

Women
Who
Code

May 8,
2018

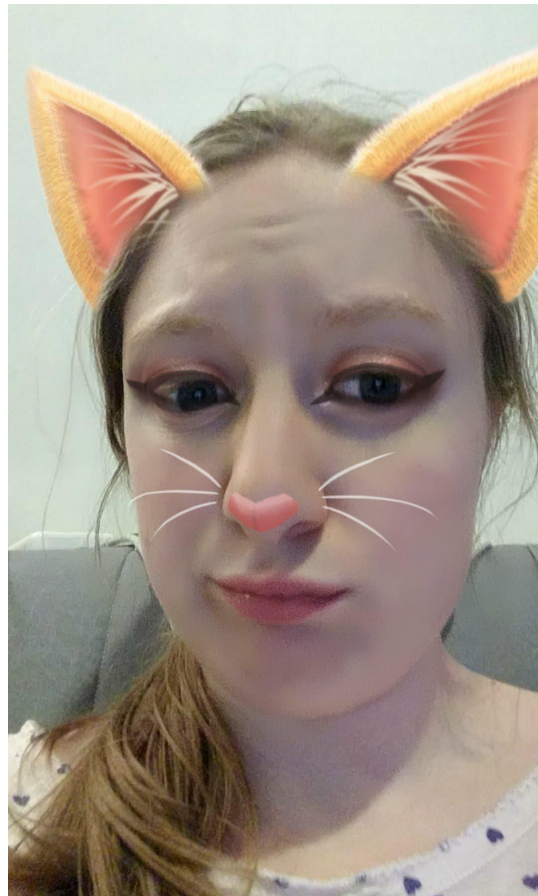
CBRE
Build
NYC

Intro to AR

With Unity & Vuforia

Presenter: Sophia van Valkenburg

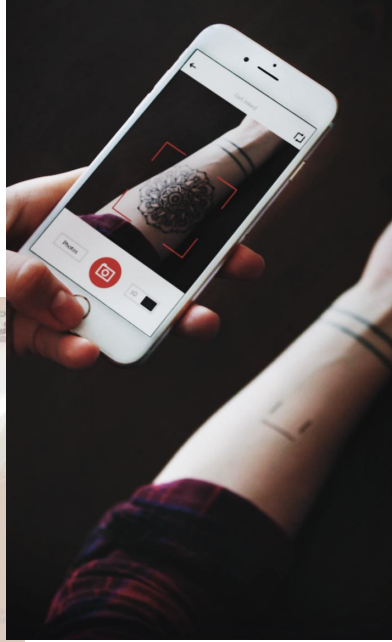
About me



About CBRE Build



Augmented Reality (AR)



What's in this talk?

