State of AR

Phil Lelyveld

University of Southern California

Entertainment Technology Center

USC School of Cinematic Arts

etc SM | ENTERTAINMENT TECHNOLOGY CENTER

Founded 1993 by George Lucas to bring together technology and entertainment visionaries to collaborate on the future of entertainment technology

Adamantly neutral

- Discussions
- Collaborations
- Research
- Coverage

Current Member Companies

The basics

Commercial Definition

VR – Blocks out world

AR – see-thru overlay

In Augmented Reality, the world that you would normally see if you walked down the aisle without the screen is being augmented – enhanced, supplemented, added to - with additional data and experiences.

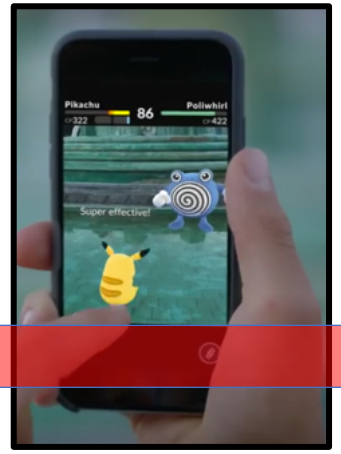
In Virtual Reality you are virtually – nearly, almost – but not really there in the grocery store aisle.

The AR – Reality – VR Continuum

Augmented Reality

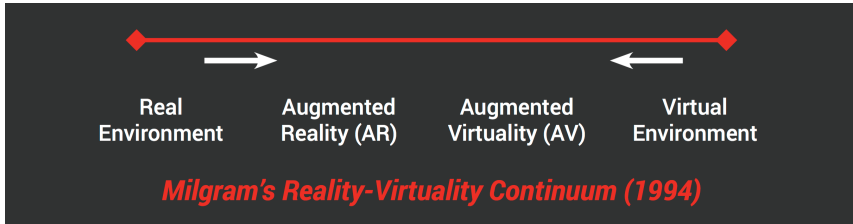
Reality

Virtual Reality



Transitional
Mixed Reality
Blended Reality

PLelyveld@ETCenter.org



Occipital Bridge – iPhone-based VR/AR with position tracking and depth sensing

Visual Layer of AR

Augmented Reality platforms

Weak AR

Strong AR

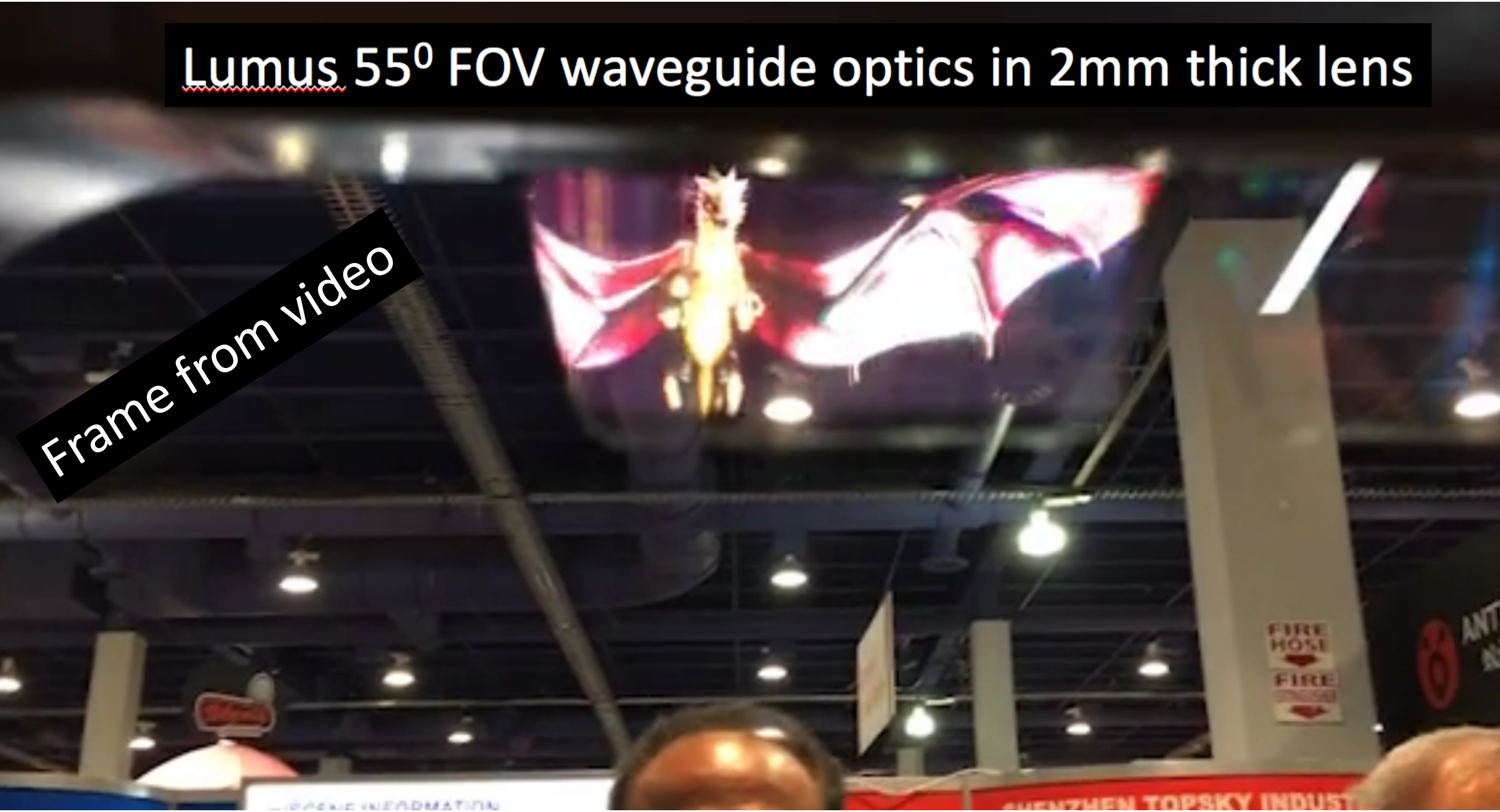
Source: Mark Billinghurst, Intro to AR lecture

