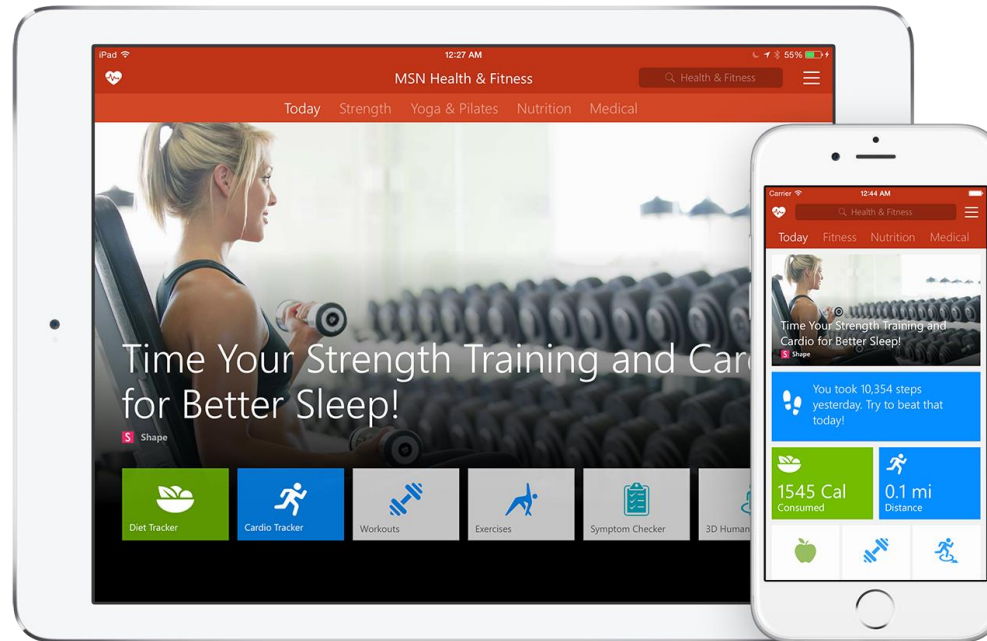
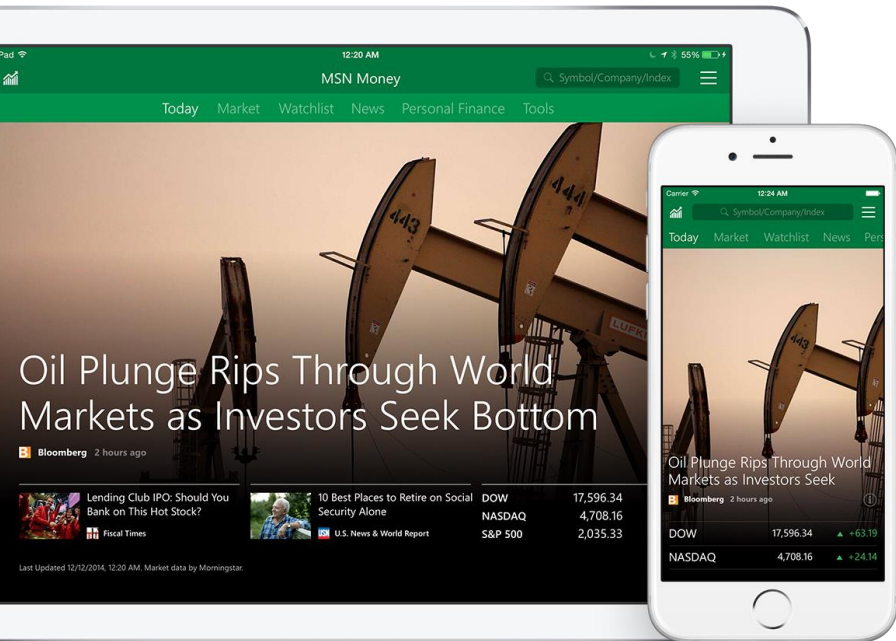
Sector: Technology
Industry: Software - Infrastruct...

Microsoft Corporation was founded in 1975 in Washington. The Company generates revenue from manufacturing, licensing, and supporting a wide range of services for many different types of computer software products.

Morningstar Rating

Cloud computing is a double edge sword for system while opening up new revenue and product deployment and delivery of cloud-based software and bus...

Last Updated Tuesday, October 16, 2012 5:02 PM. Quotes delayed. Market data by Morningstar.





HAWAII

New Post



Hotel Beach

Date Posted 10/24/2014



Life on the Island

Date Posted 10/18/2014



Over

Date



Hawaiian Flowers

Date Posted 10/23/2014



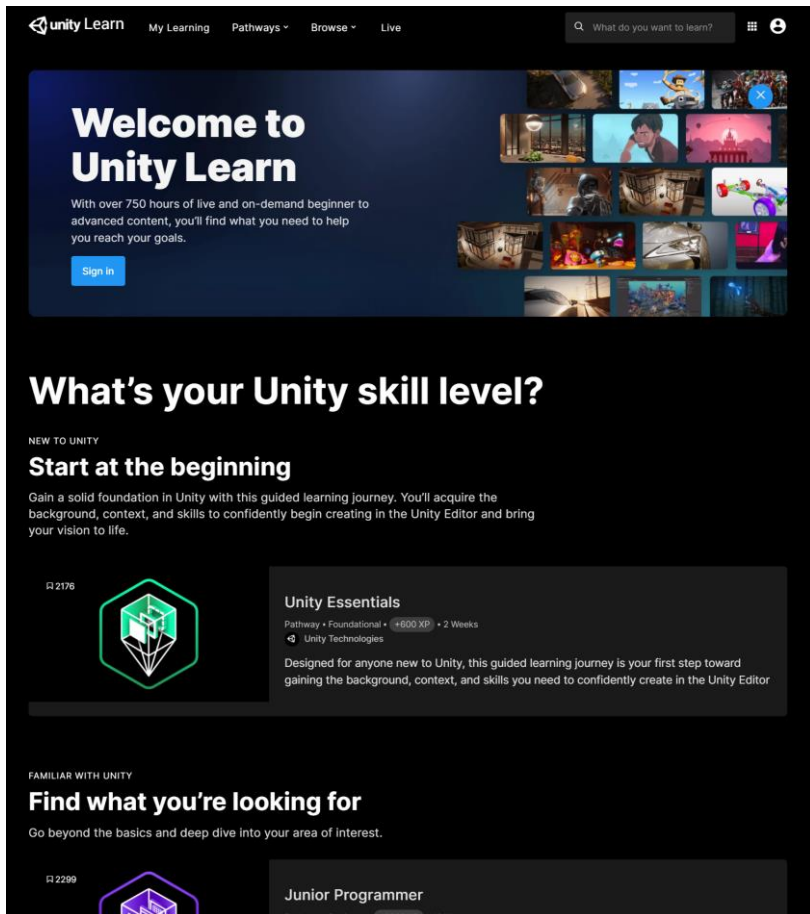




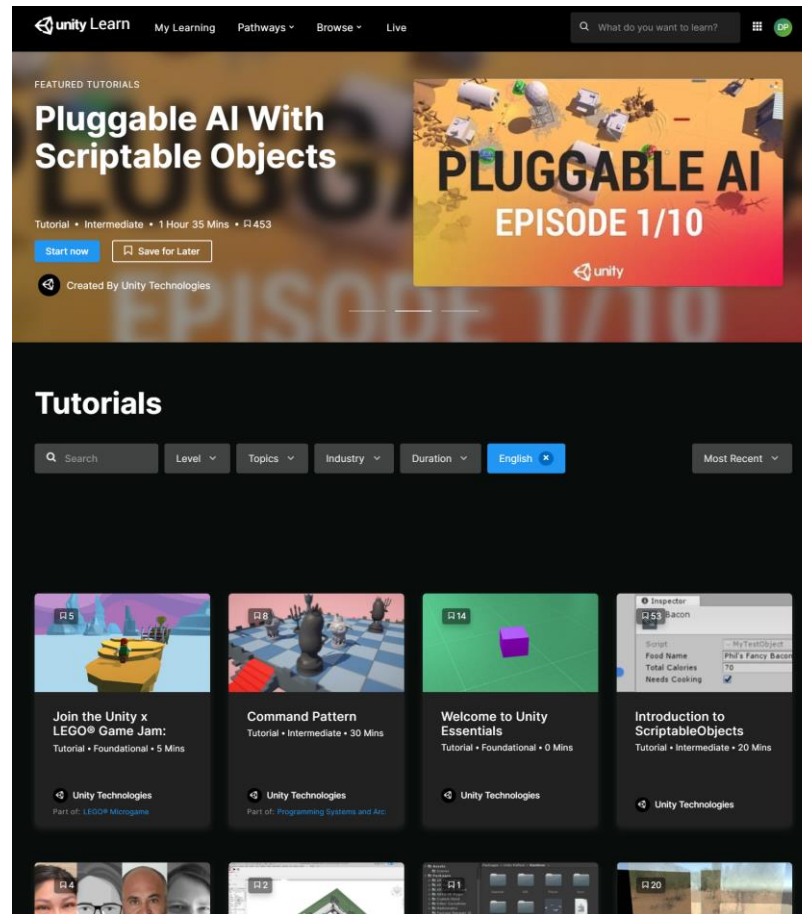
How can I create an app for Mixed Reality?



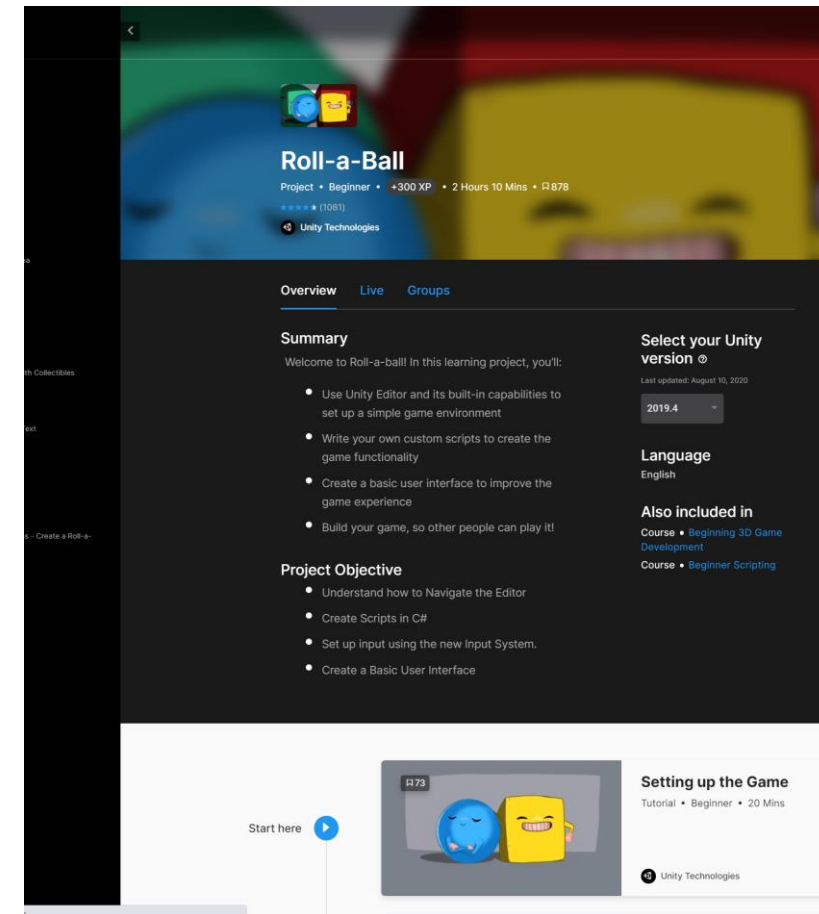
<http://learn.unity.com>



The screenshot shows the Unity Learn homepage. At the top, there is a navigation bar with 'unity Learn', 'My Learning', 'Pathways', 'Browse', and 'Live'. A search bar contains the text 'What do you want to learn?'. Below the navigation is a large hero section with the text 'Welcome to Unity Learn' and a sub-headline 'With over 750 hours of live and on-demand beginner to advanced content, you'll find what you need to help you reach your goals.' A 'Sign in' button is located at the bottom left of this section. To the right of the text is a grid of various Unity game scenes. Below the hero section is a section titled 'What's your Unity skill level?' with a sub-section 'NEW TO UNITY Start at the beginning'. This section describes a 'Unity Essentials' pathway, which is 'Foundational', worth '+4000 XP', and takes '2 Weeks'. It is designed for anyone new to Unity. Below this is another section 'FAMILIAR WITH UNITY Find what you're looking for', which encourages users to go beyond the basics. At the bottom, there is a 'Junior Programmer' pathway listed.



The screenshot shows a specific tutorial page for 'Pluggable AI With Scriptable Objects'. The main header features the title 'Pluggable AI With Scriptable Objects' and a large video thumbnail for 'PLUGGABLE AI EPISODE 1/10'. Below the title, it indicates the tutorial is 'Intermediate', '1 Hour 35 Mins', and has '453' views. There are 'Start now' and 'Save for Later' buttons. The creator is listed as 'Unity Technologies'. Below the main content is a 'Tutorials' section with a search bar and filters for 'Level', 'Topics', 'Industry', 'Duration', 'English', and 'Most Recent'. A grid of tutorial cards is displayed, including 'Join the Unity x LEGO® Game Jam', 'Command Pattern', 'Welcome to Unity Essentials', and 'Introduction to ScriptableObjects'. Each card shows a thumbnail, title, level, duration, and creator.



The screenshot shows a project page for 'Roll-a-Ball'. The header includes the Unity logo, title 'Roll-a-Ball', and details: 'Project • Beginner • +300 XP • 2 Hours 10 Mins • 878' views. It has a 4.5-star rating from 1081 reviews and is created by 'Unity Technologies'. Below the header are tabs for 'Overview', 'Live', and 'Groups'. The 'Overview' tab is active, showing a 'Summary' section with a list of bullet points: 'Use Unity Editor and its built-in capabilities to set up a simple game environment', 'Write your own custom scripts to create the game functionality', 'Create a basic user interface to improve the game experience', and 'Build your game, so other people can play it!'. There is also a 'Project Objective' section with similar bullet points. On the right side, there are sections for 'Select your Unity version' (set to 2019.4) and 'Language' (set to English). Below the main content is a 'Setting up the Game' tutorial card, which is 'Beginner' and '20 Mins' long, with a 'Start here' button and a video thumbnail.

Microsoft Docs

<http://aka.ms/MRDocs>

Concepts, guidelines & tutorials

The screenshot shows the Microsoft Docs website for Mixed Reality. The header includes navigation links for Microsoft, Docs, Documentation, Learn, Q&A, and Code Samples. The main content area is titled "Mixed Reality documentation" and features several categorized tiles: "What is Mixed Reality?", "Introducing HoloLens 2", "Dynamics 365 Mixed Reality applications", "Azure Cloud Services", "Developers", "IT admins", "VR enthusiasts", and "Mixed Reality Learn modules". Below this is a "Dive into Mixed Reality" section with sub-sections for Design, Develop, and Deploy. The "Frameworks" section lists Unity, Unreal, and Native. The "SDKs and APIs" section includes MRTK for Unity, MRTK for Unreal, and Windows XR Plugin for Unity.

Mixed Reality Toolkit (MRTK)

<http://aka.ms/MRTK>

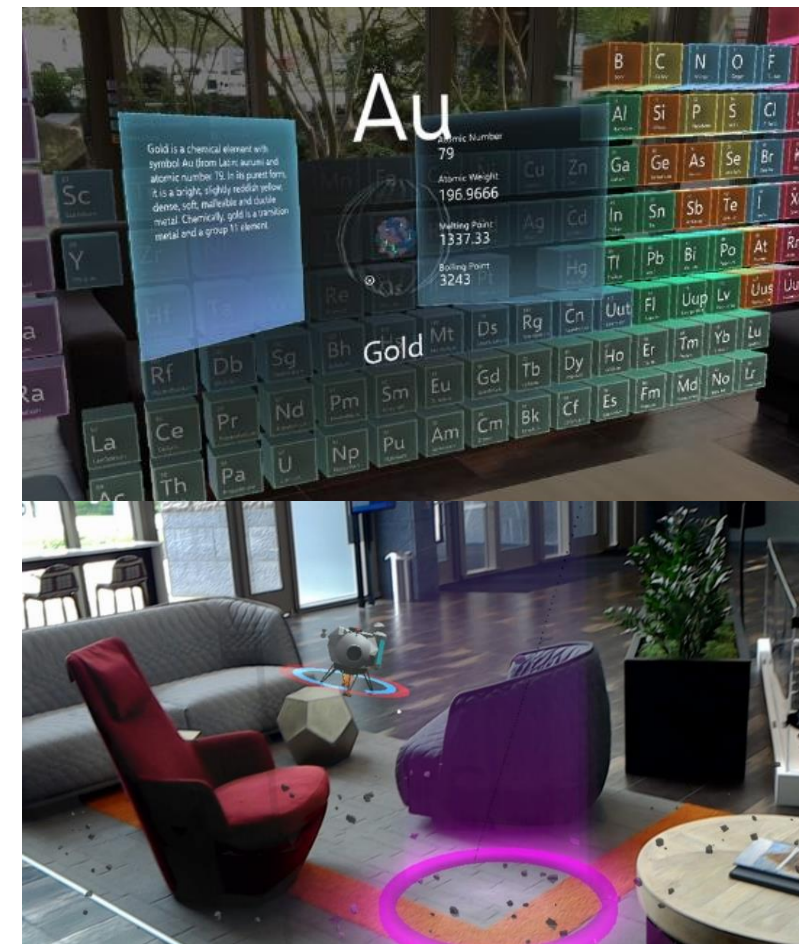
Foundational building blocks

The screenshot shows the GitHub repository for MixedRealityToolkit-Unity. The repository is owned by Microsoft and has 337 stars and 1,444 forks. It contains 3,255 commits, 5 branches, and 15 releases. The repository description states: "MixedRealityToolkit-Unity uses code from the base MixedRealityToolkit repository and makes it easier to consume in Unity." A list of files and folders is shown, including .github, Assets, External, ProjectSettings, .gitattributes, .gitignore, BreakingChanges.md, CONTRIBUTING.md, FallCreatorsUpdate.md, GettingStarted.md, License.txt, README.md, Roadmap.md, and UpgradeGuide.md. The README section is partially visible, featuring the MRTK logo and the heading "What is MixedRealityToolkit-Unity?".