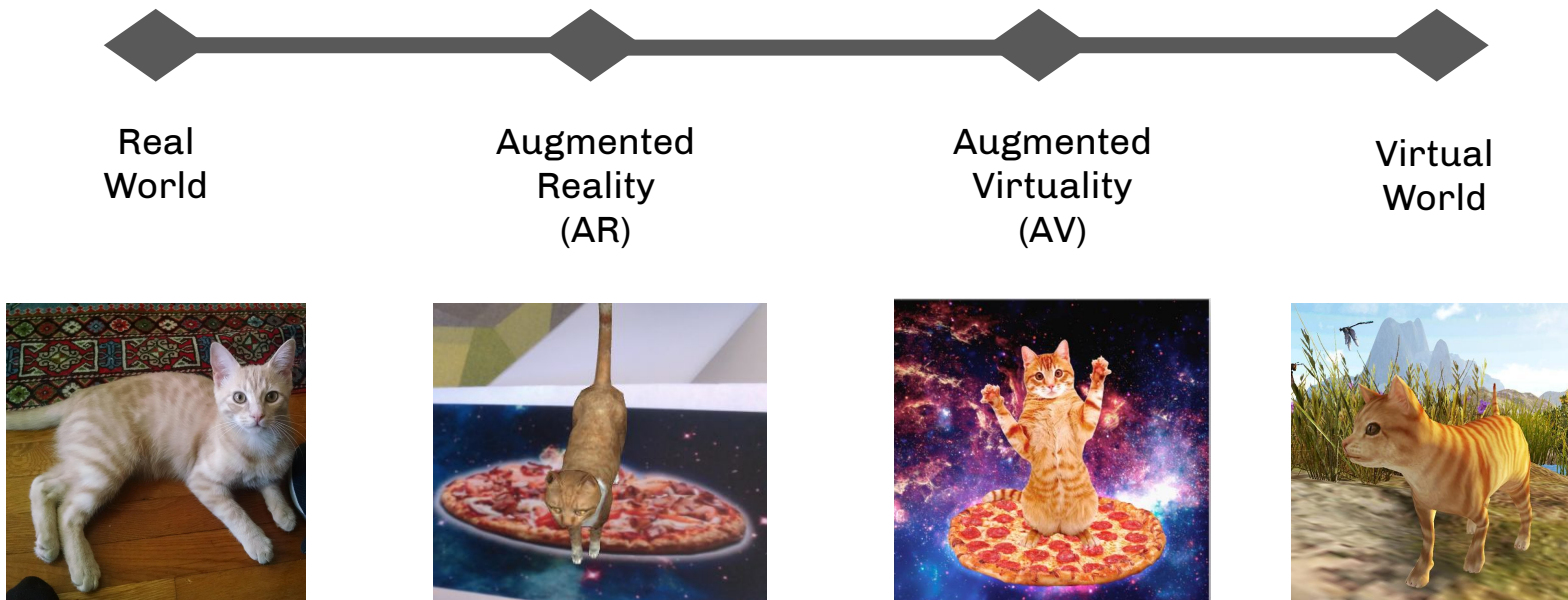
1. Overview of Augmented Reality (AR)
2. Introduce AR Frameworks & Why I chose Vuforia
3. Introduce Unity game engine
4. Show how to set up a basic Vuforia app

“Augment”:
To add or enhance



Credit: Genesis Augmented

The Mixed Reality Spectrum



JoJo the Cat, honorary CBRE Build employee

AR: Some Context

- 1901: First mention of AR in “The Master Key” by L. Frank Baum
- 1968: “Sword of Damocles” First VR head-mounted system
- 1990: “Augmented Reality” term coined
- 1992: “Virtual Fixtures” First AR system
- 2000s: computer graphics & computer vision improves, smartphones become ubiquitous
- 2014: Google glass, wearable AR
- 2015: Snapchat releases Lens feature
- 2016: Pokemon Go released, AR/VR investment > \$1 Billion
- 2017: ARKit & Google ARCore announced



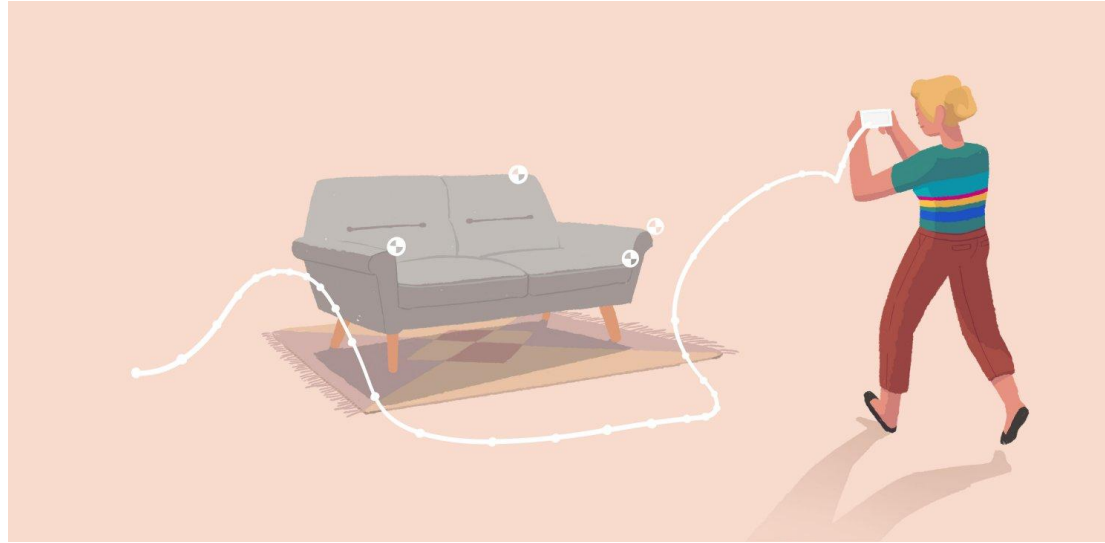
Our Future??