AR glasses will soon be traditionally stylish

Vuzix Blade 3000 smart AR glasses

ODG R-9 smart AR glasses

Lumus 55^0 FOV waveguide optics in 2mm thick lens



Audio

Ascendance of Sound
Spatial Audio

Sound grounds us in the experience

It will be critically important as we get thrown into a 3D world

Spatial audio supports the illusion of reality in AR

Smarter Audio is coming

Nuheara IQbuds by Nuheara

"layered listening, directional hearing and smart noise filters."

Here One, by Doppler Labs

- Advanced speech amplification
- Dynamic noise control
- Blended worlds

User Experience

User Interface Design

Sense of **Presence**

Heightened Sense of **Empathy**

Agency

AR Presence
Plausibility Illusion

Agency
Interactions feel natural

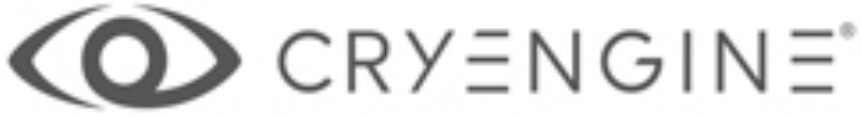
How do you make a cup of tea?

- Water in cup then tea
- Tea bag in cup then water
- Tea bag in tea pot then boil
- ….

If the world makes you guess how to accomplish something, then it breaks the plausibility illusion and becomes a game.

User Interface and Interactivity

Game Engines



UI design should maintain presence

User Interface Design

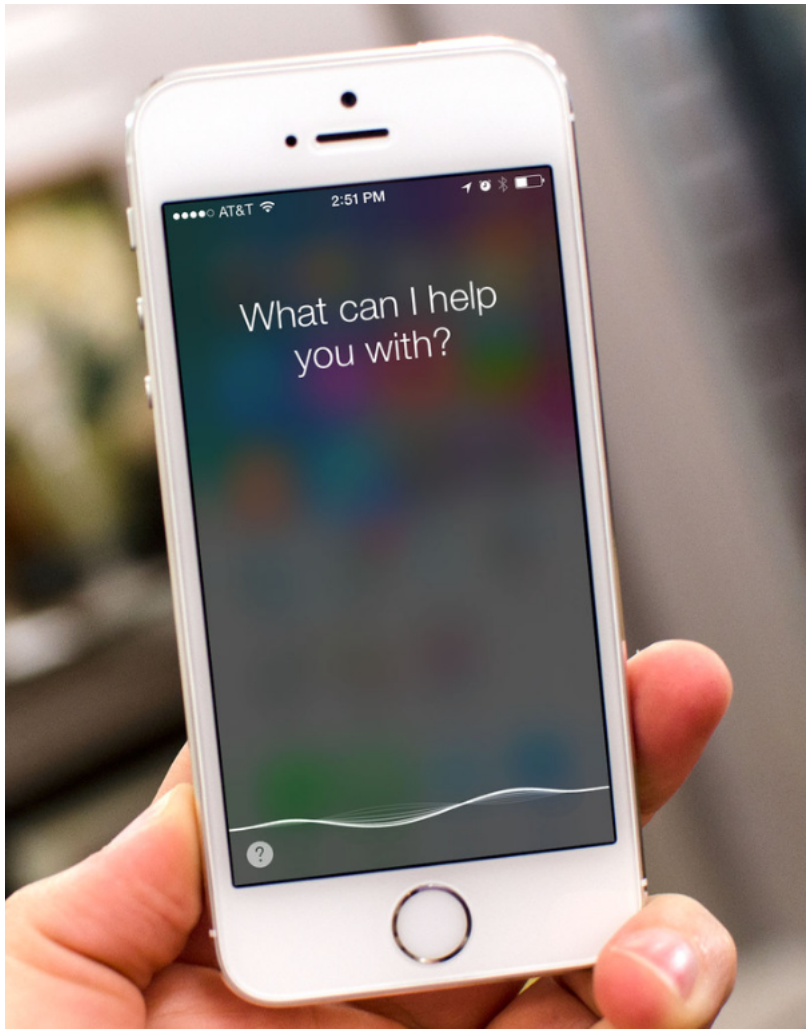
Hand Tracking

Intel RealSense

UI – Voice Recognition

Amazon
Echo (Alexa)