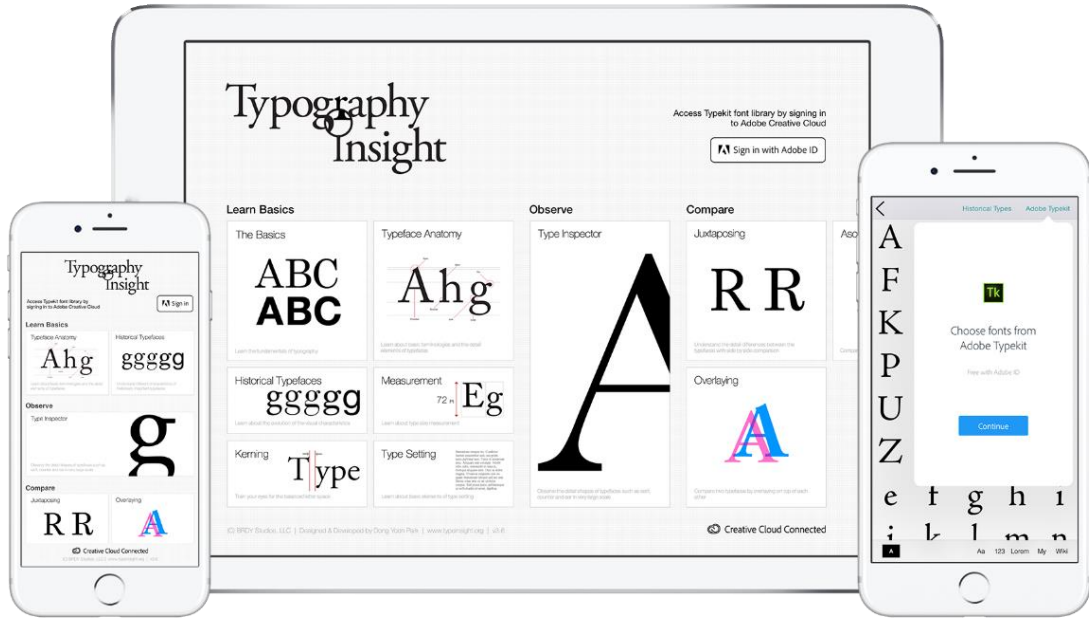
Mixed Reality Design Labs (MRDL)

<http://aka.ms/MRDL>

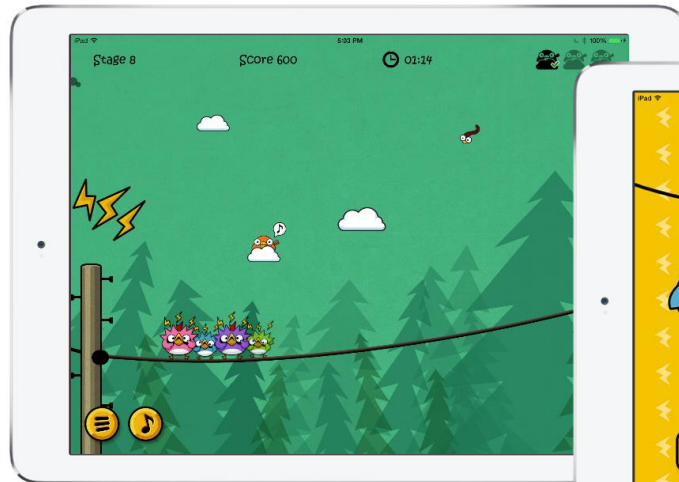
Full end-to-end experience sample apps



Can I bring my existing 2D apps to HoloLens?



Pori
Fashion Show



f



f

Brioso Pro Regular

Adobe Typekit® Support

Access thousands of fonts from Adobe Typekit
with Adobe ID

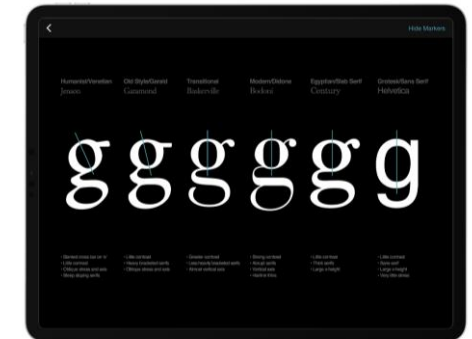
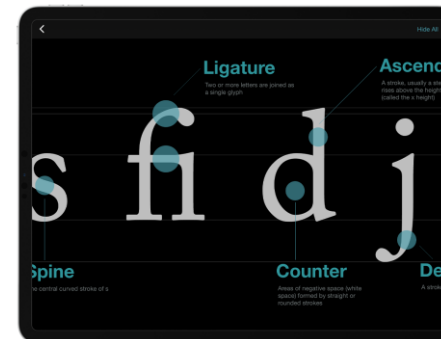
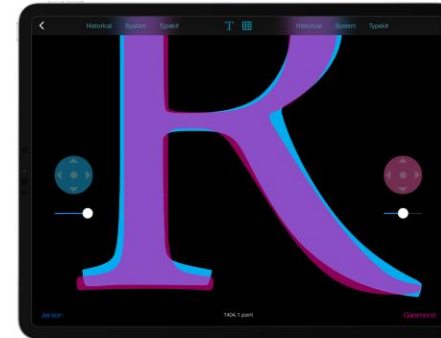
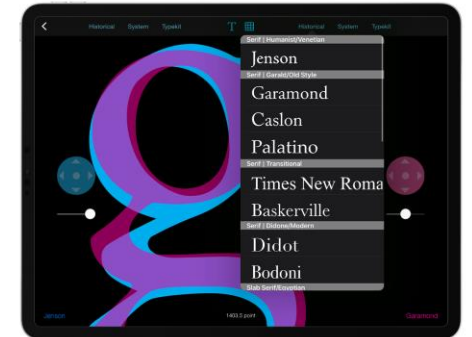
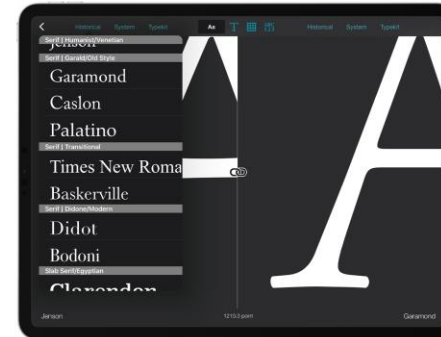
Typography Insight (2011-Present)

Your perfect companion for learning, teaching, and loving typography

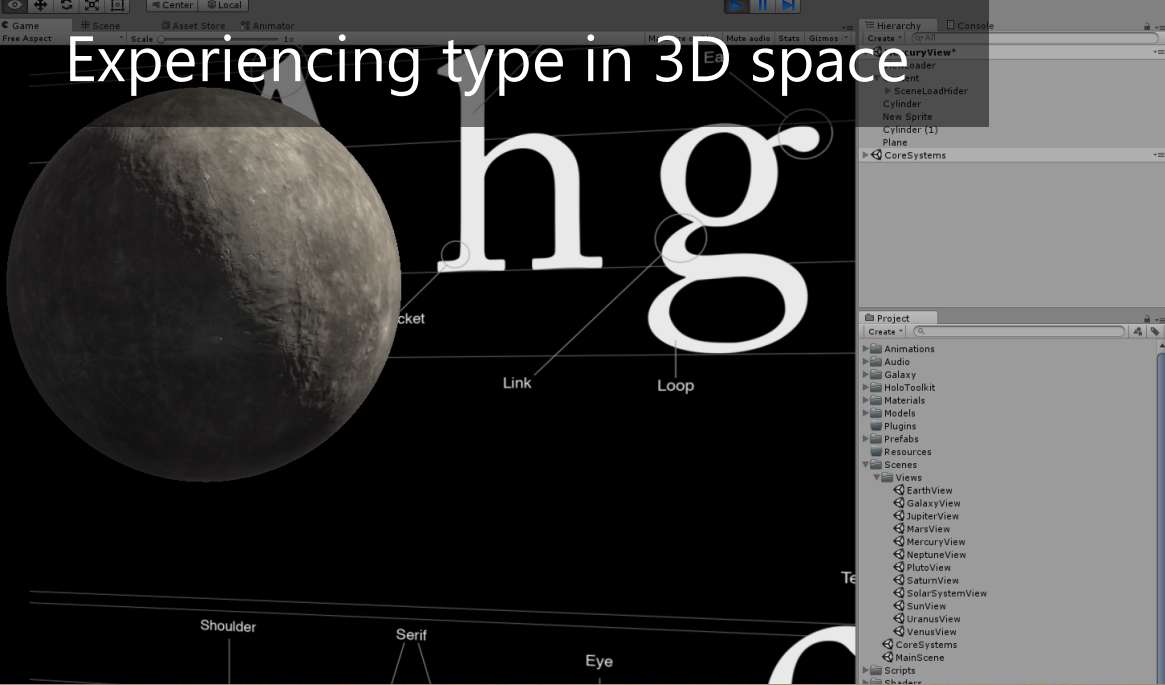


Dark Mode supported

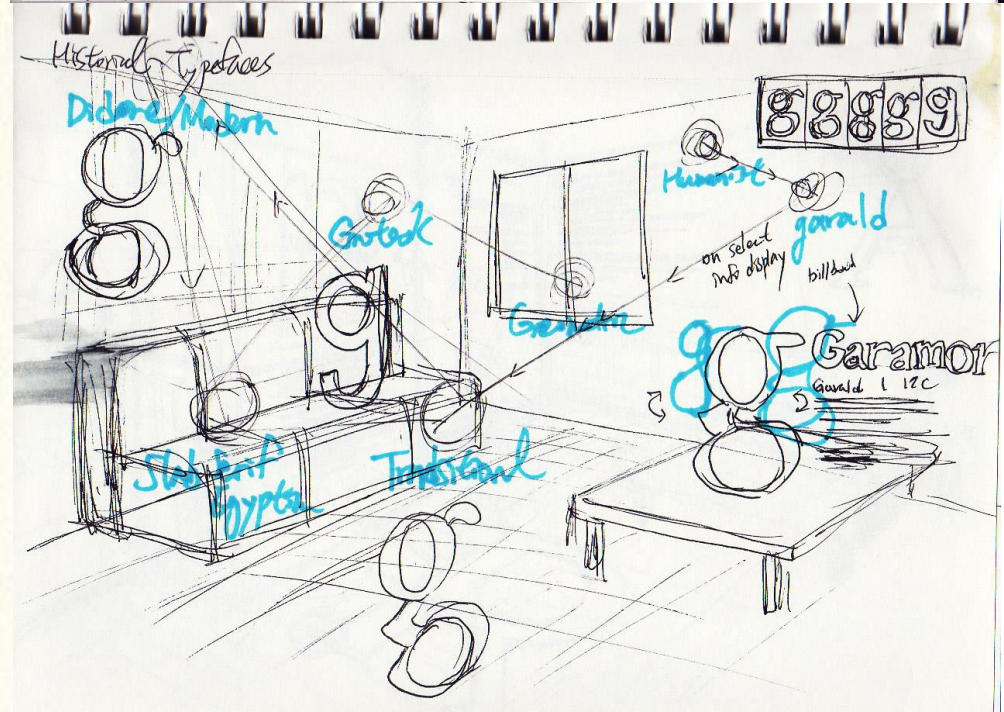
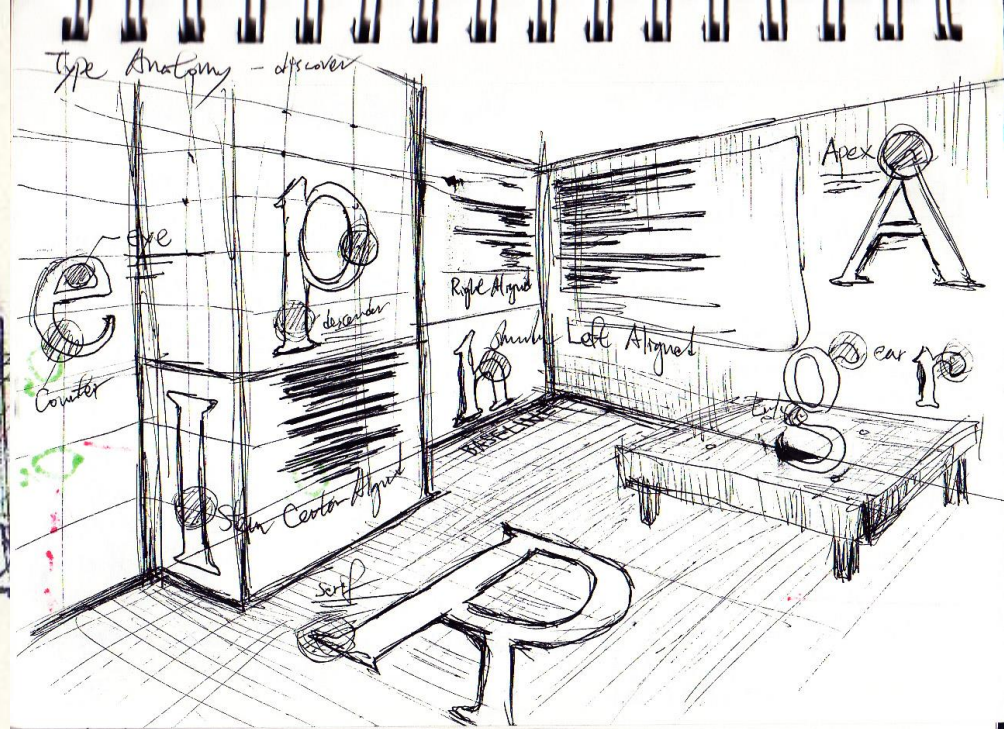
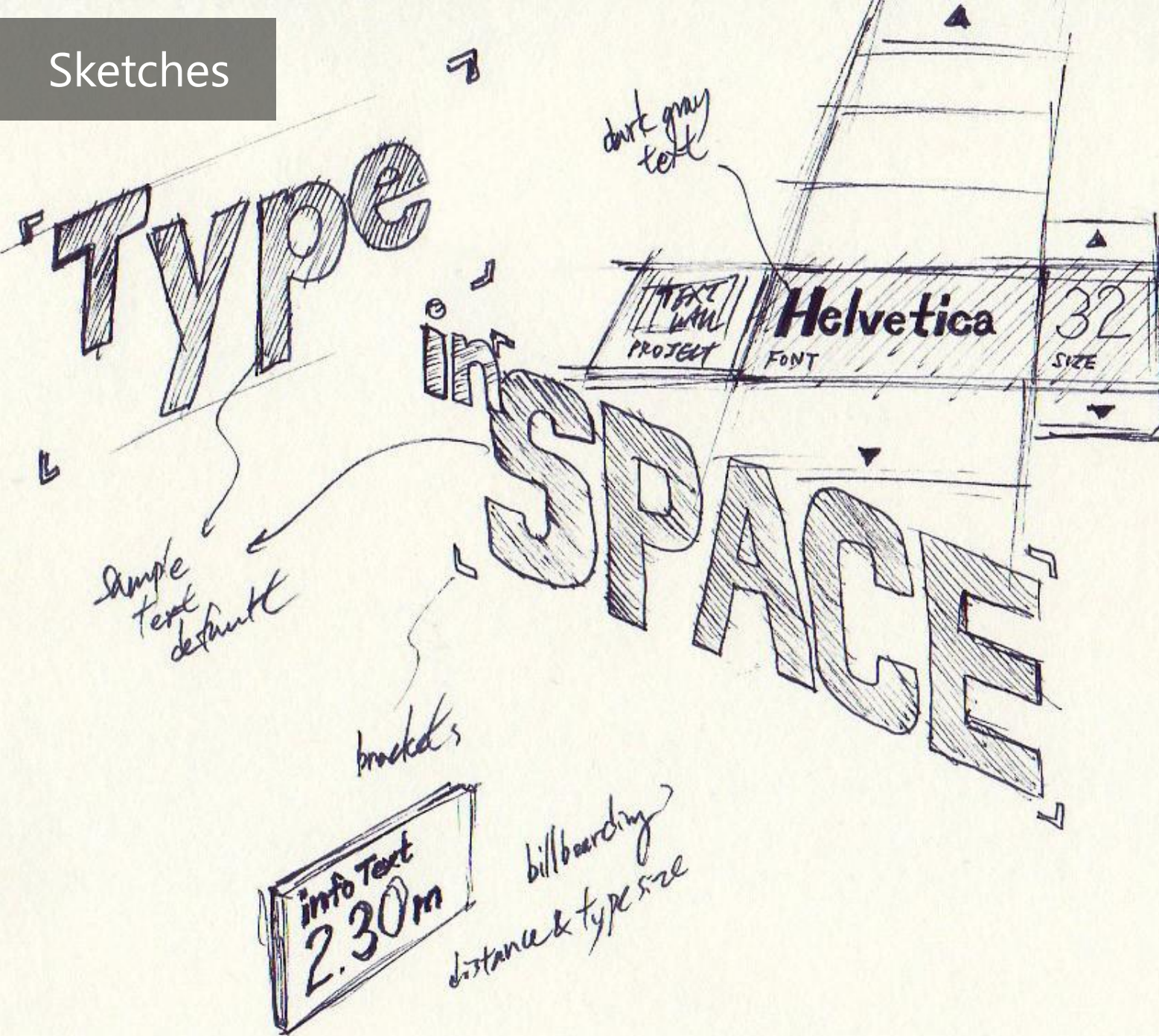
Now you can access thousands of fonts from Adobe Typekit with Adobe ID