“Hyper Reality”
Concept film by
Keiichi Matsuda

AR: Some Features

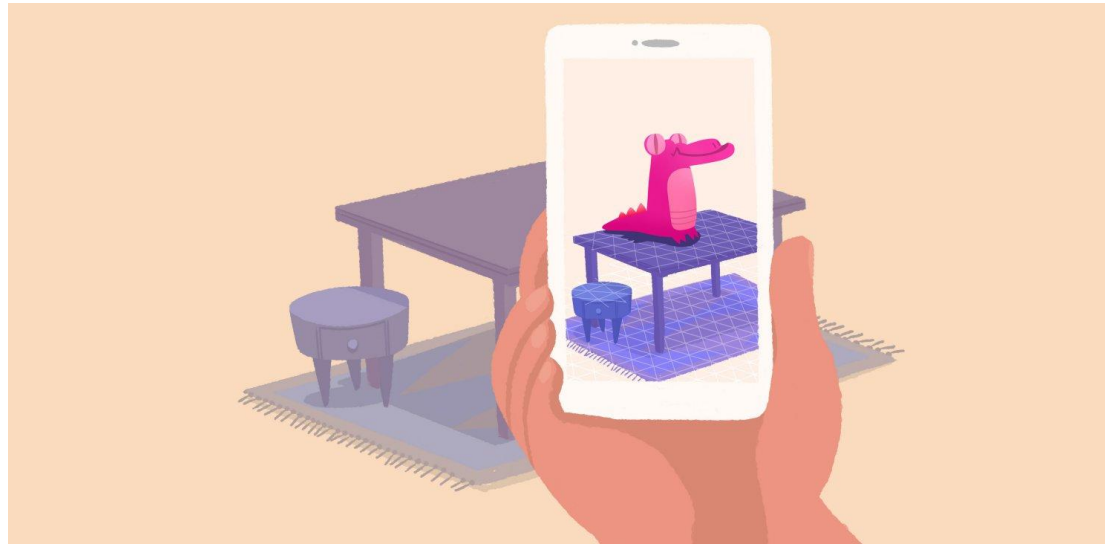
★ Motion/Camera Tracking



Credit: Google

AR: Some Features

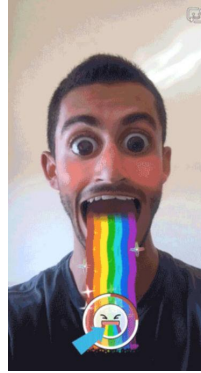
- ★ Motion/Camera Tracking
- ★ Environmental Understanding



Credit: Google

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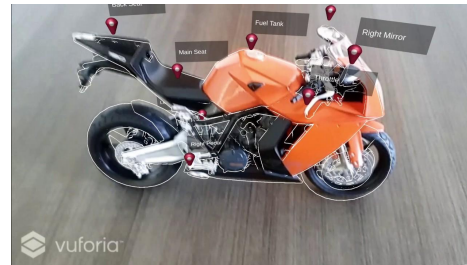
- ★ Motion/Camera Tracking
- ★ Environmental Understanding