Google
Home



Apple
Siri

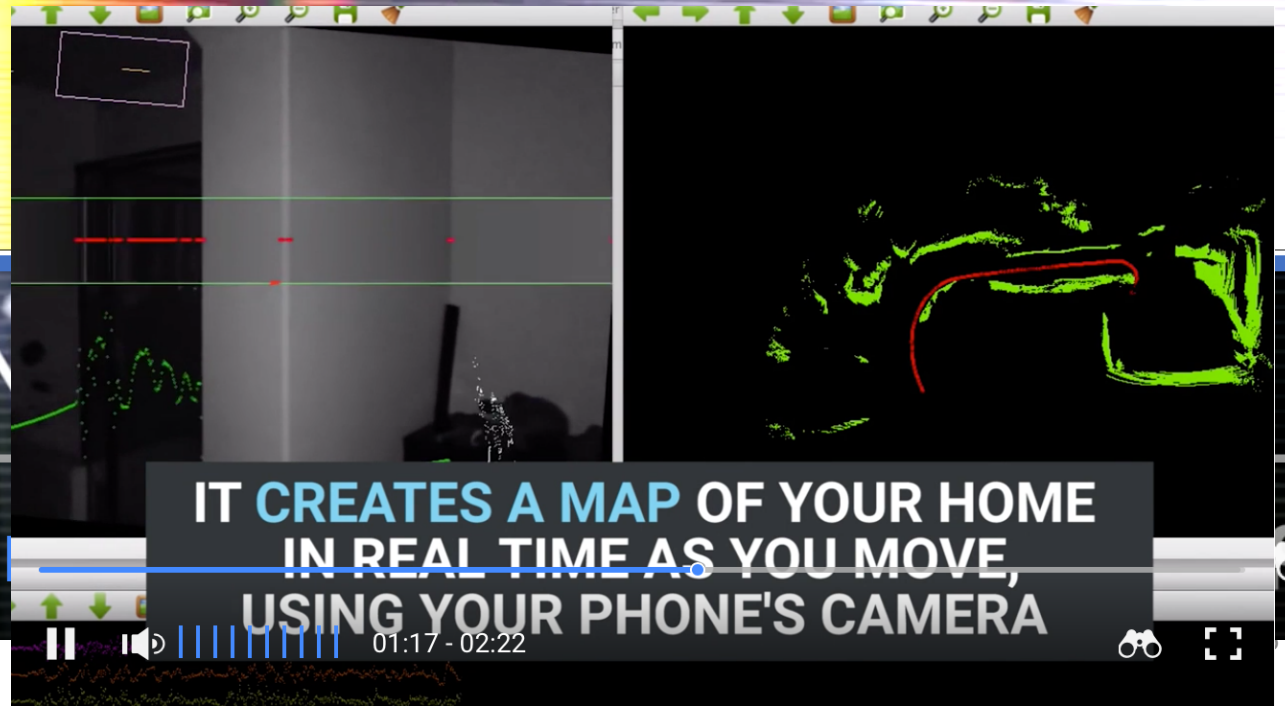
Remote Expert (Parent)

AR Storytelling

YOU ALSO HAVE TO WEAR HEADPHONES, AS SOUND IS A BIG PART OF THE EXPERIENCE

THIS IS

NIGHT TERROR



Frame from video

Mixed Reality
Spherical capture live and insert into CGI

8i

Uncorporeal

"Volumetric capture will change everything." Chris Edwards, The VR Company

Fragments

first person crime thriller

Hololens

You are the detective

Your room is the crime scene

Life-sized holographic characters are aware of your presence and interact with you

The Royal Shakespeare Company Paves Way For AR Theater

The Tempest

Social & Group AR experiences

- The soul of geo-location AR is the social experience and how it augments people's lives.
- Why can't the real world take on the qualities of a theme park? You are in the experience, moving from portal to portal.
- There is no tutorial. We encourage people to interact with each other.
- The best avatar is a real human.