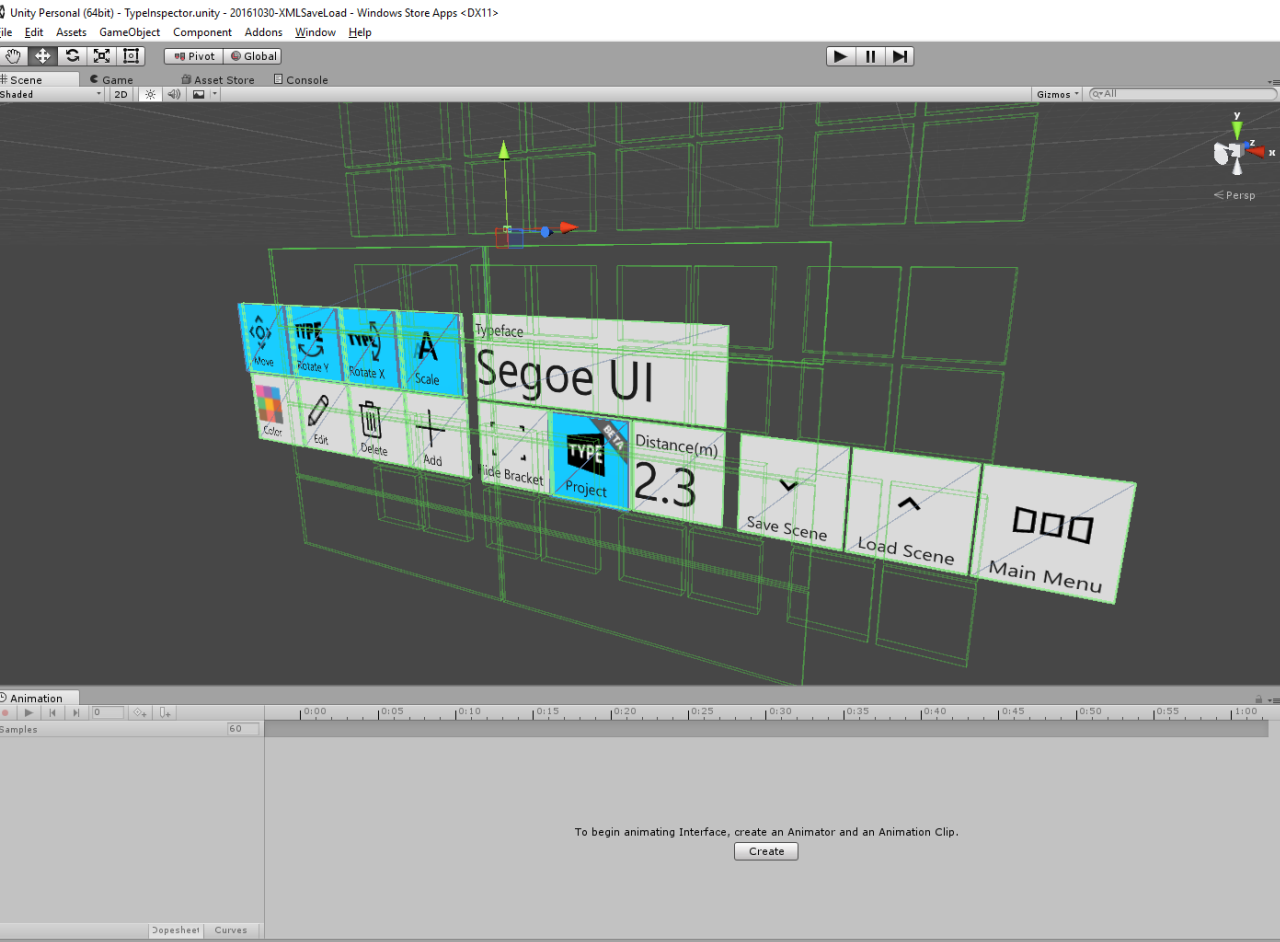
Experiencing type in 3D space



Sketches



Design Iterations – UI



Architectural Signage Design

The interface consists of a grid of tool icons and text input fields. The top row includes icons for Move, Rotate, Size+, Size-, Hide Bracket, and Project. The bottom row includes a Mari Menu icon, a Typeface field set to 'Impact', a Distance(m) field set to '2.6', and icons for Edit, Delete, and Add.

	Typeface Impact	Distance(m) 2.6			

Design Iterations – Rigid body & Trigger Animation

Holographic
TYPES

ARE
GORGEOUS

Arial Regular	Segoe UI SemiLight
Arial Bold	Segoe UI Regular
Sitka	Segoe UI Bold
Georgia	Merdana
Arial Bold	Merdana
Georgia	Impact

TYPEFACE DISTANCE (cm)

Scale

TYPE

Add Hide Bracket Project Show Menu

Move Rotate Y Rotate X

Color Edit Delete

Testing in various environments

Seattle

Emerald

g g g

Serif - Modern/Didone

Serif - Old Style/Garald

g g g g g g

Main Menu

h d p

Ascender

Counter

Bracket

The traditional bracket system

Main Menu

Typography

In

space is beautiful

Move	Rotate	Size+	Size-	Hide Bracket	Project
Typeface	Distance(m)	Edit	Delete	+	Add
Palatino	2.2				

L2 L2

v1.0 on Store 08/01/2016

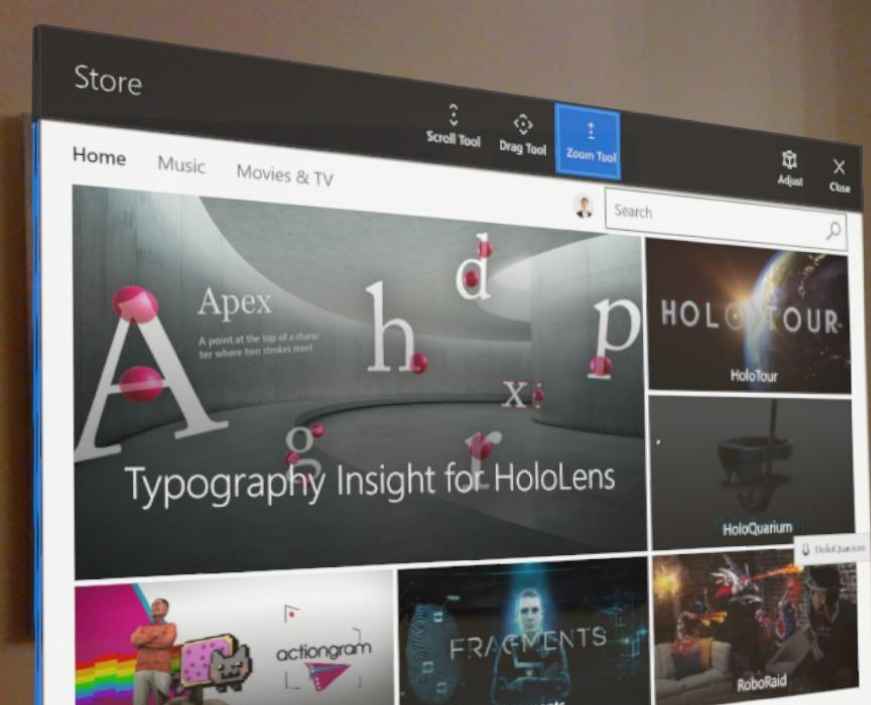
Typography

In

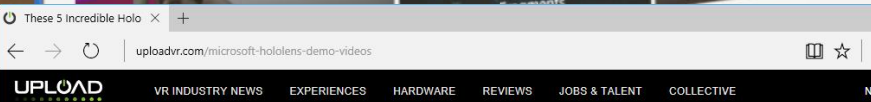
Space

Lorem ipsum

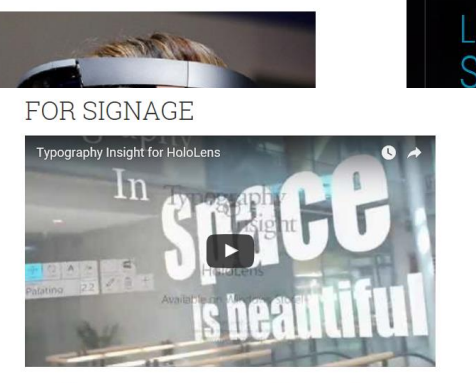
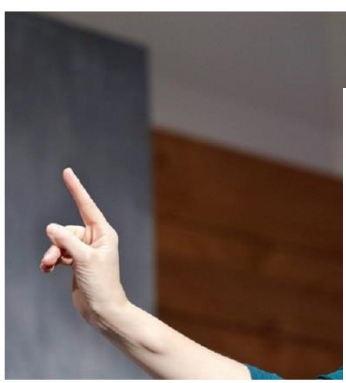
A	AA	TYPE	SIZE
Size	Size	Hide-Bracket	Project



Design Community was excited about the potential of MR



These 5 Incredible HoloLens Videos Will Make You A VR/AR Believer

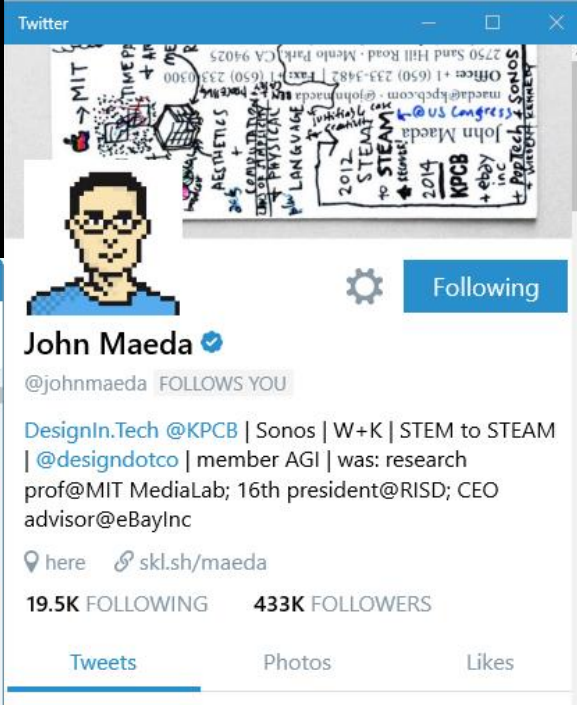
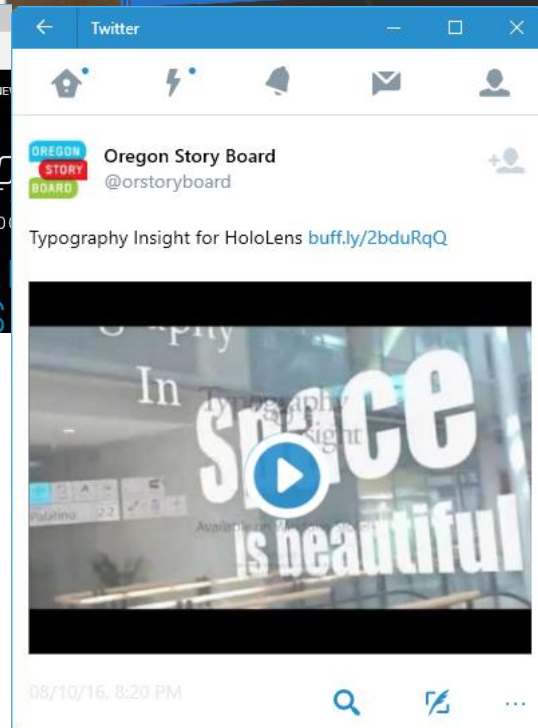


FOR SIGNAGE



From billboards and street signs to the fronts of buildings, words meet our eyes almost everywhere we look and it's kind of astonishing how ugly most of these words actually look when you read them. Typography sets apart easy-to-understand text from something that's frustrating to read. The \$3 app *Typographic Insight* by Dong Yoon Park offers a pretty compelling demonstration of how you could see how particular type styles will look

Over the last few weeks we've seen demonstrations of the capabilities



Experiment at Bellevue Arts Museum



To Design
much more than simply
is to Assemble
to Order
or even to Edit

Unauthorized Holographic sculpture placed in Bellevue Art Museum

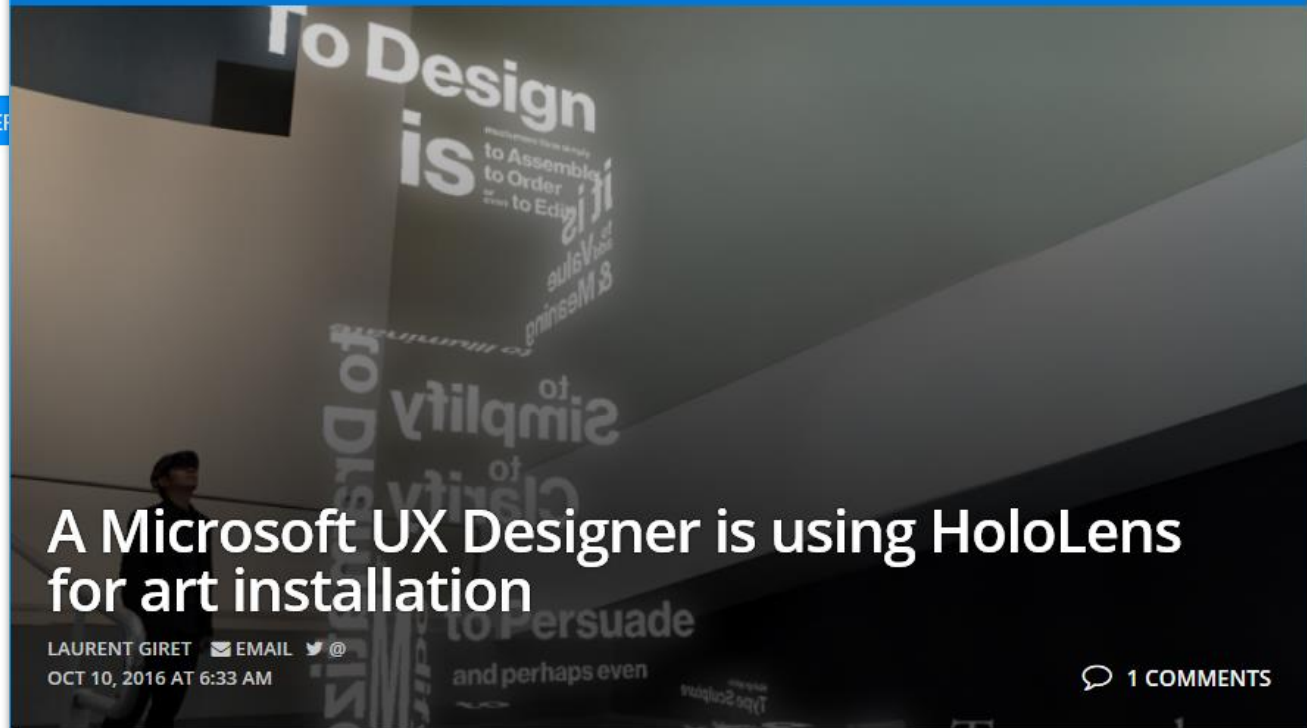
by Surur [@mspoweruser](#)
Oct 9, 2016 at 22:16 GMT



Microsoft User Experience Designer DongYoon Park has posted a video which raises interesting questions about mixed reality and communal spaces.