Face Detection



Plane Detection



Object Recognition

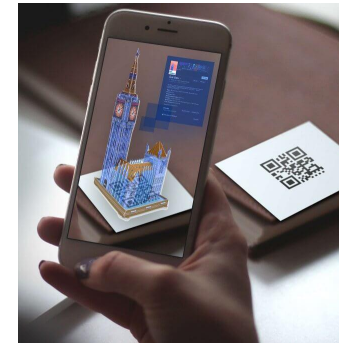
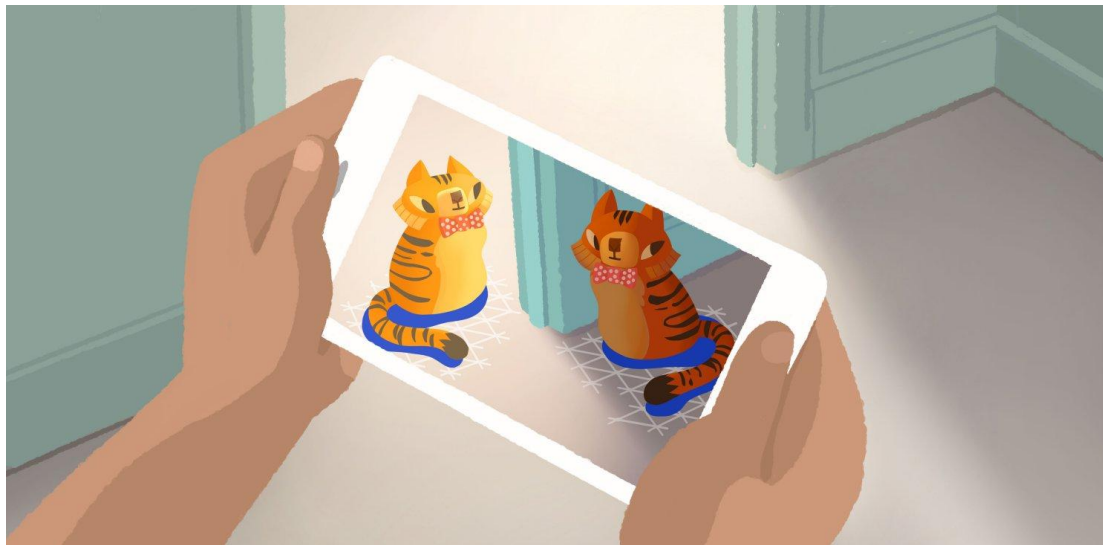


Image Recognition

AR: Some Features

- ★ Motion/Camera Tracking
- ★ Environmental Understanding
- ★ Light Estimation

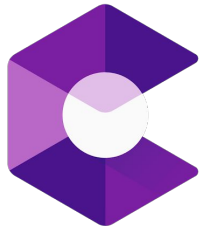


Credit: Google

AR: Some Frameworks

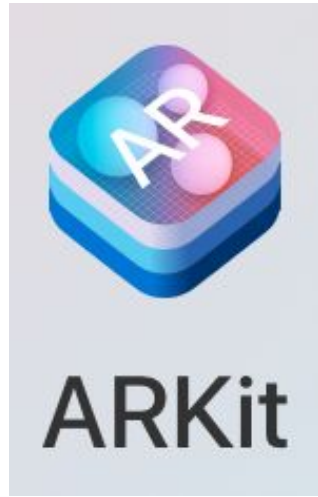


AR: Some Frameworks

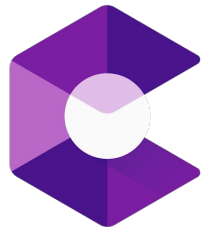
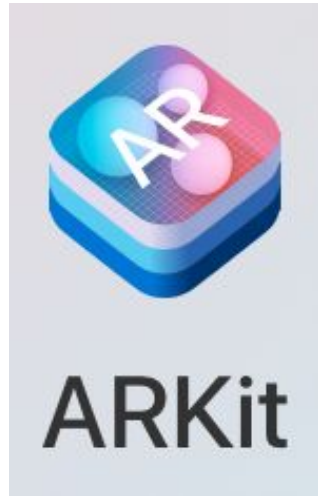


ARCore

AR: Some Frameworks



AR: Some Frameworks

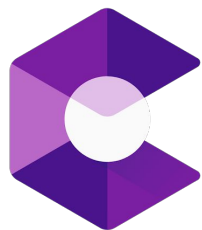
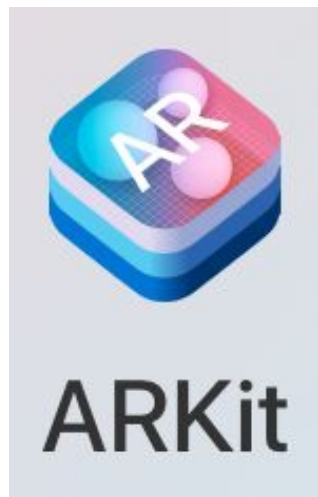


ARCore

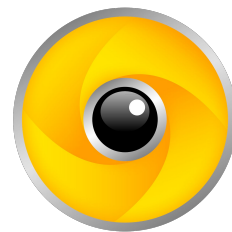
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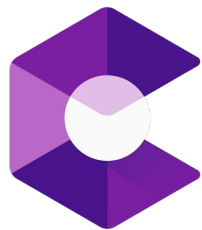


