

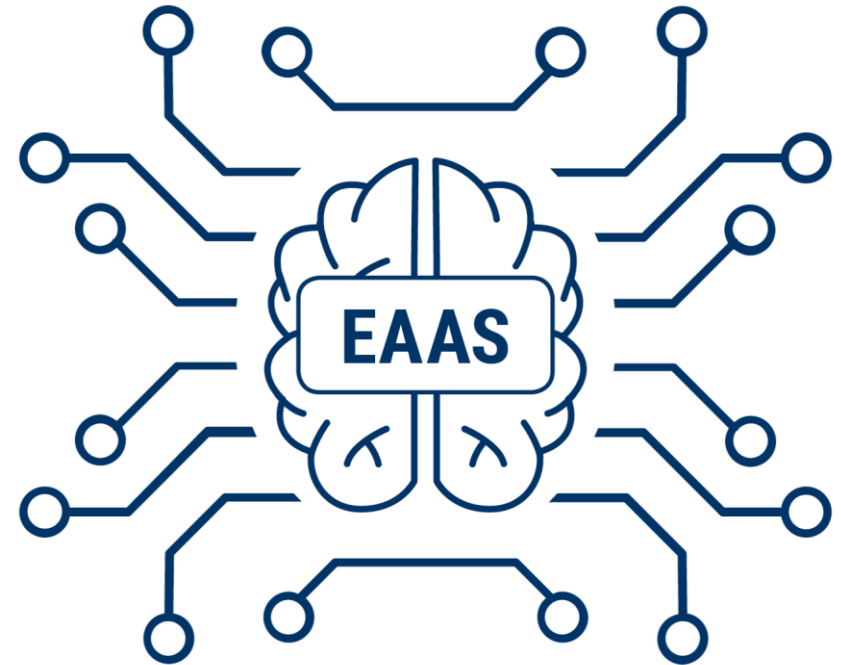
Augmented & virtual reality trends



WHO WE ARE

The technology market intelligence platform.

CB Insights software lets you predict, discuss, and communicate emerging technology trends using data in ways that are beyond human cognition. We are a leader in the Expert Automation & Augmentation Software (EAAS) space.



TRUSTED BY THE WORLD'S LEADING COMPANIES



F-PRIME

FIRSTMARK 



NORWEST | VENTURE PARTNERS

 Riviera

SEQUOIA 

“We use CB Insights to find emerging trends and interesting companies that might signal a shift in technology or require us to reallocate resources.”



Beti Cunniff, Corporate Strategy, Microsoft



The CBI Community – Membership Has Benefits

INDUSTRY-SCALE SUMMITS



PEER-TO-PEER NETWORK



CLIENT-ONLY EVENTS



ABOUT THE ANALYST

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Nick Pappageorge is an intelligence analyst at CB Insights, where he produces data-driven research on private market companies' financing, exit, and performance trends across emerging industries – specifically, industrial IoT, AR/VR, robotics, and blockchain.

Prior to joining CB Insights, Nick held a research role at MakerBot Industries, a 3D printing company. Nick is a graduate of Hamilton College. Most popular analyses by Nick include:

[Future Factory: How Technology Is Transforming Manufacturing](#)

[Enterprise Blockchains & The Future of Decentralization](#)

[Amazon Strategy Teardown](#)