In the video he places a typography-inspired sculpture in the atrium and rooftop sculpture garden of the Bellevue Art Museum created using his Typography Insight for HoloLens app.

The sculpture is interactive (though at present just for Park) meaning HoloLens users can move, rotate and collectively evolve it.



A Microsoft UX Designer is using HoloLens for art installation

LAURENT GIRET [EMAIL](#) [@](#)
OCT 10, 2016 AT 6:33 AM

1 COMMENTS

Dong Yoon Park, Principal UX Designer at Microsoft has created a "Holographic art sculpture" for Bellevue Arts Museum with his recently released Typography Insight app for [HoloLens](#). The app has been originally released on iOS in 2011 to allow users to play with typography in a mixed reality environment, but the designer (who also worked on the Windows Bridge for iOS, aka [Project Islandwood](#)) brought new features to the HoloLens version to make the experience much more immersive.

The designer's 'Holographic Type Sculpture' is currently placed in Bellevue Arts Museum's atrium and rooftop sculpture garden. Park explained in a [blog post](#) that he already thought about providing attendees many ways to interact with the mixed reality art piece:

Fire chills 2 hours, 4 hours when boiler explodes in St. Louis

ST. LOUIS (AP) — A fire that burned for 2 hours, 4 hours when a boiler exploded in a St. Louis apartment building on Monday, leaving at least 11 people dead and 100 others injured.

Blast on Russian subway kills 11; 2nd bomb is defused

MOSCOW (AP) — A powerful explosion on a subway train in Moscow on Monday killed 11 people and injured more than 100 others, and a second bomb was defused nearby.



AP Analysis: Is Trump really talking to Kim from Korea?

WASHINGTON (AP) — Donald Trump's decision to talk to North Korean leader Kim Jong-un is a bold move that could reshape the world's nuclear landscape.



AP Analysis: Is Trump really talking to Kim from Korea?

WASHINGTON (AP) — Donald Trump's decision to talk to North Korean leader Kim Jong-un is a bold move that could reshape the world's nuclear landscape.

News Space

SPATIAL NEWS VISUALIZER FOR HOLOLENS

Fewer missing but more dead as river recedes in Colombia

BOGOTA (AP) — A deadly flood in Colombia on Monday left fewer people missing but more dead as a river receded.

AP Analysis: Is Trump really talking to Kim from Korea?

WASHINGTON (AP) — Donald Trump's decision to talk to North Korean leader Kim Jong-un is a bold move that could reshape the world's nuclear landscape.



Violent storms, tornadoes leave 5 dead in South

MEMPHIS (AP) — Violent storms and tornadoes in the South on Monday left 5 people dead and injured dozens.



Second juvenile, 15, arrested on Facebook Live

PHOENIX (AP) — A 15-year-old boy was arrested on Monday for a second time after being caught on Facebook Live.



Bill O'Reilly, ex-Fox chief hit with more sexual allegations

WASHINGTON (AP) — Bill O'Reilly, former Fox News host, is hit with more sexual allegations.



Chimpanzee at zoo flings feces at grandma, goes viral

PHOENIX (AP) — A chimpanzee at a zoo flung feces at a grandmother, and the video went viral.



Doctor, teen critically hurt after stopping to help crash victims

PHOENIX (AP) — A doctor and a teen were critically hurt after stopping to help crash victims.



Scope of untasted rape evidence expands in Wisconsin

MILWAUKEE (AP) — The scope of untasted rape evidence expands in Wisconsin.



Equal Pay Day provides rallying point for women in workplace

PHOENIX (AP) — Equal Pay Day provides a rallying point for women in the workplace.



Why Democrats aren't worried about the 'nuclear option'

PHOENIX (AP) — Democrats aren't worried about the 'nuclear option'.

Dems claim votes to block Gorsuch; GOP will override them

WASHINGTON (AP) — Democrats claim to have enough votes to block Neil Gorsuch's confirmation, but the GOP will override them.

AP EXPLAINS: What is the Senate's 'nuclear option'?

WASHINGTON (AP) — The Senate's 'nuclear option' is a controversial move to change the rules for confirming Supreme Court justices.



newsroom
SPATIAL NEWS VISUALIZER FOR HOLOLENS

Museum of Type

for Windows Mixed Reality

Designed & Developed by Dong Yoon Park

(C) BRDY STUDIOS, LLC

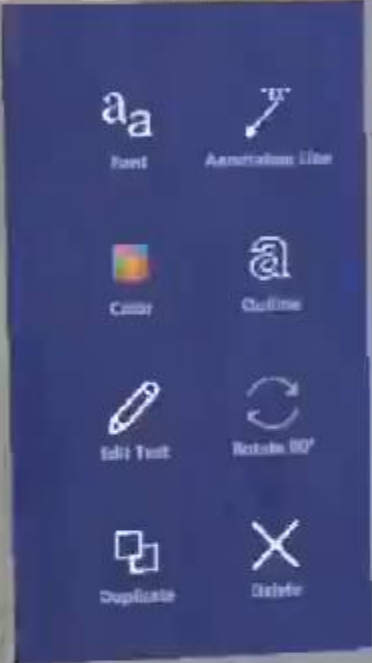
TYPE IN SPACE FOR HOLOLENS 2

TYPE

TYPE IN SPACE FOR HOLD

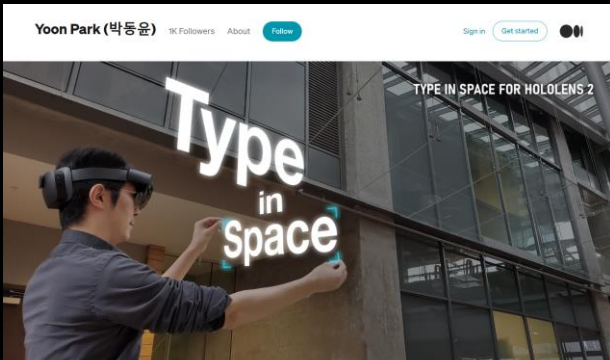
세계와 현실
관과

TYPE
IN
SPACE



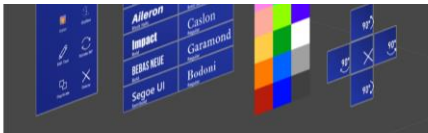
Mixed reality design & development stories on Medium

<https://medium.com/@dongyoonpark>



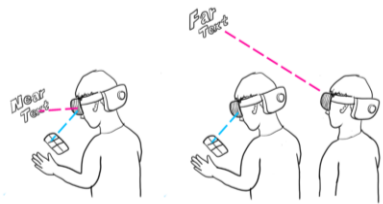
Designing Type In Space for HoloLens 2

Yoon Park (박동윤) Dec 10, 2019 · 11 min read



Button

The button is one of the most foundational UI components. In HoloLens 2, you can directly press buttons with hand-tracking input. However, since you are essentially pressing through the air without any physical tactile feedback, it is important to amplify visual and audio feedback.



Faral depth switches between the target object and the menu causes the eye strain.

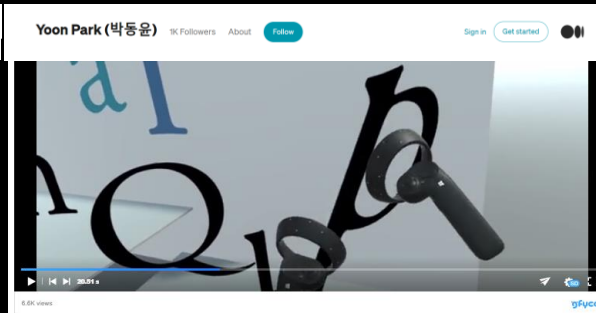
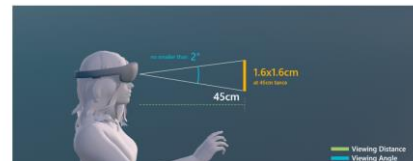


Bringing the Periodic Table of the Elements app to HoloLens 2 with MRTK v2

Sharing the story of updating HoloLens app made with HoloToolkit(HTK) to use new Mixed Reality Toolkit v2(MRTK) which supports HoloLens 2's articulated hand tracking and eye tracking input

Adjusting the element view position for the near interactions, adding PressableButton for the 'Close' action

Once an element is focused and selected, the box flies to the user and opens up a 3D model and information panels. Since the original version was designed for the gaze and air-tap, the element was still far from the user. To leverage HoloLens 2's direct hand input interaction, I have adjusted the element position to the near interaction range which is about 45cm from the user.



Museum of Type - Windows Mixed Reality App Design & Development Story

A designer's journey into the virtual environment and typography

Yoon (Dong Yoon Park) Nov 14, 2017 · 11 min read

Last year, with my love of typography, I have explored spatial text layout in the physical space and introduced two apps for HoloLens.

- **Typography Insight for HoloLens:** A spatial type layout and reference tool for learning and experimenting with type in physical space. (Medium post: [Designing Typography Insight for HoloLens](#))
- **News Space for HoloLens:** A spatial news headline visualizer which fills up your room with the latest news headlines. (Medium post: [News Space for HoloLens](#))

With Windows Mixed Reality immersive headsets, I have continued my journey, exploring the possibilities of the typography education in the virtual space.



News Space for HoloLens: Spatial News Headline Visualizer in Mixed Reality

Yoon (Dong Yoon Park) Apr 21, 2017 · 3 min read

After publishing my first personal HoloLens project "Typography Insight for HoloLens" last year, I continued experiments on typography in mixed reality space. One of the most fascinating aspects of HoloLens was the rendering quality of type. Since HoloLens has higher PPD (Pixels Per Degree) than other AR/VR devices, it renders beautiful sharp text. I wanted to create an app that can leverage text rendering quality as well as physical environment.

News Space is a spatial news headline visualizer in Mixed Reality space. It fills up your room with the latest news headlines. Since the news headlines are world-locked, you can walk around and view the detailed images and summaries. By air-tapping one of the news provider button, you can load headlines from the provider.

For the news item layout, instead of using traditional 2D style list on a limited frame, I wanted to use the entire physical environment around the user. Through the series of experiments with different layout shapes such as three-dimensional list and curved surface, I found that the spherical layout is comfortable since it gives me relatively consistent distance to the news headlines regardless of the viewing angle.

UX Building Blocks & Tools for MR

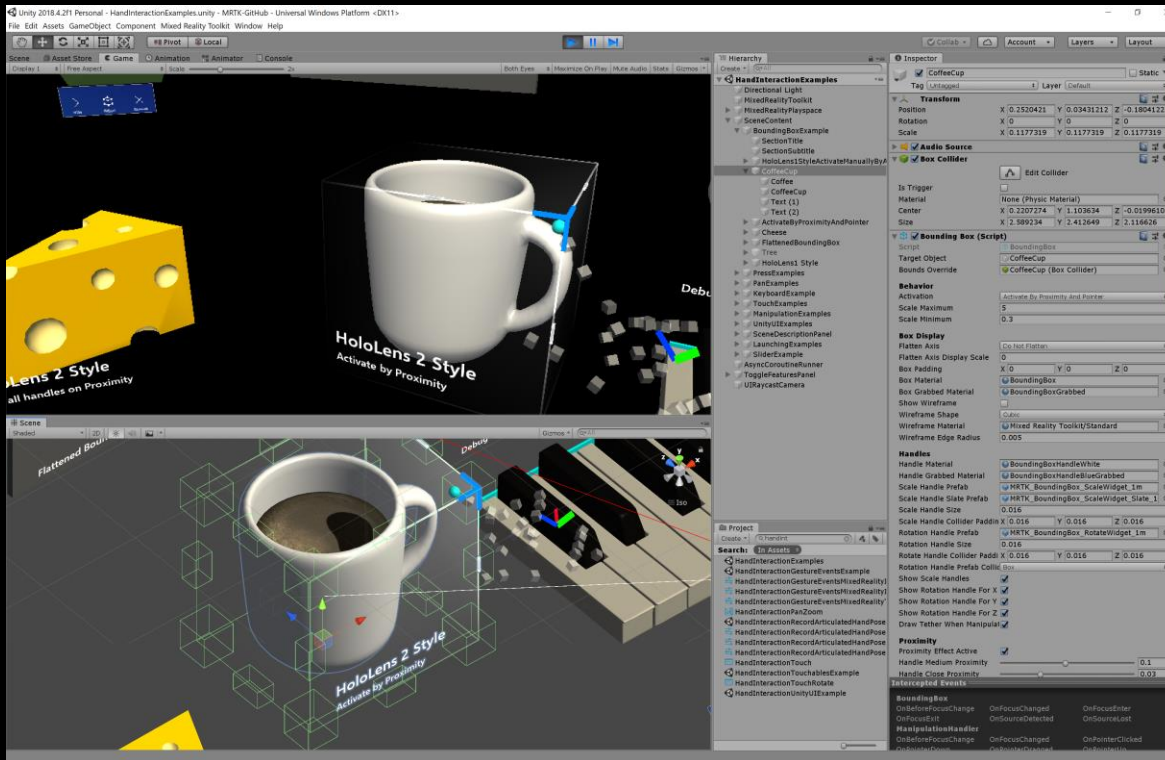
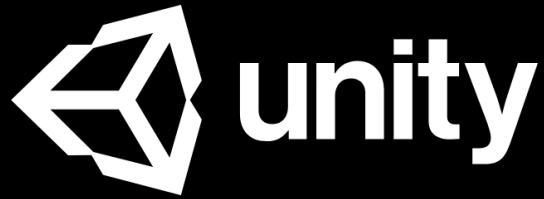




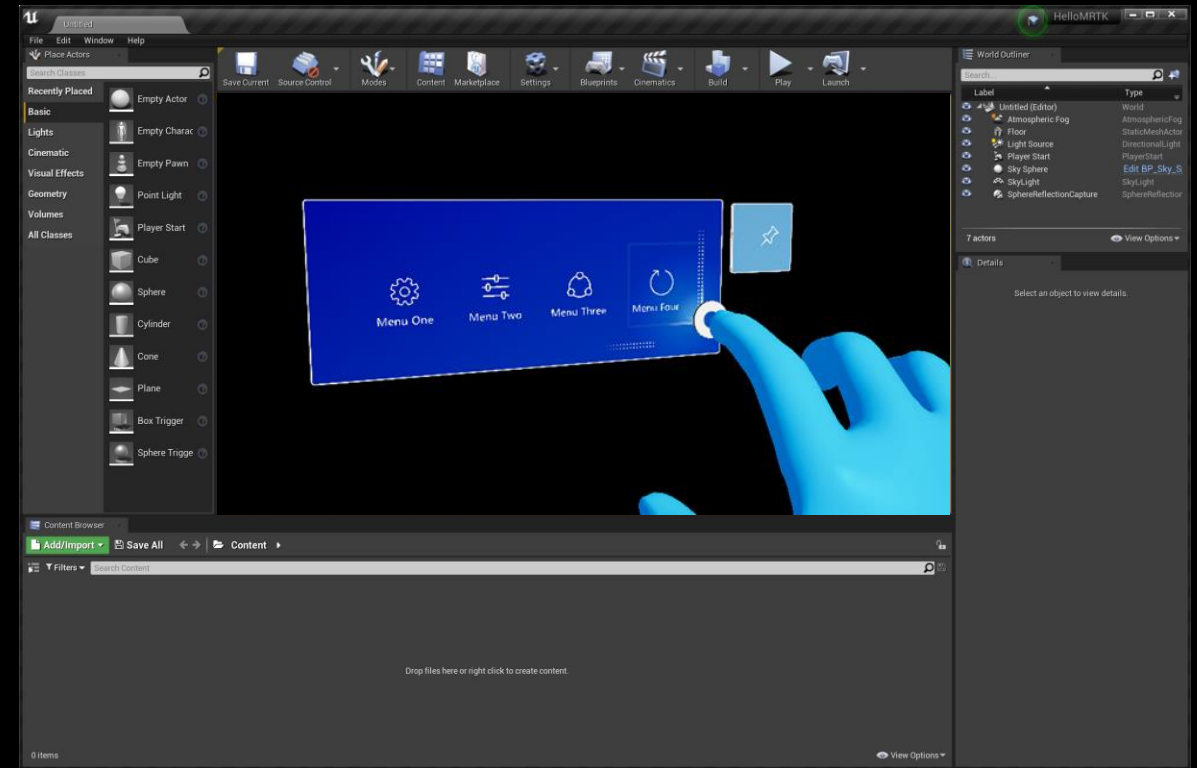
MRTK
*MIXED REALITY
TOOLKIT*

Foundational components and building blocks
for the common spatial interactions and UI