Flint Dille

Creative Lead, Niantic Labs

Creator of Ingress and Pokemon

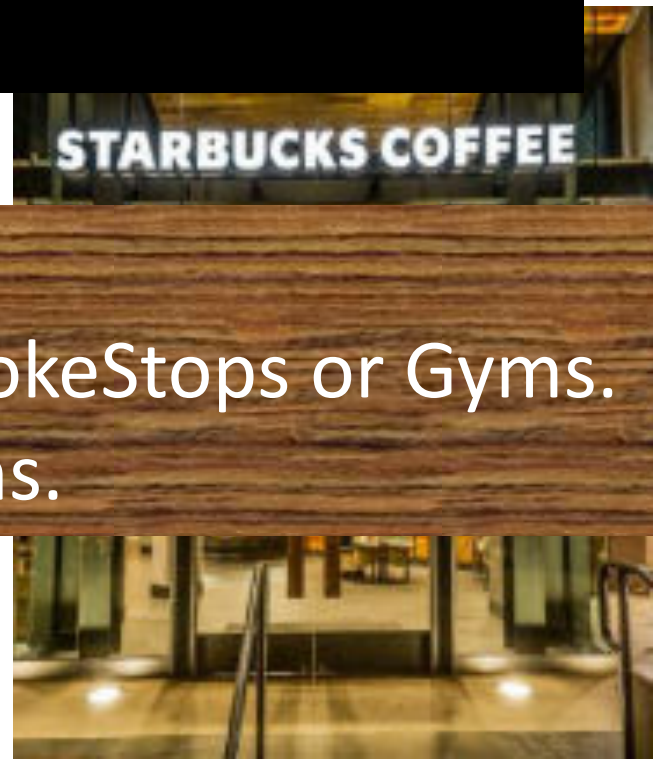
World Building

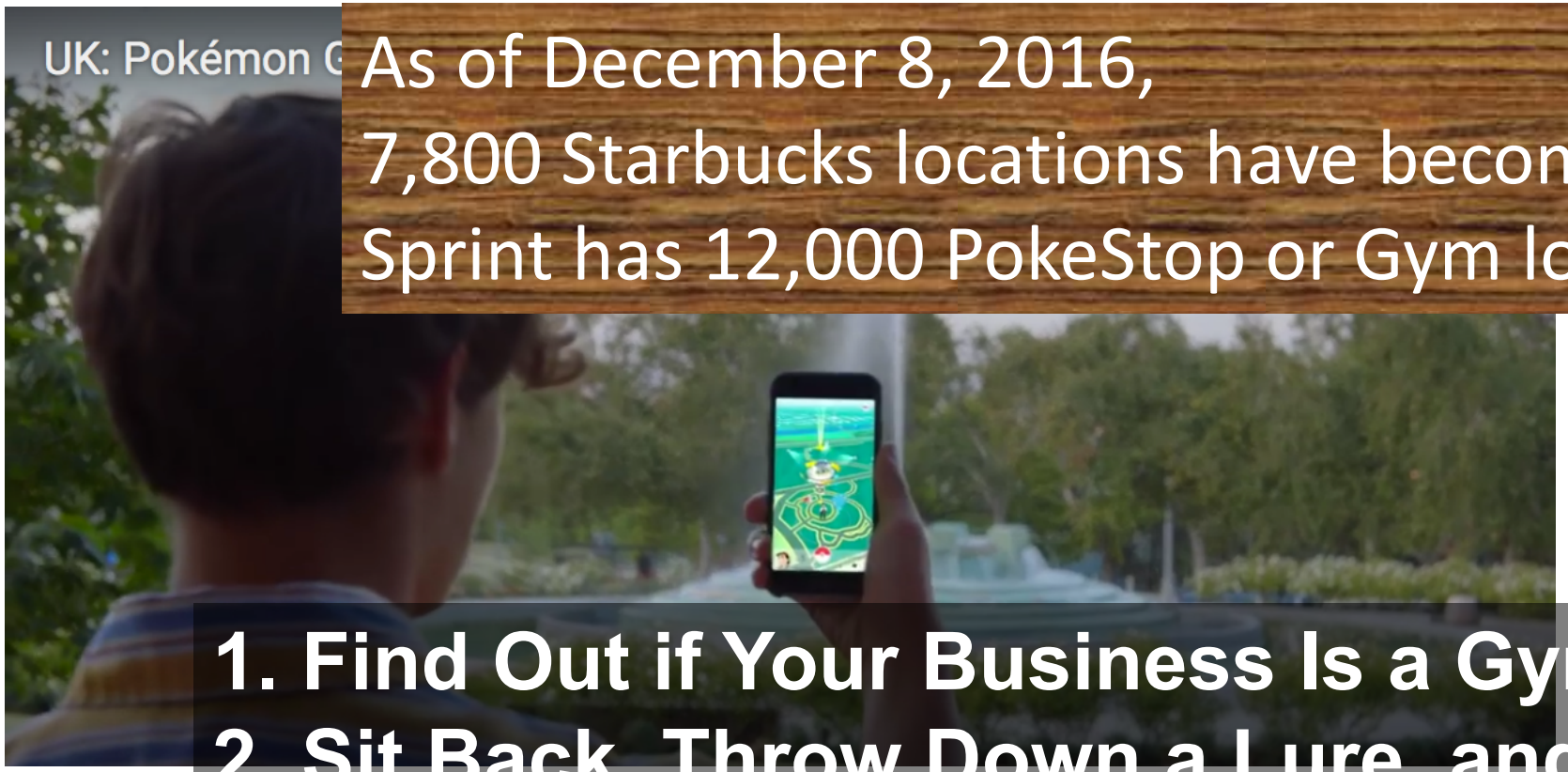
Storymaking + Engagement

- Becomes self-generating -

Tencent 腾讯

Pokemon Go Is Driving Insane Amounts of Sales at Small Local Businesses





As of December 8, 2016,
7,800 Starbucks locations have become a PokeStops or Gyms.
Sprint has 12,000 PokeStop or Gym locations.

1. **Find Out if Your Business Is a Gym or PokeStop**
2. **Sit Back, Throw Down a Lure, and Enjoy the Show**
3. **Go Where the Pokemon Roam**

Expanding the scope of “Augmented Reality”