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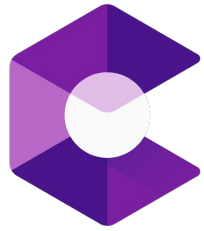
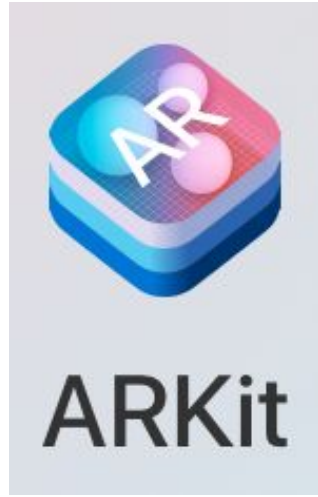
wikitude

EasyAR
DeepAR



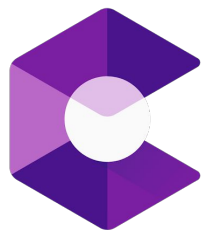
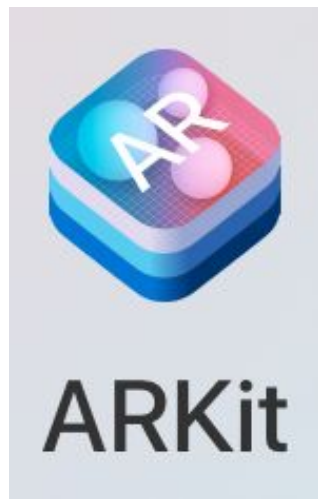
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AR: Some Frameworks



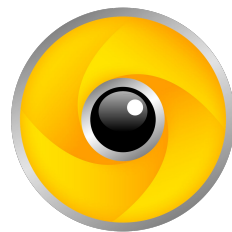
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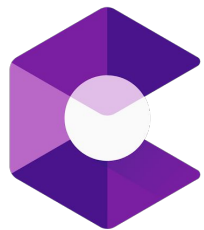


ARCore

AR Frameworks



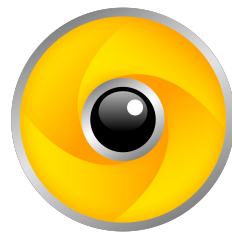
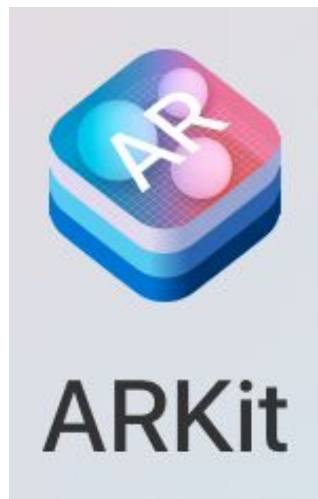
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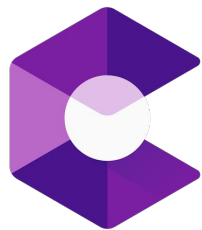
ARCore



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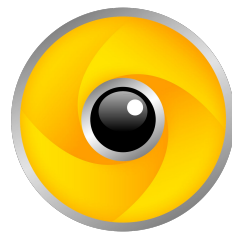
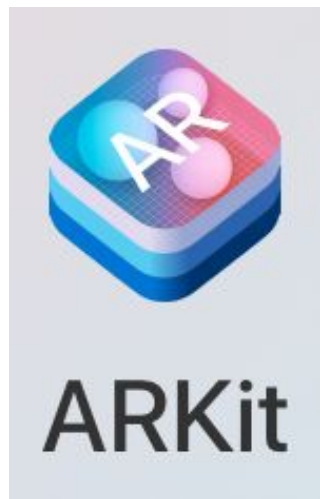
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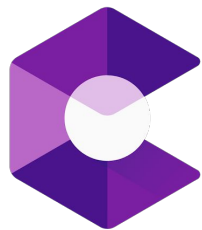
ARCore