MRTK-Unity



MRTK-Unreal



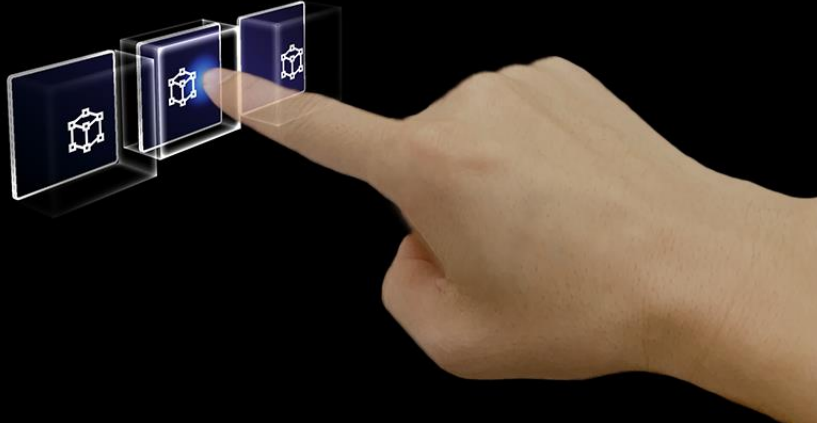
M R T K

*MIXED REALITY
TOOLKIT*

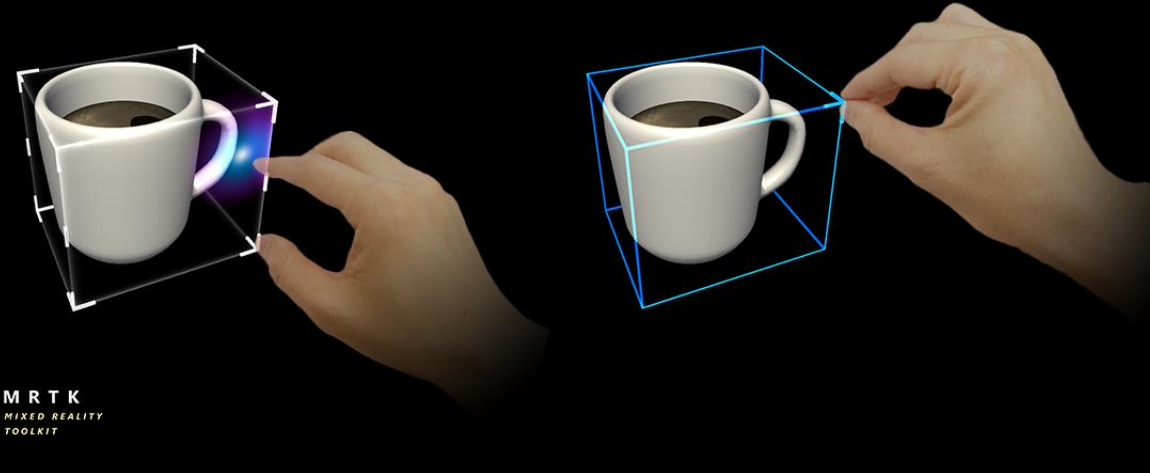
Open-source cross-platform building blocks
for Mixed Reality experiences

<http://aka.ms/MRTK>

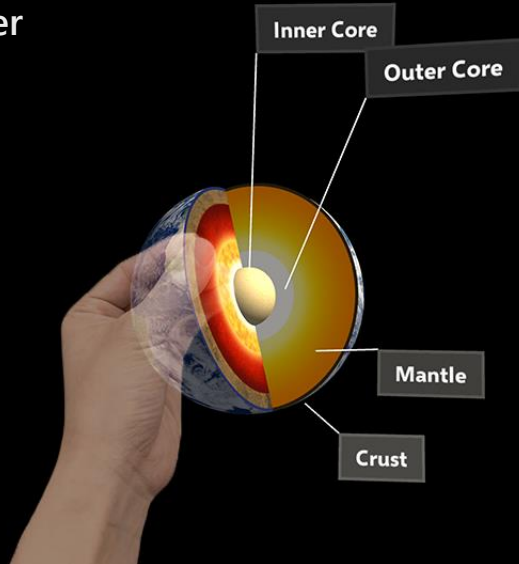
Button



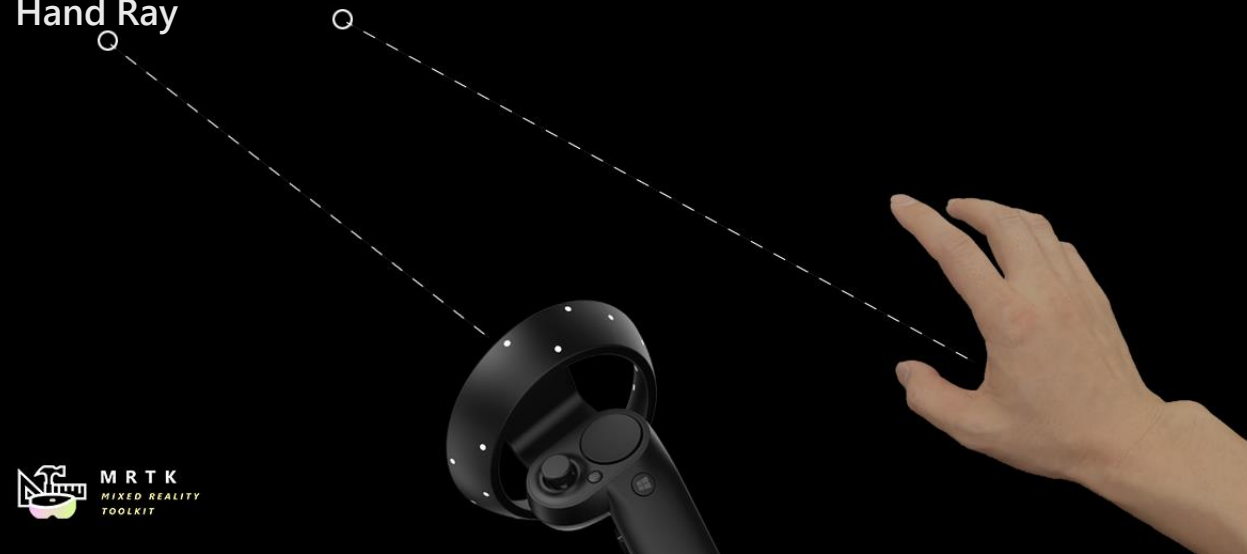
Bounding Box



Manipulation Handler



Hand Ray



Speech Command

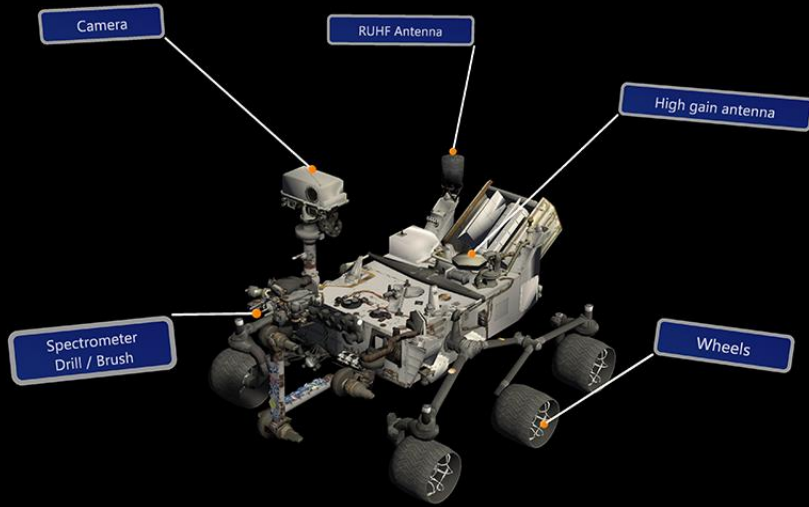


Say "Button"

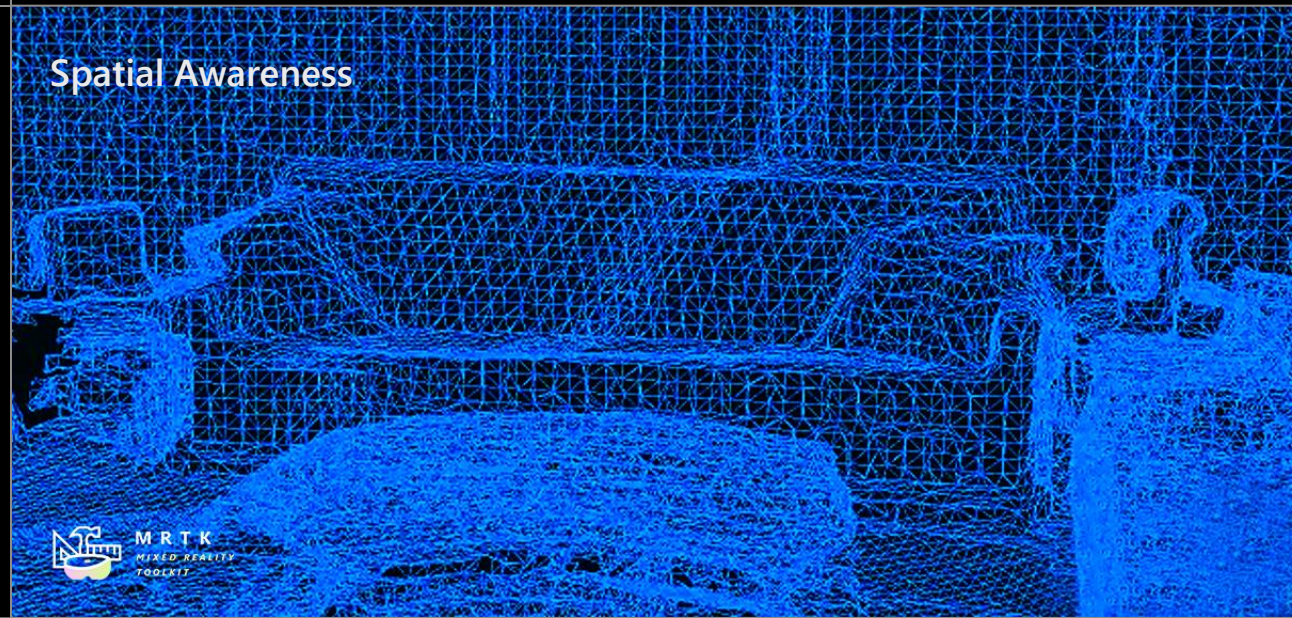
Slate



Tooltip



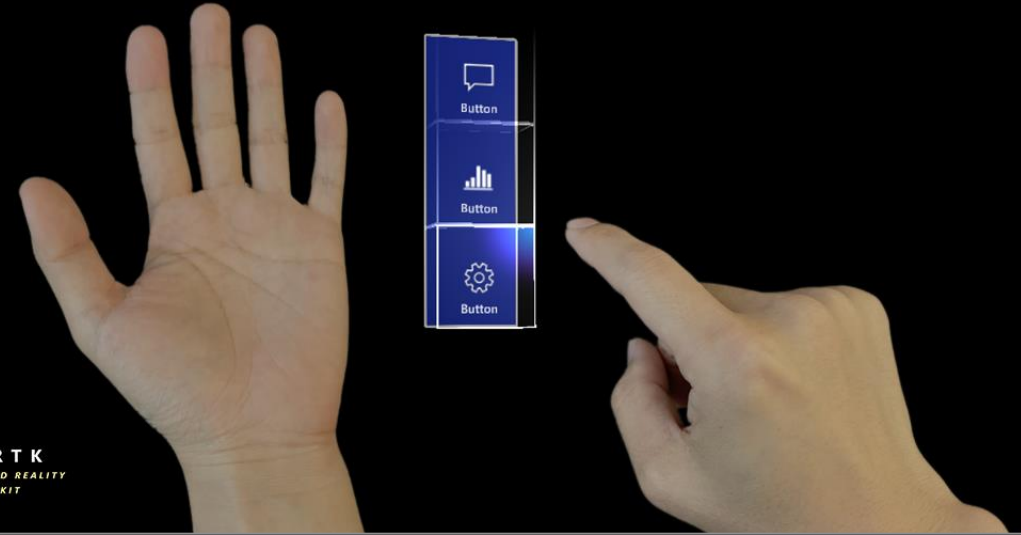
Spatial Awareness



Keyboard



Hand Menu



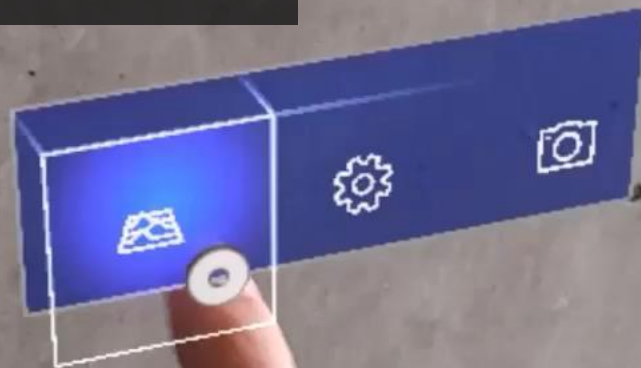
Slider



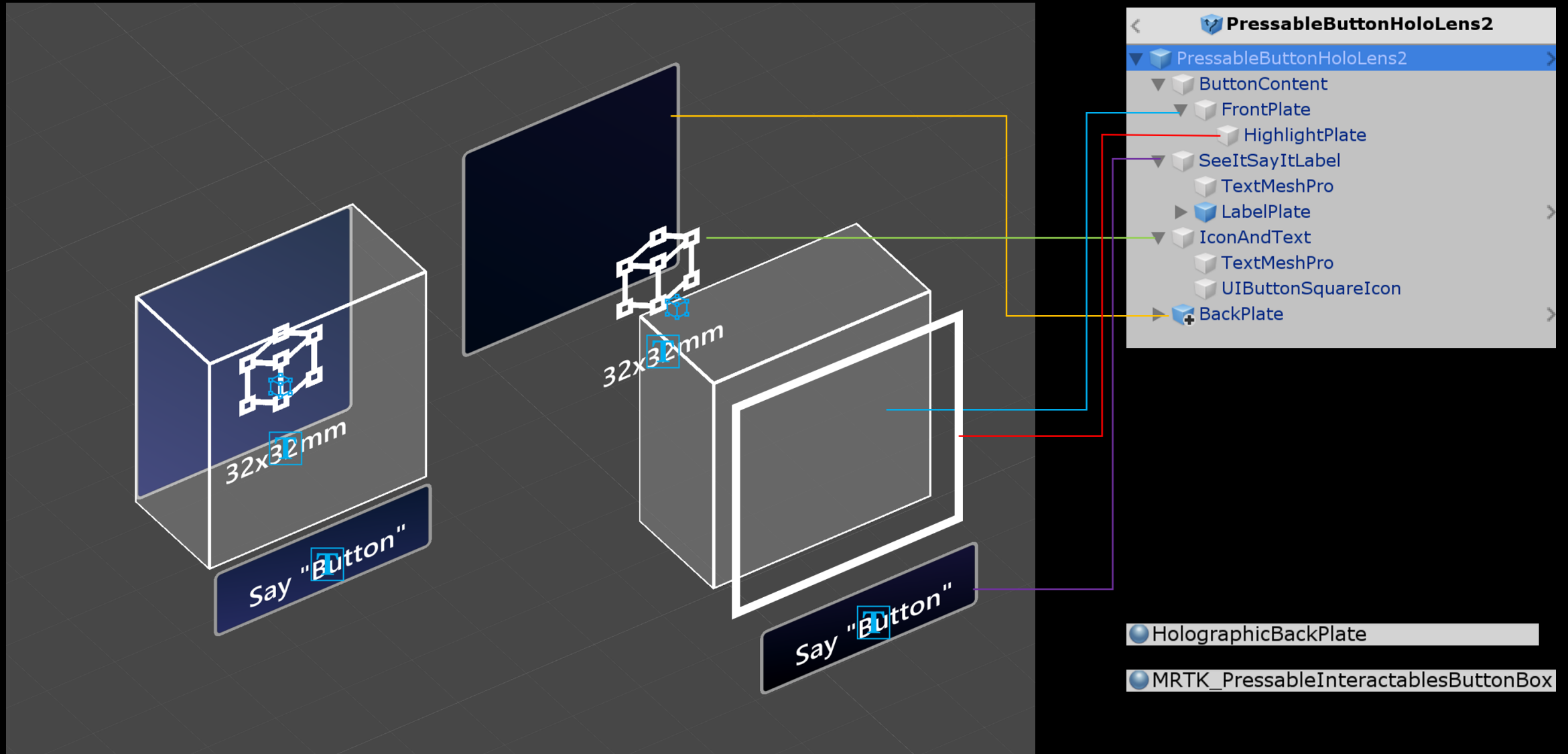
Near Menu



MRTK HoloLens 2 Button Prefab



■ HoloLens2 Button Structure

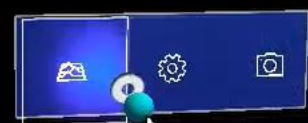
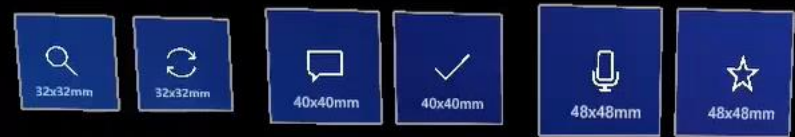


- HolographicBackPlate
- MRTK_PressableInteractablesButtonBox

MRTK Input Simulation

HoloLens 2 style buttons and other custom button examples using PressableButton.cs

Color Change on Pressed Event



- Build and test your experience without devices
- Fast design iteration
- Supports various types of inputs: Hand, Eye, Controllers, etc.