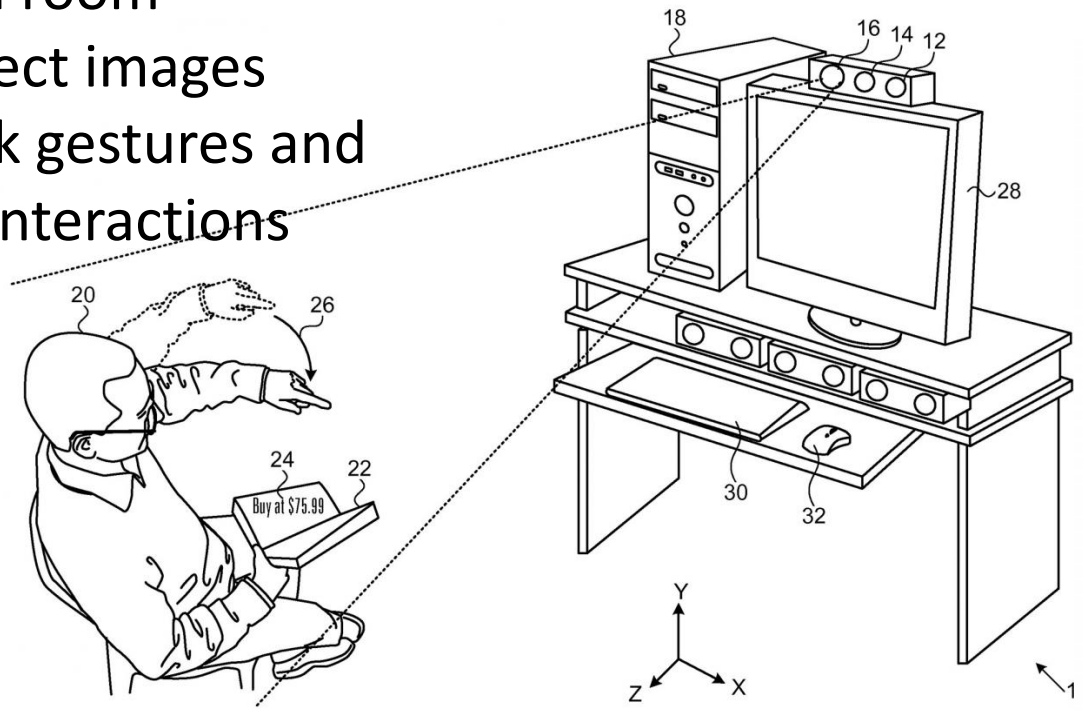
“adaptive projection”