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wikitude



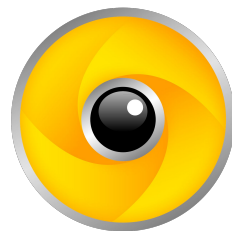
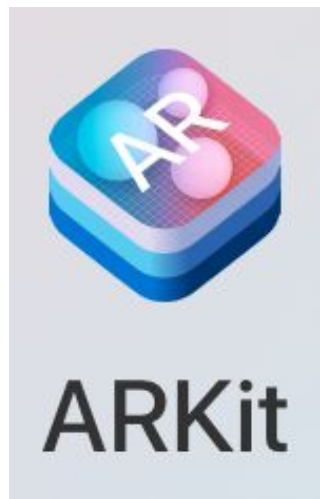
ARCore



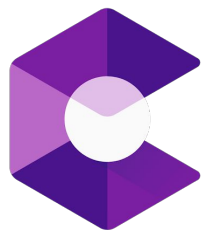
MEDIA



AR: Some Frameworks



wikitude



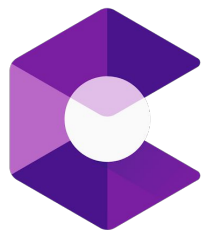
ARCore



MEDIA



AR: Some Frameworks



MEDIA



ARCore

vs



vuforia™

vs



- Powerful
- Difficult to set up
- Android-only



ARCore

vs



vuforia™

vs



→ Powerful

→ Difficult to set up

→ Android-only

→ Lots of features

→ Easy to set up

→ Android, iOS, Windows



ARCore

vs



vuforia™

vs



ARstudio

→ Powerful

→ Difficult to set up

→ Android-only

→ Lots of features

→ Easy to set up

→ Android, iOS, Windows

→ Create your own
Facebook lenses

→ Focus on
art/modeling



vuforia™

★ Object Recognition



★ Object Recognition



Model
Target



Multi
Target



Cylinder
Target



Object
Target



★ Object Recognition



Model
Target



Multi
Target



Cylinder
Target



Object
Target

★ Image Recognition



★ Object Recognition



Model
Target



Multi
Target



Cylinder
Target



Object
Target

★ Image Recognition



Image
Target



VuMark



★ Object Recognition



Model
Target



Multi
Target



Cylinder
Target



Object
Target

★ Image Recognition



Image
Target



VuMark

★ Plane Detection



★ Object Recognition



Model
Target



Multi
Target



Cylinder
Target



Object
Target

★ Image Recognition



Image
Target



VuMark

★ Plane Detection

★ No Face Detection or Light Estimation, but that's OK



★ Object Recognition



Model
Target



Multi
Target



Cylinder
Target



Object
Target

★ Image Recognition



Image
Target



VuMark

★ Plane Detection

★ No Face Detection or Light Estimation, but that's OK

★ Integrated with Unity game engine



- ★ 2D and 3D game development platform



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- ★ Deploys to mobile, desktop, console, web, etc



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- ★ ~~C# and Javascript~~

2017 [edit]

- *Aaero*
- *Albion Online*
- *Animal Crossing: Pocket Camp*
- *Bendy and the Ink Machine*
- *Club Penguin Island*
- *Cuphead*
- *Double Dragon IV*
- *Dream Daddy: A Dad Dating Simulator*
- *Endless Space 2*
- *Escape from Tarkov*
- *Everything*
- *FAR: Lone Sails*
- *Flip Wars*
- *Getting Over It with Bennett Foddy*
- *Gwent: The Witcher Card Game*
- *Heavy Metal Machines*
- *Hiveswap*
- *Hollow Knight*
- *Life is Strange: Before the Storm*
- *Monument Valley 2*
- *NASCAR Heat 2*

- *Night in the Woods*
- *Osiris: New Dawn*
- *Outcast: Second Contact*
- *Oxygen Not Included*
- *P.A.M.E.L.A.*
- *Praey for the Gods*
- *Snipperclips*
- *Strafe*
- *Sudden Strike 4*
- *Super Bomberman R*
- *Syberia 3*
- *Syndrome*
- *Torment: Tides of Numenera*
- *Tannenberg*
- *VRChat*
- *WarFriends*
- *West of Loathing*
- *White Day: A Labyrinth Named School*
- *Yooka-Laylee*



unity

Demo: Chatty Cat

“Treasure Hunt” style game that uses:

- ★ Marker-based AR
- ★ Mouse / Touch Interaction
- ★ Dialog Panel



sophia.vanvalkenburg@cbre.com