Examples of touch events using HandInter
Only works with HoloLens 2's articulated h

The screenshot shows the Unity editor interface. On the right, the 'MixedRealityToolkit' settings panel is visible, showing options for 'Quest2ConfigurationProfile', 'Target Scale' (set to 'Room'), and 'Camera System Type' (set to 'MixedRealityCameraSystem'). Below this, there are sections for 'Camera', 'Input', 'Boundary', 'Teleport', 'Spatial Awareness', 'Diagnostics', 'Scene System', 'Extensions', and 'Editor'. An 'Add Component' button is at the bottom of the settings panel. On the left, the 'Project' window shows a search for 'handinter' in assets, displaying several 'HandInter...' assets with different icons.

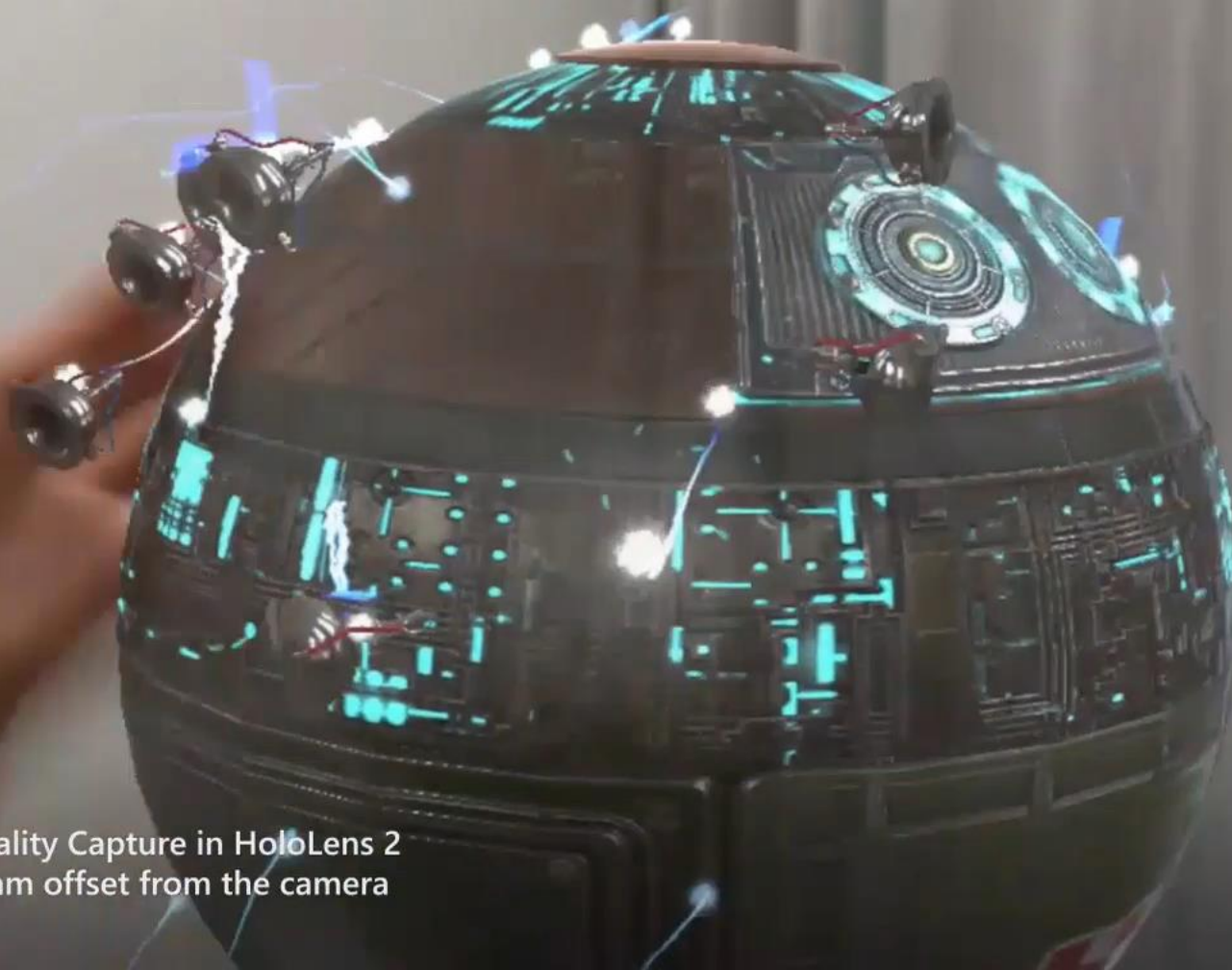
Press LeftControl + H to open up the input simulation guide
Debug Message



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DESIGN LABS



MRTK
MIXED REALITY
TOOLKIT



Recorded with Mixed Reality Capture in HoloLens 2
The video shows hologram offset from the camera

Surfaces

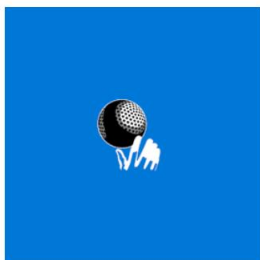


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Surfaces app – Microsoft Store in HoloLens 2



MRTK
MIXED REALITY
TOOLKIT



Surfaces

Microsoft Design Labs • [Developer tools](#) > [Development kits](#)

Surfaces demonstrates how to use Mixed Reality Toolkit (MRTK)'s input system and building blocks to create an app experience for HoloLens 2.



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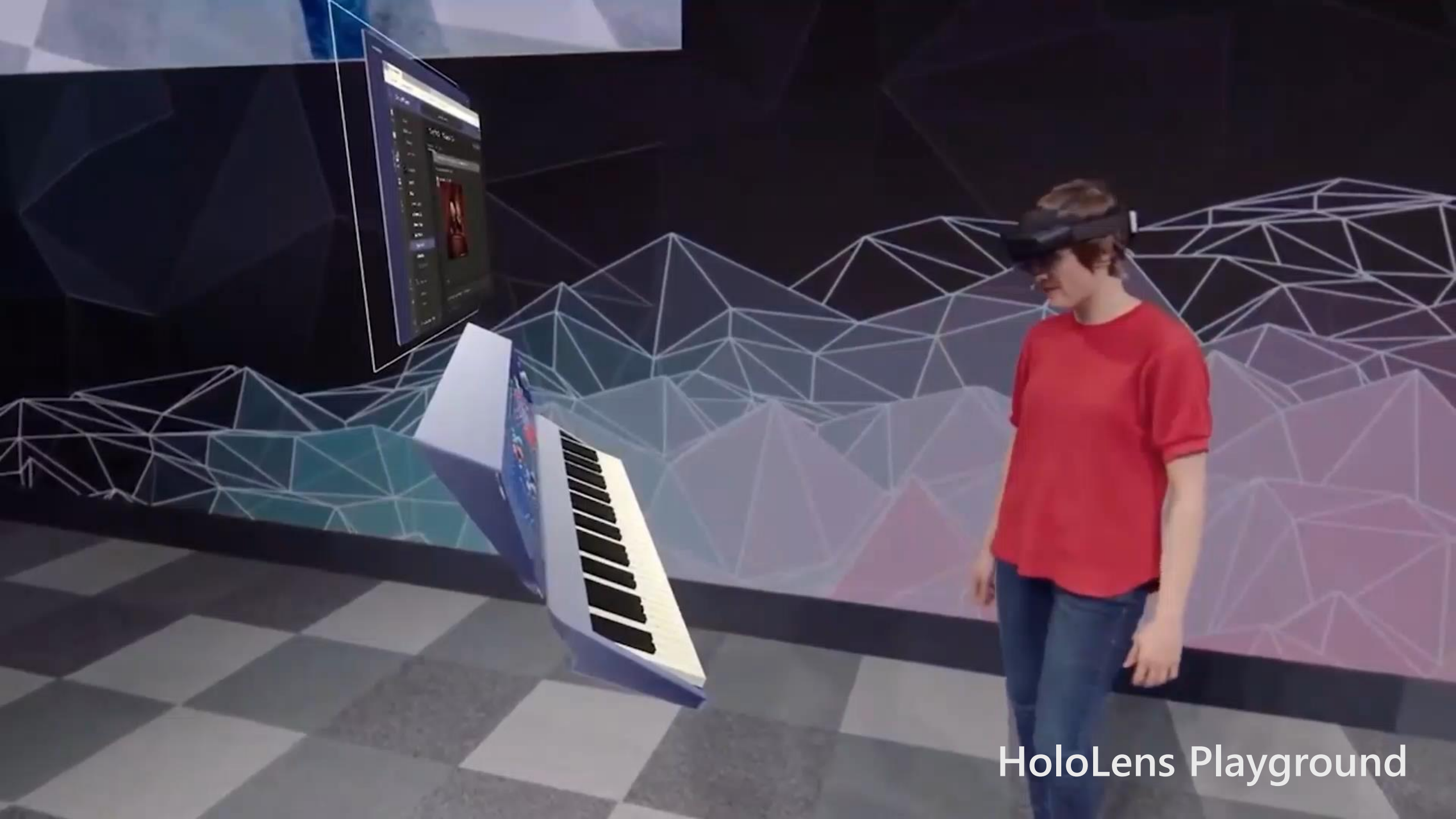
[See System Requirements](#)

Available on

Capabilities

HoloLens

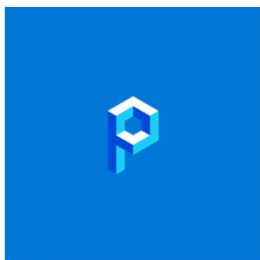
Mixed reality



HoloLens Playground



HoloLens Playground app – Microsoft Store in HoloLens 2



HoloLens Playground

Microsoft Design Labs • [Developer tools](#) > [Development kits](#)

Experience new, more natural ways of interacting with holograms in our mixed reality playground. You can summon a hummingbird to your outstretched hand, play a piano with all your fingers, and use your eyes in some magical ways we don't want to spoil here! In addition to being a great place to play, this app showcases for developers what's possible with the Mixed Reality Toolkit, available at <https://aka.ms/MRTK>.



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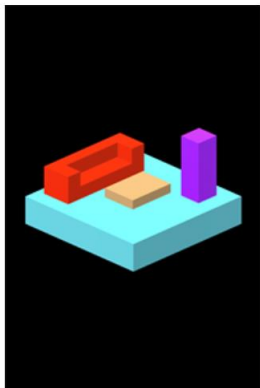
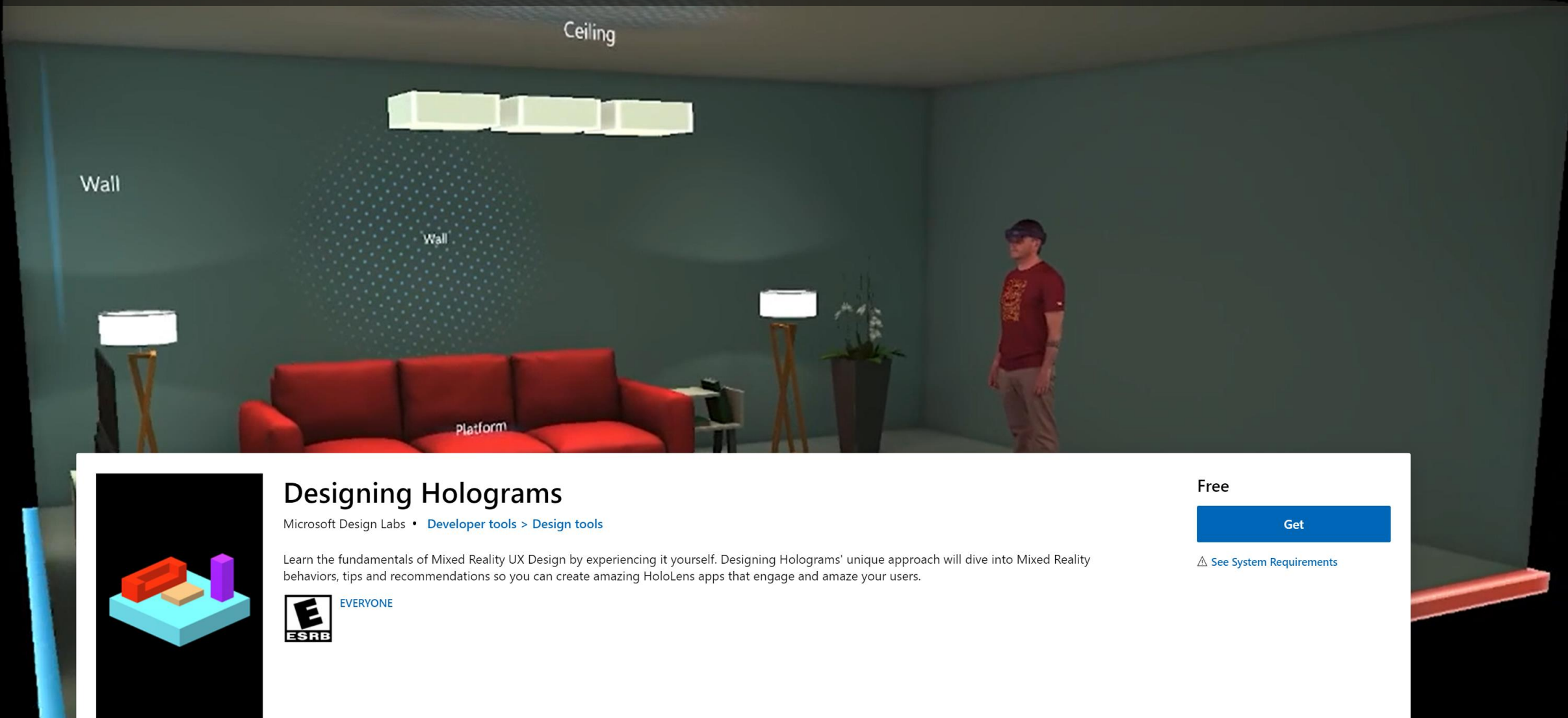
Capabilities

Designing Holograms app – Microsoft Store in HoloLens 2





Designing Holograms app – Microsoft Store in HoloLens 2



Designing Holograms

Microsoft Design Labs • [Developer tools](#) > [Design tools](#)

Learn the fundamentals of Mixed Reality UX Design by experiencing it yourself. Designing Holograms' unique approach will dive into Mixed Reality behaviors, tips and recommendations so you can create amazing HoloLens apps that engage and amaze your users.



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HandInteractionExamples Scene

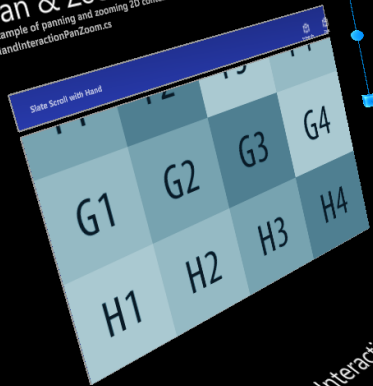
MRTK
MIXED REALITY TOOLKIT

Hand Interaction Examples

This example scene demonstrates various types of hand tracking interactions such as Press, Touch, Grab, Scroll, Move, Rotate, and Scale. You can find common UI and interaction building blocks that are part of HoloLens shell.

Pan & Zoom Interaction

Example of panning and zooming 2D content using HandInteractionPanZoom.cs



Keyboard Interaction

Keyboard not supported on this platform.



Bounding Box

Standard UI for viewing 2D content on object. Example using FlatnessInspector.cs



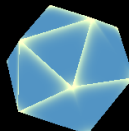
Press Interaction

HoloLens 1 supports and other devices button examples using PressInspector.cs



Touch Interaction

Examples of touch events using HoloLensShellInspector.cs. Only works with HoloLens 2's allocated HMR.



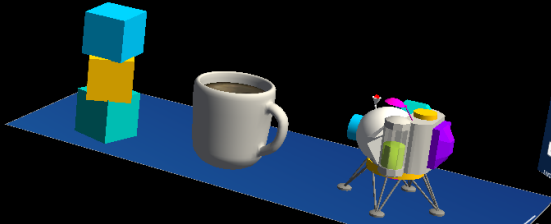
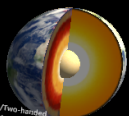
Slider Interaction

Examples of slider controls using SliderInspector.cs



Manipulation Interaction

Examples of using ManipulationInspector.cs for the mouse.