Apple patent

Scan room

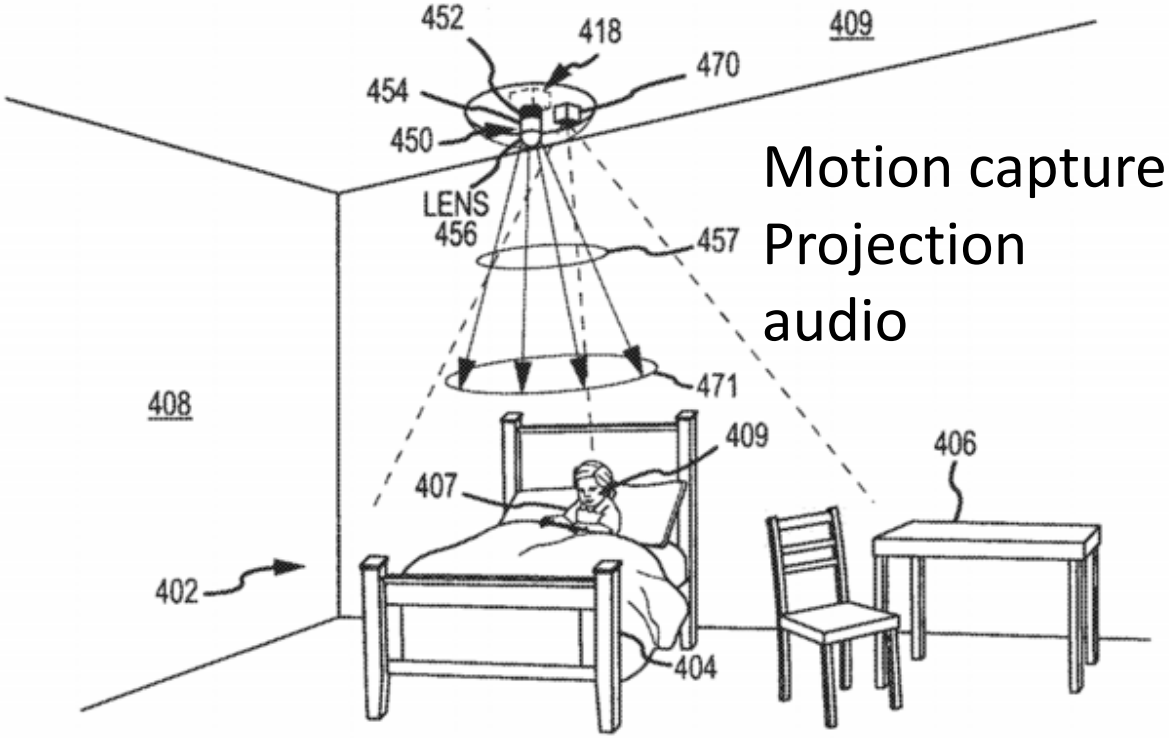
Project images

Track gestures and interactions



Hotel room interactive environment

Disney patent



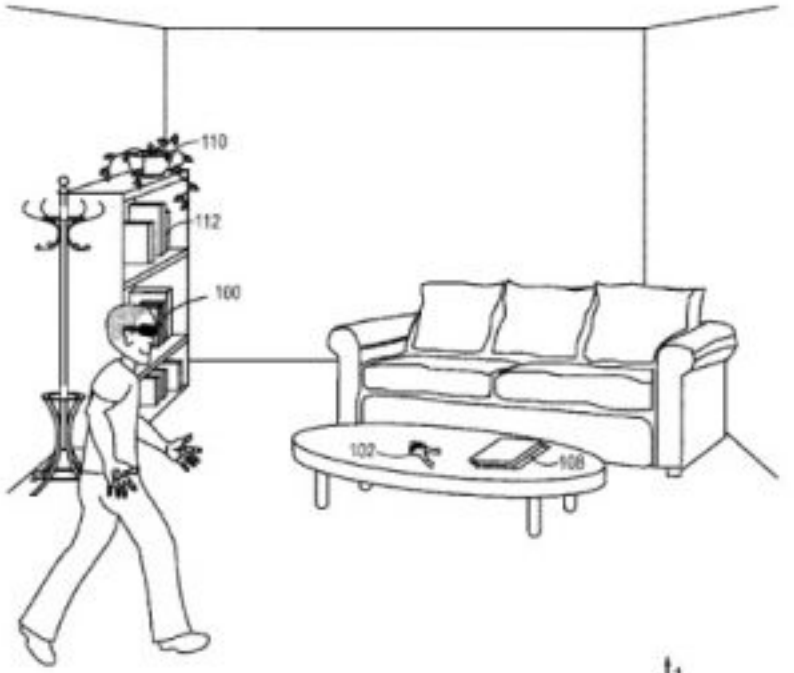
Motion capture

Projection

audio

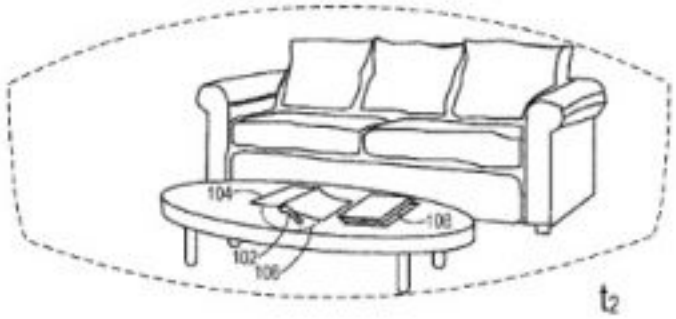
Instead of us reaching out to touch devices, devices will reach out to us to deliver experiences

AI in the cloud and low latency transport will enable lifestyle AR



Microsoft patent

HMDs that identify and track every object and its state



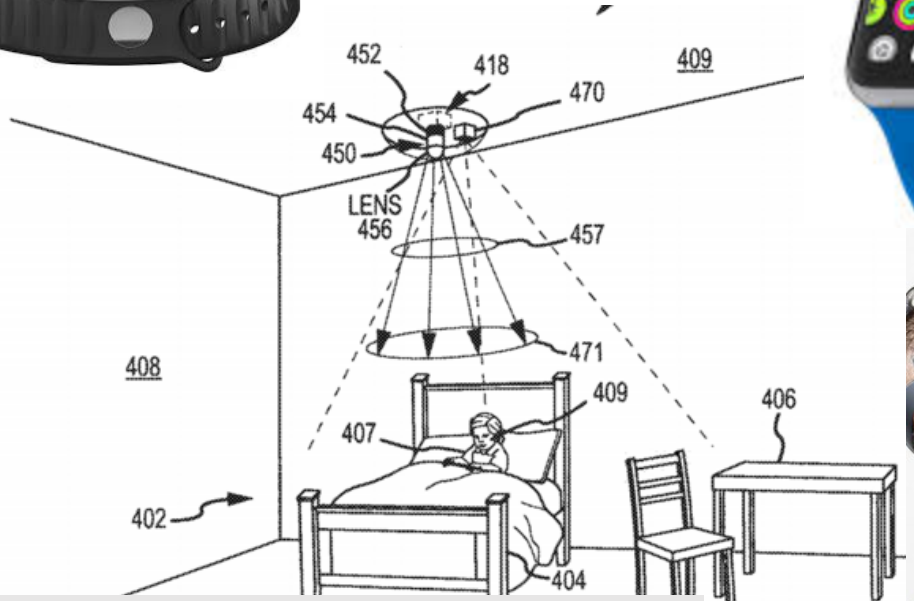
”Where did my son leave my keys?”

*Ambient delivery—continuous, always available services provided in the most convenient and unobtrusive way**