Unity UI Examples

Examples of Unity comes UI support for near and far interactions



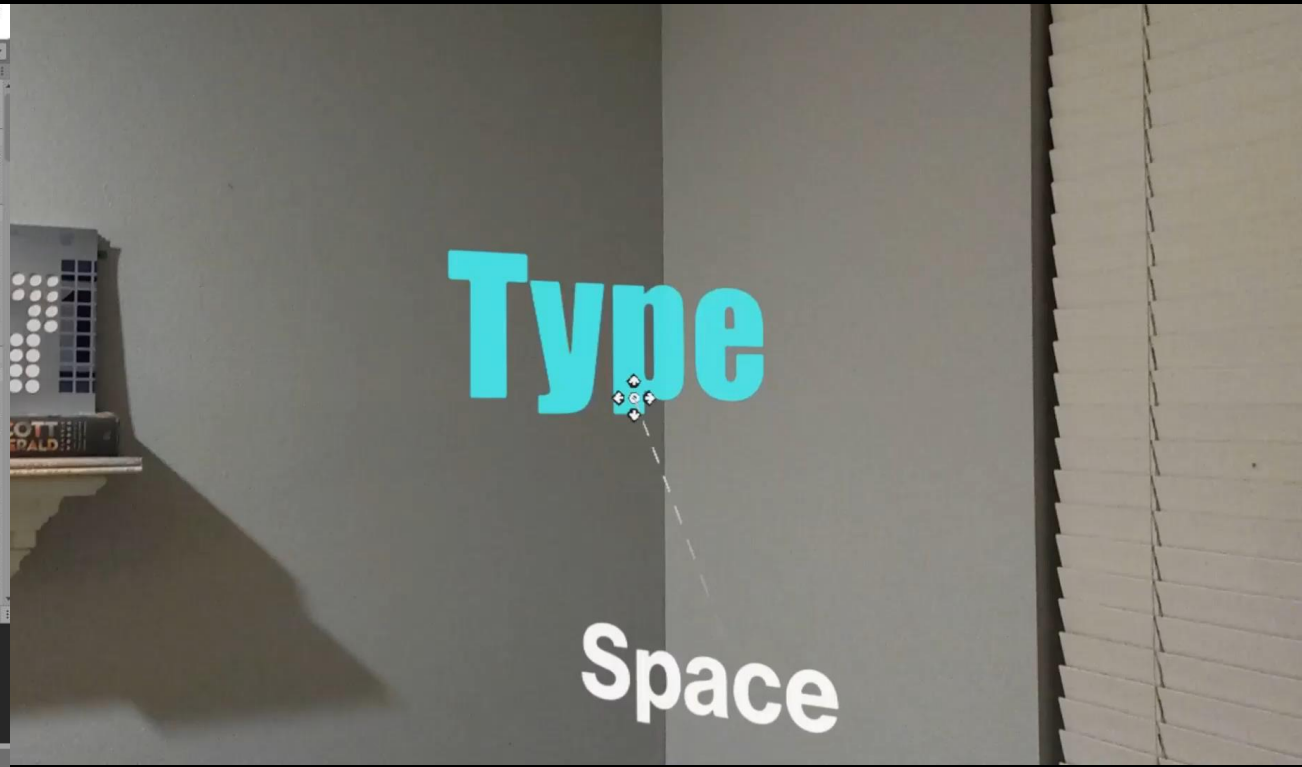
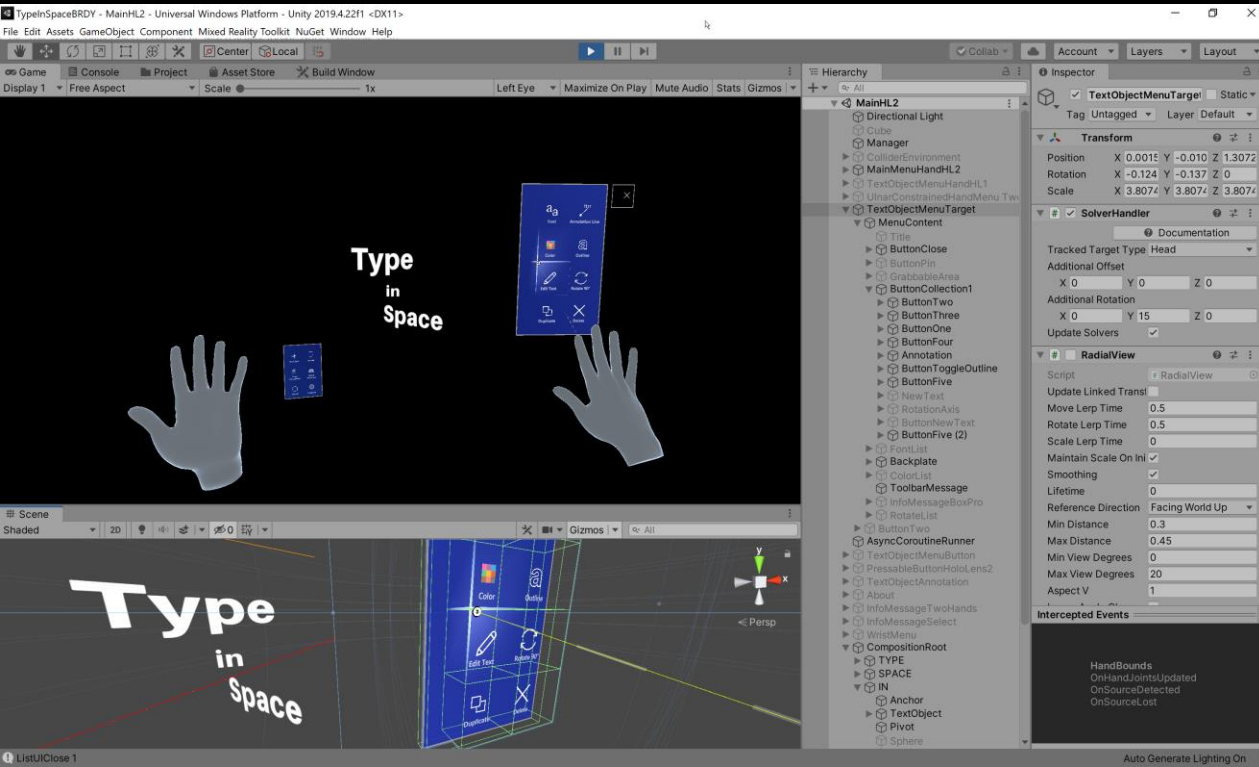
Launch External UWP Apps
Launch Edge Browser
Launch Settings



Microsoft Maquette

Design considerations for Mixed Reality

Always test on the device, frequently.



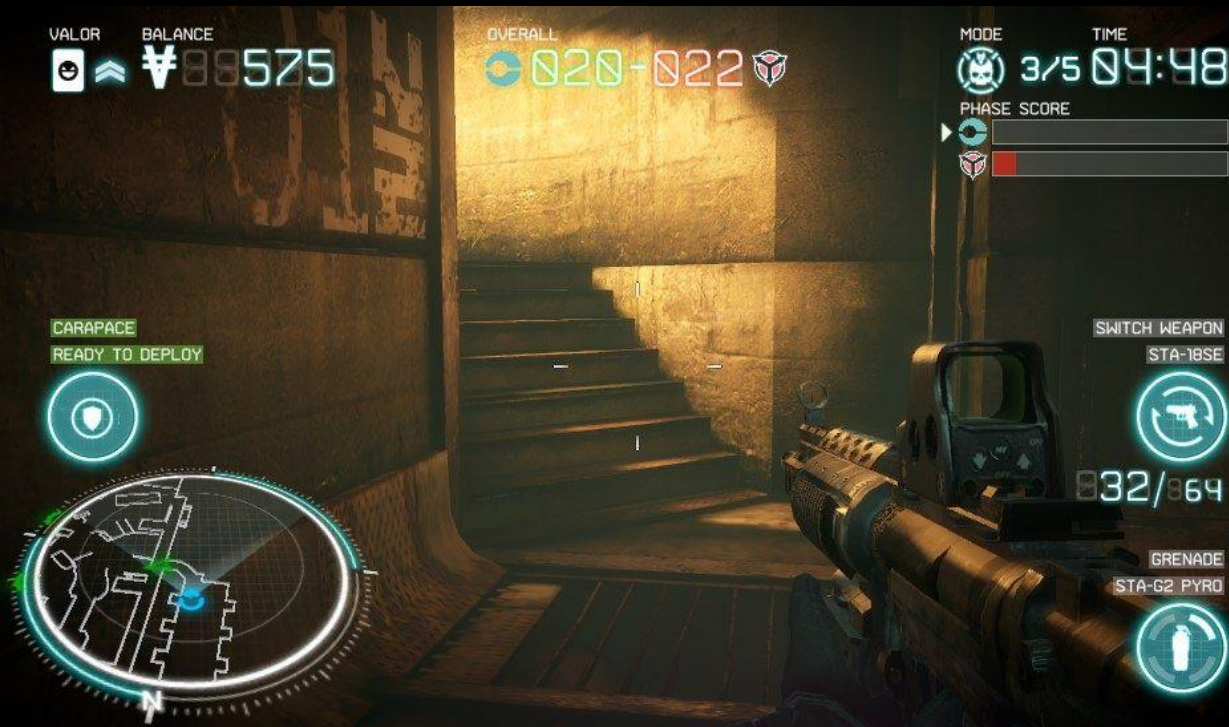
3D might not always be the best answer.



VS



Beware of preconceived notions.



Fundamental design principles are the same.

Type

in

Space

For HoloLens2

Prototype & iterate & test.



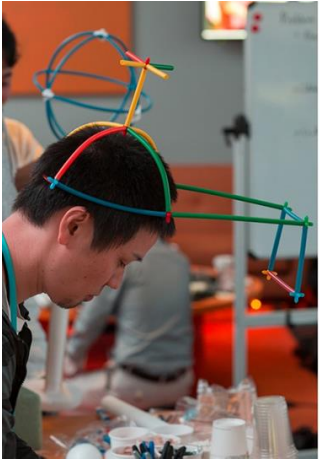
Bodystorming



Acting

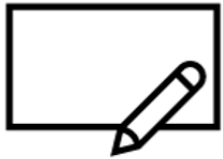


Storyboarding





Notes



Whiteboard



Bodystorm



Act



Storyboard



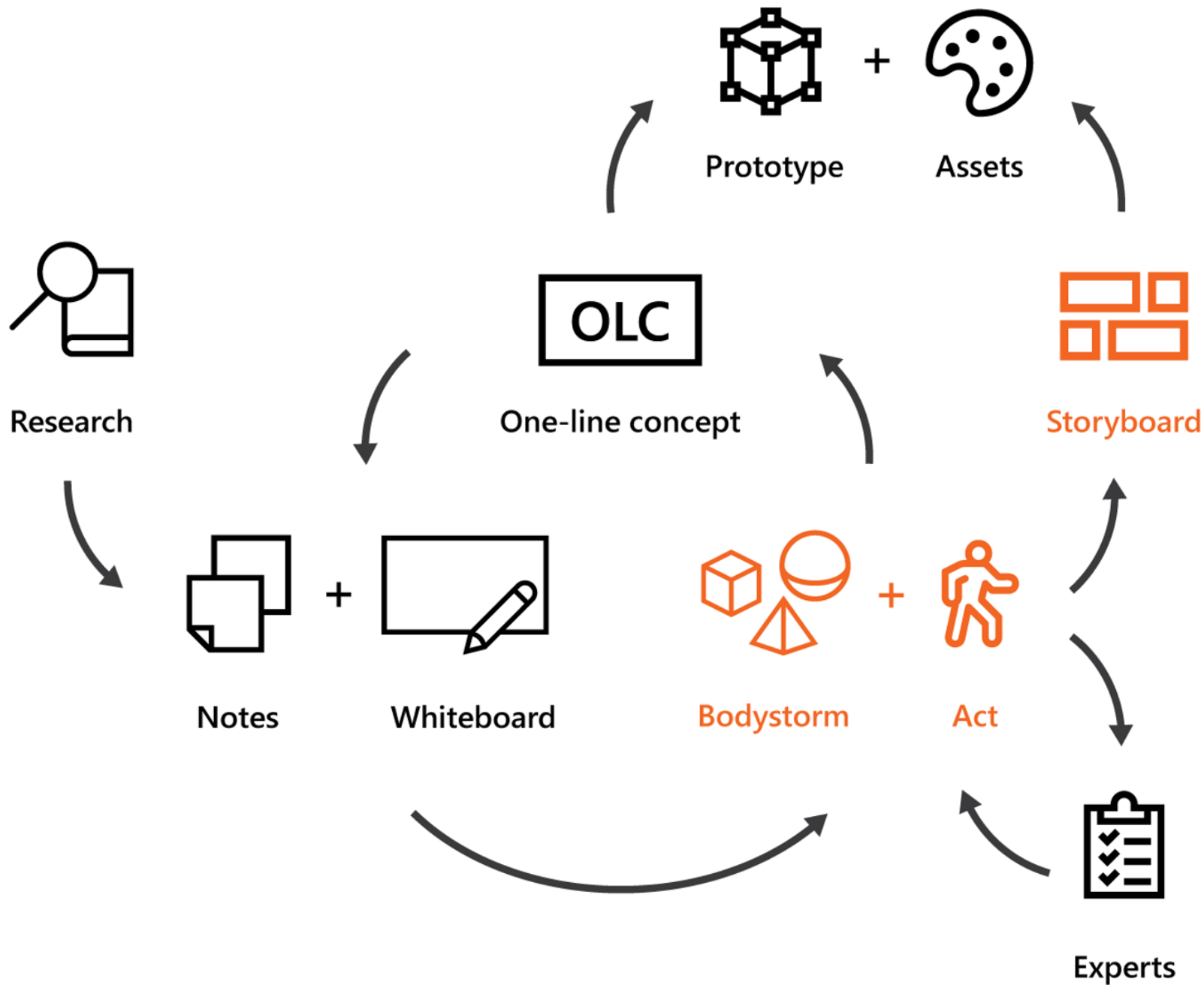
One-line concept



Prototype



Asset creation



Documentation & Resources

Mixed Reality Documentation

➔ Design

<http://aka.ms/MRDocs>

Mixed Reality documentation

Explore the expanding world of Mixed Reality applications with Windows Mixed Reality, Mixed Reality Toolkit (MRTK), Unity, Unreal, and more for HoloLens and Windows Immersive Headsets.



CONCEPT
[What is Mixed Reality?](#)



OVERVIEW
[Introducing HoloLens 2](#)



REFERENCE
[Dynamics 365 Mixed Reality applications](#)



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Dive into Mixed Reality

Whether you're a designer, developer, IT professional, we have the right curated path to get you walking before you run.



Design

- [Design and prototype](#)
- [Choose your type of Mixed Reality app](#)
- [Expand your design process](#)
- [Learn about UX elements](#)
- [Learn about user comfort](#)
- [Understand interaction fundamentals](#)



Develop

- [Choose your technology path](#)
- [Install the tools](#)
- [Get started with Unity](#)
- [Get started with Unreal](#)
- [Get started with Native](#)
- [Get your app ready for HoloLens 2](#)



Deploy

- [Prepare for commercial deployment](#)
- [Manage user identity and sign-in](#)
- [Enroll your devices](#)
- [Manage your HoloLens updates](#)
- [Release notes](#)
- [Troubleshooting & support](#)

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- Welcome to Mixed Reality
- Discover
- Design
 - Start designing and prototyping**
 - About this design guidance
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- What's new

Design checkpoints

Use the following checkpoints to bring your application ideas and concepts into the world of mixed reality.

1. Getting started

Like all journeys, your adventure into designing Mixed Reality applications starts with the basics. We recommend familiarizing yourself with the [What is Mixed Reality](#) and [What is a hologram?](#) articles to get your mind primed for immersive design. Once you've completed your read-through, you'll be ready to start your Mixed Reality design journey!



Checkpoint	Outcome
Expand your design process	Get a first-hand look at design process for Mixed Reality, gathered from designers inside and outside of Microsoft
Types of Mixed Reality apps	Decide where your app experience will live on the Mixed Reality spectrum
Designing Holograms app	Learn the fundamentals of Mixed Reality UX Design by experiencing it yourself by diving into into Mixed Reality behaviors, tips and recommendations for creating amazing HoloLens apps (available for download from Microsoft Store in HoloLens 2)

2. Core concepts

Whether you're developing for VR or AR, there are a several core concepts that apply to designing

Download PDF

2. Core concepts

Whether you're developing for VR or AR, there are a several core concepts that apply to designing fluid immersive experiences. Understanding the users point of view, positioning objects, and ensuring everyone is comfortable and safe are your top priorities at this stage of your journey. By the end of this section you'll have a solid foundation to carry through into interaction design.



Concept	Outcome
Holographic frame	Understand how users see your content overlaid onto the real world when wearing their headsets
Coordinate systems	Learn how to position holograms at places in the world that are meaningful to the user, whether it's their physical room or a virtual realm you've created
Spatial mapping	Anchor objects in the user's world and take advantage of real world's physical surfaces
Comfort considerations	Ensure user comfort and safety by creating and presenting immersive content in a way that mimics the natural world

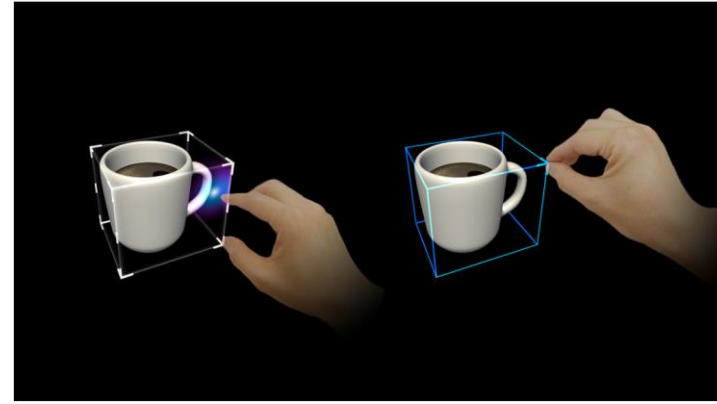
3. Interaction design

No matter how beautiful and immersive a virtual experience is, it's useless without interaction. This section will walk you through basic interaction models, hand and motion controllers, using voice input, and gathering eye tracking data from your users. By the end of this section you'll be ready to tackle the last big topic on your design journey: user experience.