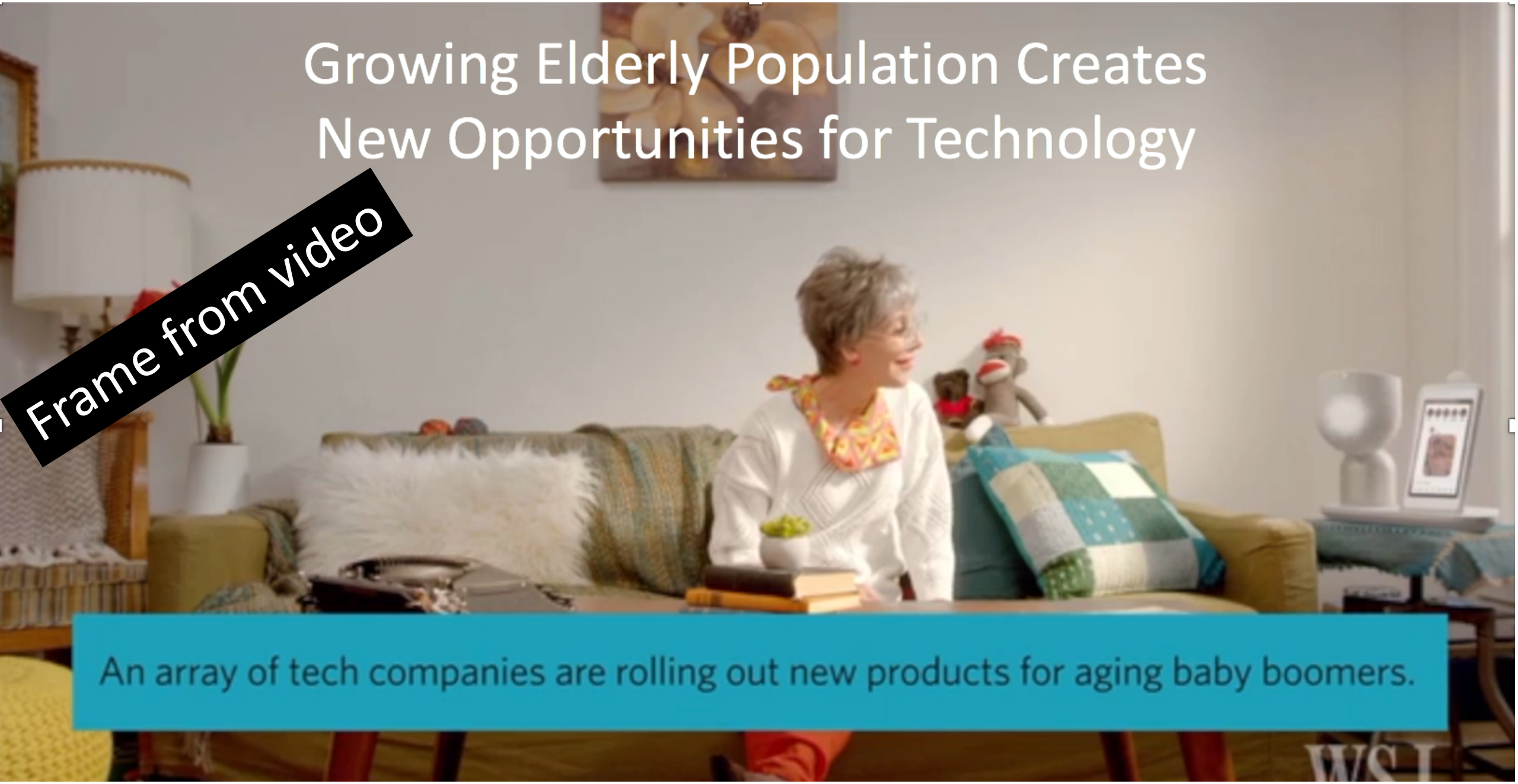
Personalized blended reality

Pervasive connectivity

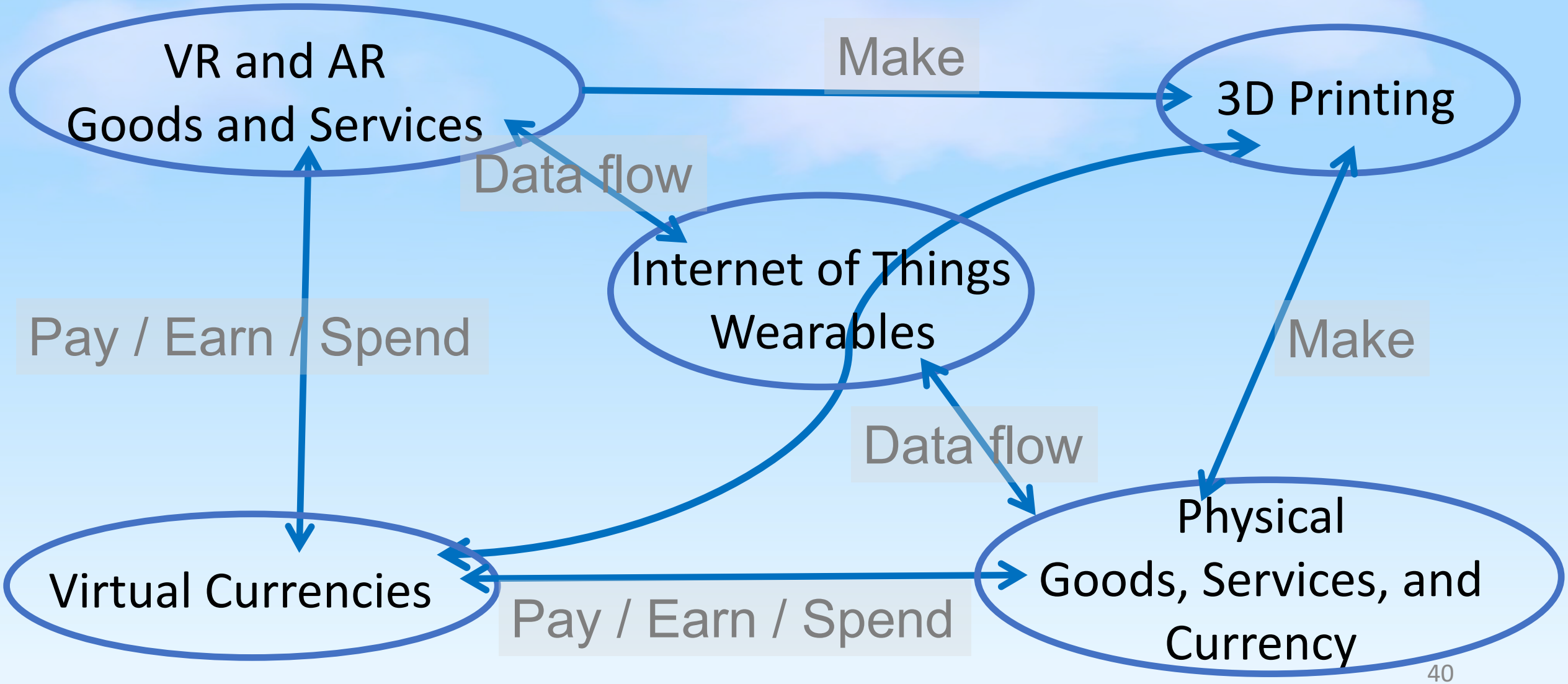
- **Mostly augmented reality**
- **Virtual reality for special cases**



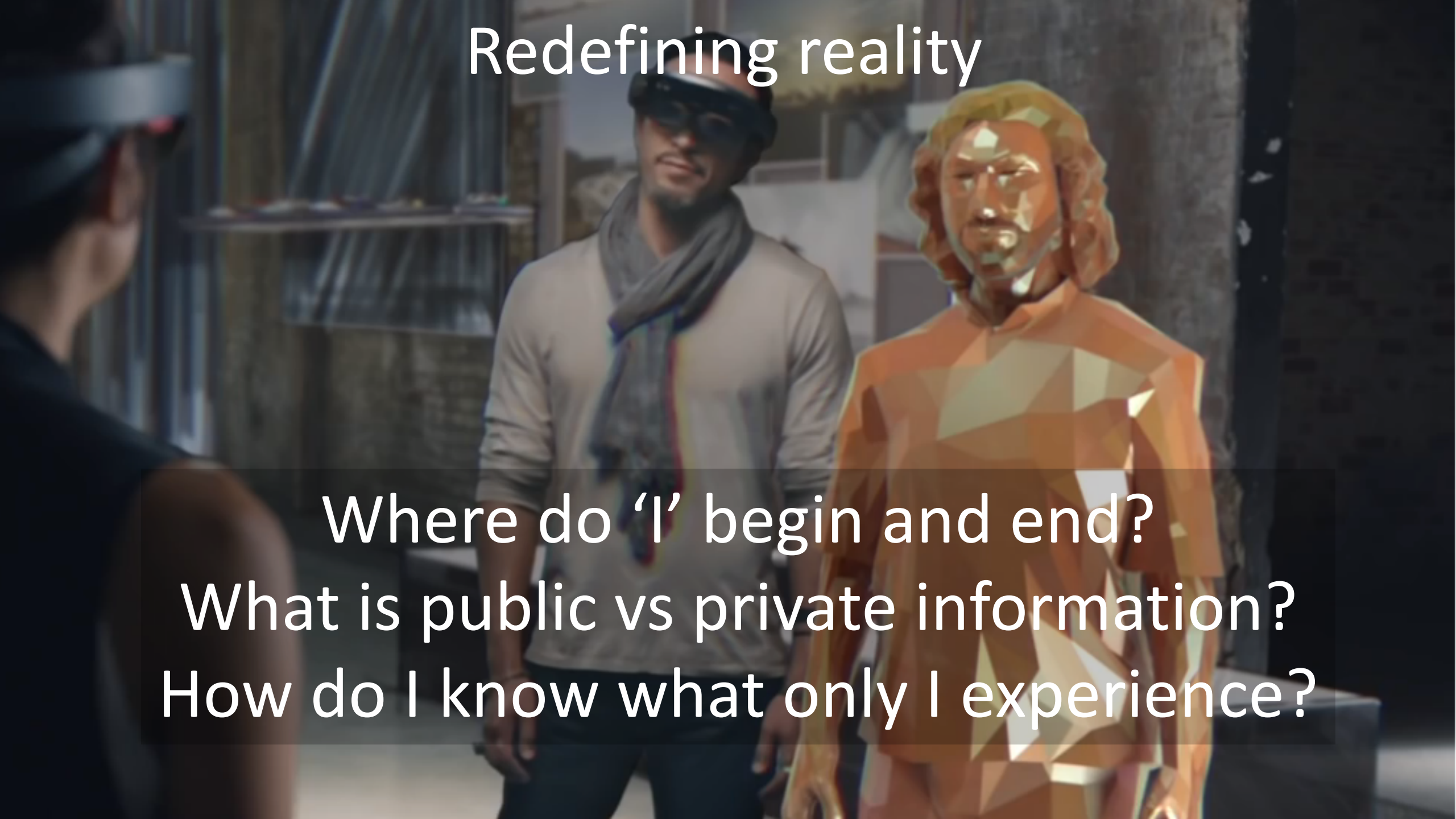
* Steve Milunovich, Barrons, 10/5/16


Growing Elderly Population Creates
New Opportunities for Technology
Frame from video
An array of tech companies are rolling out new products for aging baby boomers.
WSJ

Erasing the boundaries between real and virtual worlds of work and play



Redefining reality



Where do ‘I’ begin and end?
What is public vs private information?
How do I know what only I experience?

We already live in a constructed environment, so the idea the Virtual and Augmented Reality could be more or less real is a complicated question.

"The culture is ready for [VR+AR] now,
given the amount of tech that we touch right now
and the devices that we use daily."

Ted Schilowitz, Futurist, Fox Studio

Consumers don’t buy technologies, they buy the experiences that the technologies deliver

Frame from video
Netflix Vista
Your life is a movie
Go out and watch it

Be creative and innovative

But consider the consequences

Thank You

Phil Lelyveld

Entertainment Technology Center @ USC

AR Salon program
Sponsorship opportunities
PLelyveld@ETCenter.org