4. User experience elements

Now that you've mastered basic interactions, you can focus on the finer points of user experience elements and how to adapt them for Mixed Reality's unique environments. You'll cover common behaviors, asset design, object scaling, and typography, all with an eye on making your apps as intuitive for users as possible. This section marks the end of the official Mixed Reality design journey, but there are more resources in the [What's next?](#) section to keep you going.

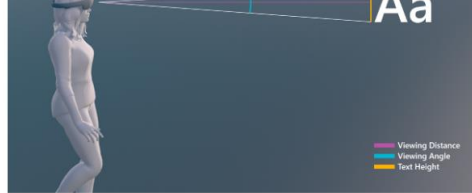


Concept	Outcome
Common controls and behaviors	Learn about frequently used spatial interactions and UI building blocks
Color, light and materials	Design quality assets for Mixed Reality that take color, lighting, and materials into account
Object scale	Incorporate as many real-world visual cues as possible to us help your users understand where objects are, how big they are, and what they're made of
Typography	Use clear, readable text in three-dimensional space to give your users the important information they need

What's next?

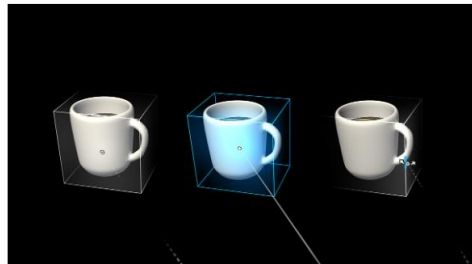
A designers job is never done, especially when learning to create immersive experiences in a new

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 - > Controls and behaviors
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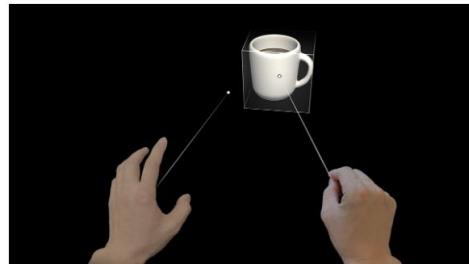


Typography

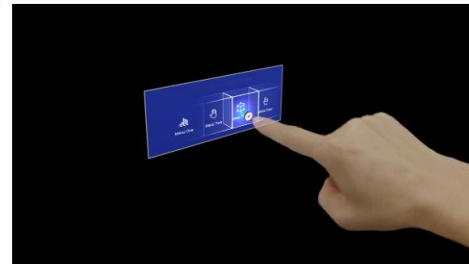
Controls and behaviors



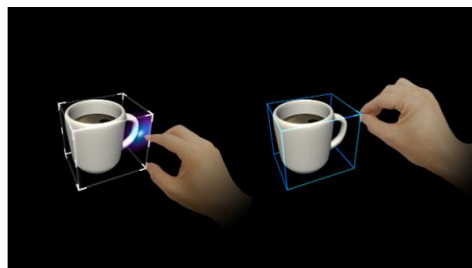
Cursor



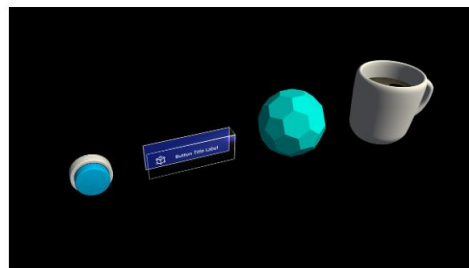
Hand ray



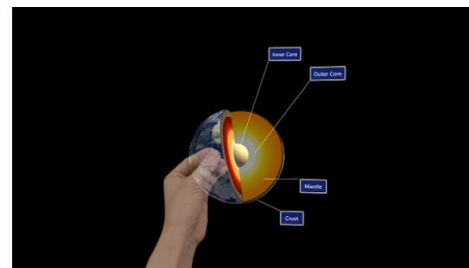
Button



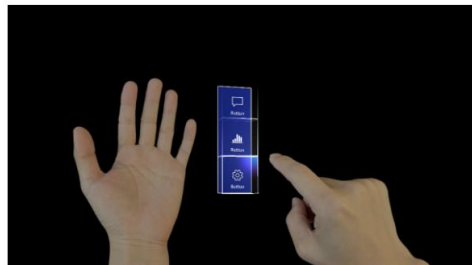
Bounding box



Interactable object



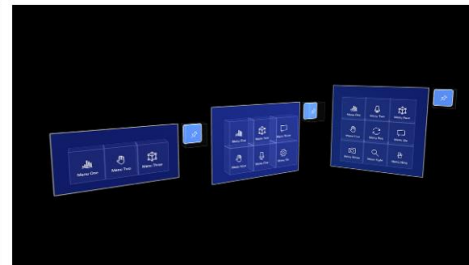
Manipulation



Hand menu



Near menu



Object collection

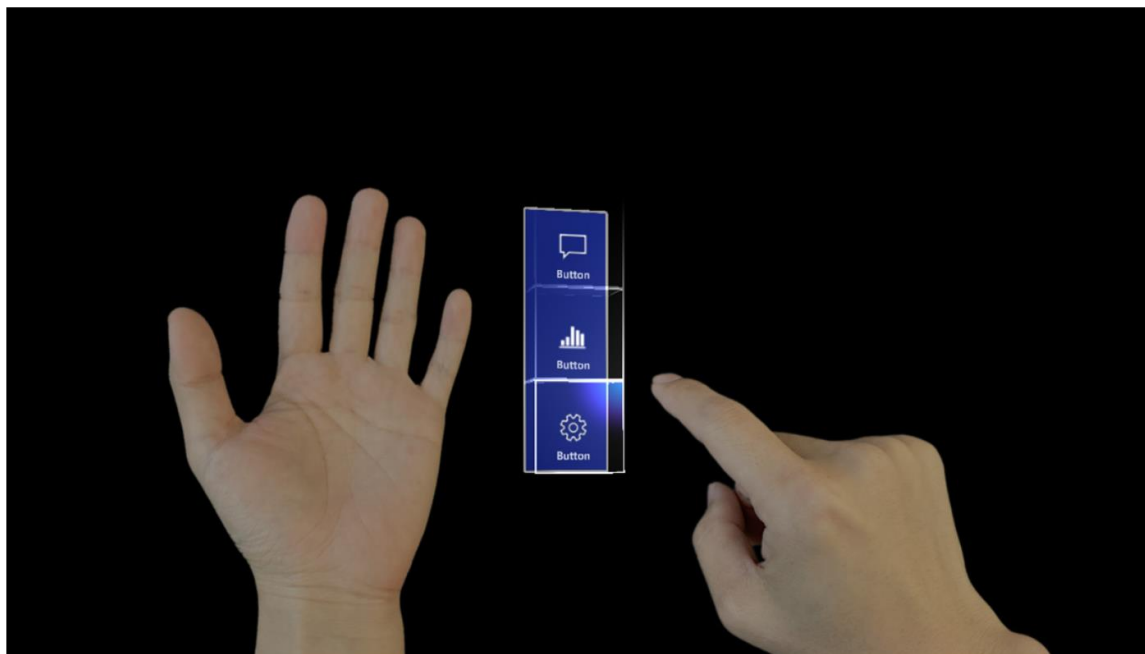
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 - Interactable object

Hand menu

08/26/2019 • 4 minutes to read • +1



Hand menus allow users to quickly bring up hand-attached UI for frequently used functions.

Below are the best practices we have found for hand menus. You can also find an example scene demonstrating the hand menu in [MRTK](#).

Behavior best practices

A. Keep the number of buttons small: Due to the close distance between a hand-locked menu and the eyes and also the user's tendency to focus on a relatively small visual area at any time (the attentional cone of vision is roughly 10 degrees), we recommend keeping the number of buttons small. Based on our exploration, one column with three buttons work well by keeping all the content within the field of view (FOV) even when users move their hands to the center of the FOV.

B. Utilize hand menu for quick action: Raising an arm and maintaining the position could easily cause arm fatigue. Use a hand-locked method for the menu requiring a short interaction. If your menu is complex and requires extended interaction times, consider using world-locked or body-locked instead.

C. Button / Panel angle: Menus should billboard towards the opposite shoulder and middle of the head. This allows a natural hand

Is this page helpful?

Yes No

In this article

Behavior best practices

[Hand menu placement best practices](#)

[Menu positions that are not recommended](#)

[Hand menu in MRTK\(Mixed Reality Toolkit\) for Unity](#)

[See also](#)

Mixed Reality Documentation

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- > Develop
- > Distribute

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 - > Interaction models
 - ▼ UX elements
 - Overview
 - > Style
 - ▼ Controls and behaviors
 - Cursors
 - Hand ray
 - Button
 - Interactable object
 - Bounding box and App bar
 - Manipulation
 - Hand menu**

HoloLens 2 cameras identify hands accurately when they are separate from each other. Any overlapping hands can cause hand menus move away from the anchor location.

Is this page helpful?

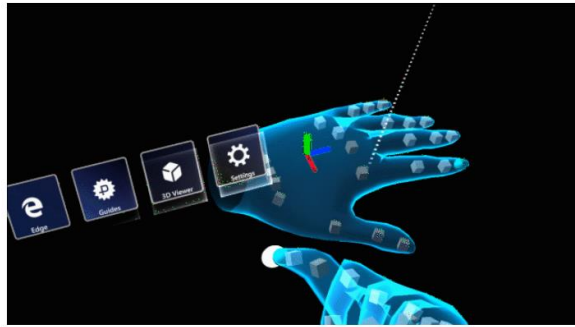
Yes No

In this article

- Behavior best practices
- Hand menu placement best practices**
- Menu positions that are not recommended
- Hand menu in MRTK(Mixed Reality Toolkit) for Unity
- See also

Menu positions that are not recommended

We have done user research with different menus layouts and locations, the following menu locations are **NOT recommended**, find the cons of each study below:



Above the arm

- 1 - Difficult to maintain good hand tracking
- 2 - Causes user fatigue due to unnatural position



Above fingers

- 1 - Hand fatigue due to holding hand for long time
- 2 - Hand tracking issues on index and middle finger



Above-center palm

- 1 - Hand tracking issues due to overlapping hands
- 2 - Hand fatigue due to holding hands for long time in order to interact with menus



Top fingertip

- 1 - Hand tracking issues
- 2 - Hand fatigue holding hand above normal posture
- 3 - Issues pressing buttons with other fingers by accident due to limited space between fingers

Mixed Reality Documentation

➔ Design

<http://aka.ms/MRDocs>



Mixed Reality Dev Days 2020 Session Videos

MRTK's UX Building Blocks

Microsoft | Docs | Documentation | Learn | Q&A | Code Samples

Mixed Reality | Products | Developers | IT Pros | VR Enthusiasts | Support


Docs / Windows / Mixed Reality / What's new / Programs and events / Mixed Reality Dev Days / Session recordings

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 - Programs and events
 - Mixed Reality Speaker Series
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 - Mixed Reality Dev Days
 - Session recordings**
 - Current Mixed Reality release notes
 - Community resources
 - Contributing to this documentation
 - Deploying HoloLens at scale

Session details and recordings

02/21/2020 • 6 minutes to read



Session Title	Speaker	Description
Opening Keynote	Alex Kipman	Alex Kipman starts our first ever virtual Mixed Reality Dev Days event.
Intro to Azure Mixed Reality Services: Azure Remote Rendering	Jonathan Lyons, Christopher Manthei, and Marc Appelsmeier	Azure Remote Rendering just entered public preview. Learn how you can use ARR to render interactive 3D models with hundreds of millions of polygons and stream them to devices like HoloLens 2 in real-time.
Intro to Unreal + MRTK for HoloLens 2	Summer Wu & Luis Valverde	Unreal Engine support for HoloLens 2 reached production-ready status with the release of UE 4.25 in May! Alongside UE 4.25, in response to the top ask we've been hearing from developers since Unreal's HoloLens support first shipped in preview, our team released the first component of the Mixed Reality Toolkit for Unreal: UX Tools 0.8. In this talk, we'll provide an overview of the features provided in Unreal Engine 4 and MRTK for Unreal, and how to use them to build epic experiences for HoloLens 2.
Getting started with the HoloLens 2 and Unity	Dan Miller - Unity	Learn the basics of setting up Unity and building for the HoloLens 2. This presentation will cover best practices, basic features of the HoloLens 2 and how to quickly add hand tracking support and interactivity with native Unity APIs
Intro to Azure Mixed Reality Services: Azure Spatial Anchors	Archana Iyer & Vicente Rivera	An overview of Azure Spatial Anchors (ASA) and relevant scenarios. This talk will go over new capabilities developed in the past year, with code samples on how to use them. We will go over best practices while building with ASA and how you can start integrating it into your products.
Intro to MRTK-Unity	Catherine Diaz	The introduction to MRTK session will be a tutorial on how to create a simple MRTK app from start to finish. This talk will go over interaction concepts and show MRTK's multi-platform capabilities.
Learnings from the MR	Lars Simkins	Join the engineers behind the MRDL Surfaces app for HoloLens 2 as they talk about the app's design story and technical highlights.

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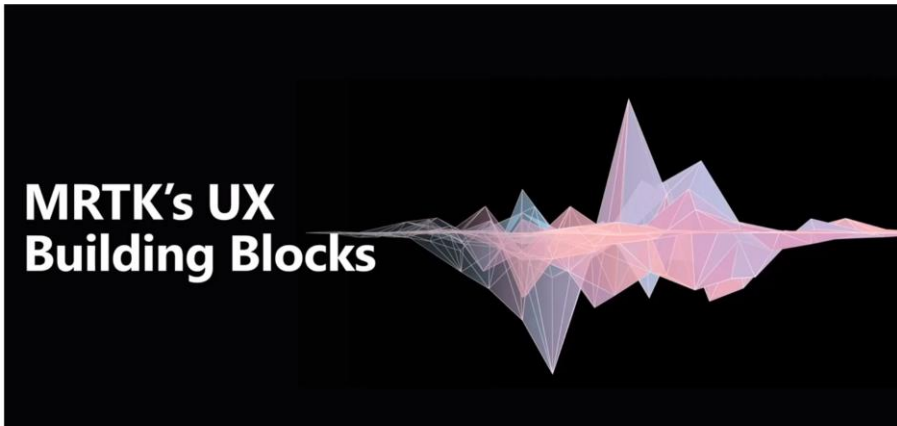
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May 25, 2020 at 9:06AM by Jesse McCulloch - Mixed Reality

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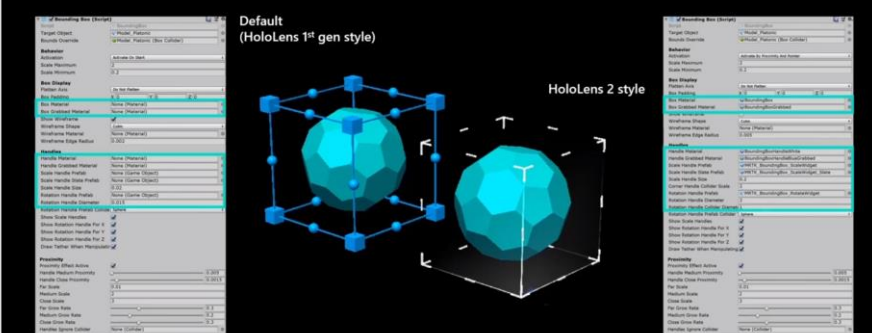


00:00 / 47:00

Description Embed Download

Deep dive on the MRTK's UX components that

How to use Bounding Box



Default (HoloLens 1st gen style)

HoloLens 2 style

25:16 / 21:44

YouTube – MRTK's UX Building Blocks

MRTK's UX Building Blocks

The image displays a composite view of the Global XR Bootcamp website and its YouTube channel. On the left, the website features the event logo, dates (November 13-14th 2020), and a 'Next Upcoming Event' countdown for the 'Global XR Bootcamp 2020 Kick-off' on November 13th. The main content area describes the event as a 24-hour live stream of high-quality sessions by global speakers, covering topics like virtual reality, augmented reality, and mixed reality. A sidebar on the left lists navigation options like 'Home', 'Community Leaders', and 'Online agenda & info'. On the right, the YouTube channel page is shown, featuring a video player for 'Global XR Bootcamp 2020 Opening & welcome' and a list of 9 videos, including 'From 2D to 3D: UI design for WebXR', 'Reimagining Tourism through Virtual Reality', and 'Smartglasses as a Store: how the next e-commerce clicks will be on bricks'. The YouTube interface includes a search bar, navigation menu, and a list of subscribers.

Thank you!

See you in Mixed Reality

 @cre8ivepark

 Yoon Park

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