What We're Going to Cover

1



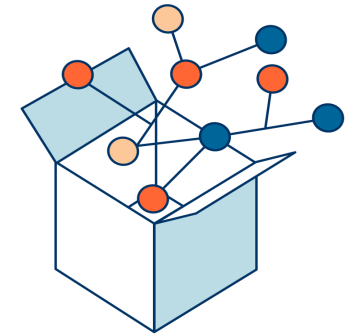
Background and financing
trends

2



What large corporations are
doing

3



Where startups are
proliferating

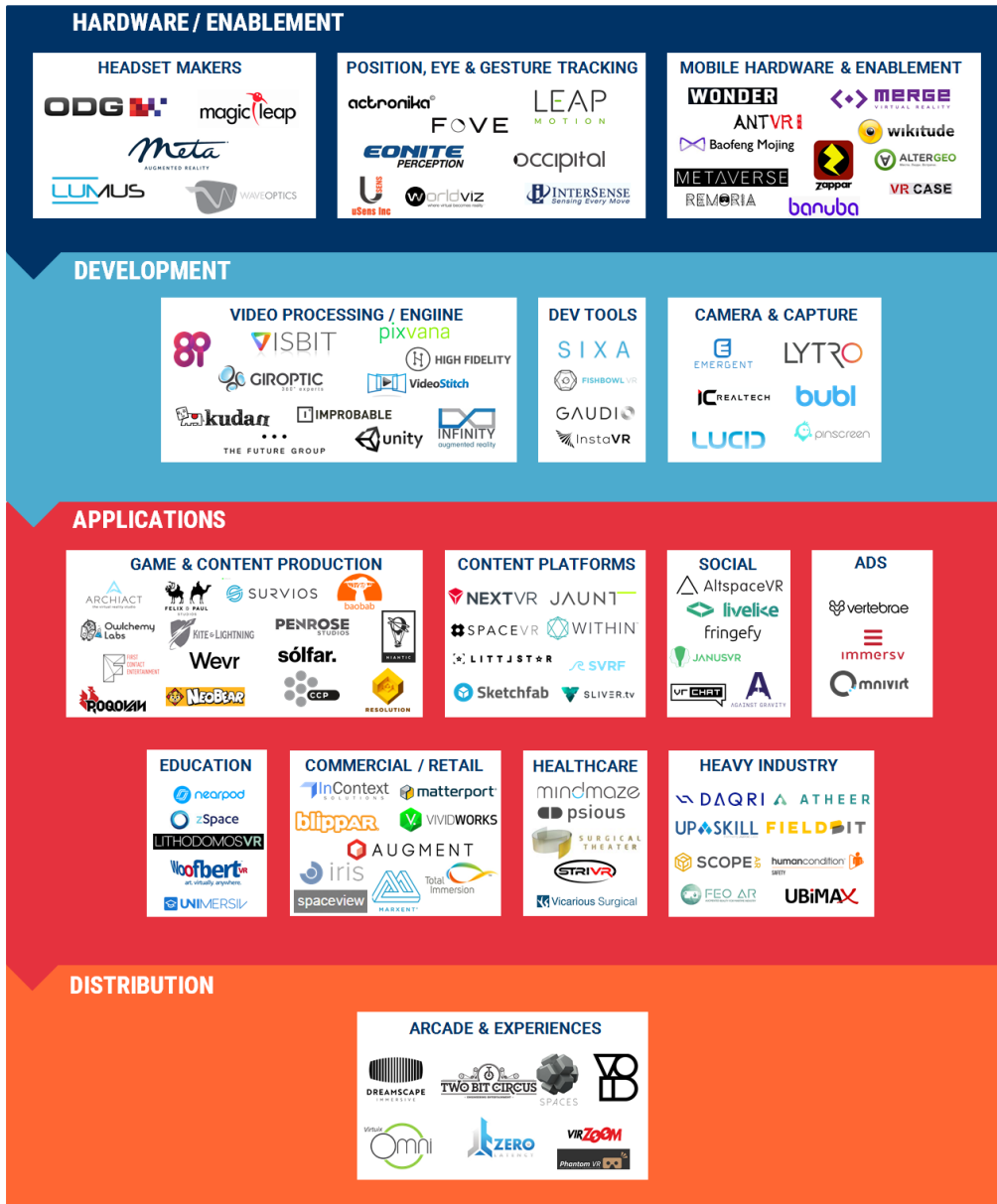
Background and financing trends



The AR/VR “stack” from hardware to distribution

All areas of the stack remain nascent. Hardware makers enable developers, applications, and finally distribution, which is starting to take shape with arcade-style experiences.

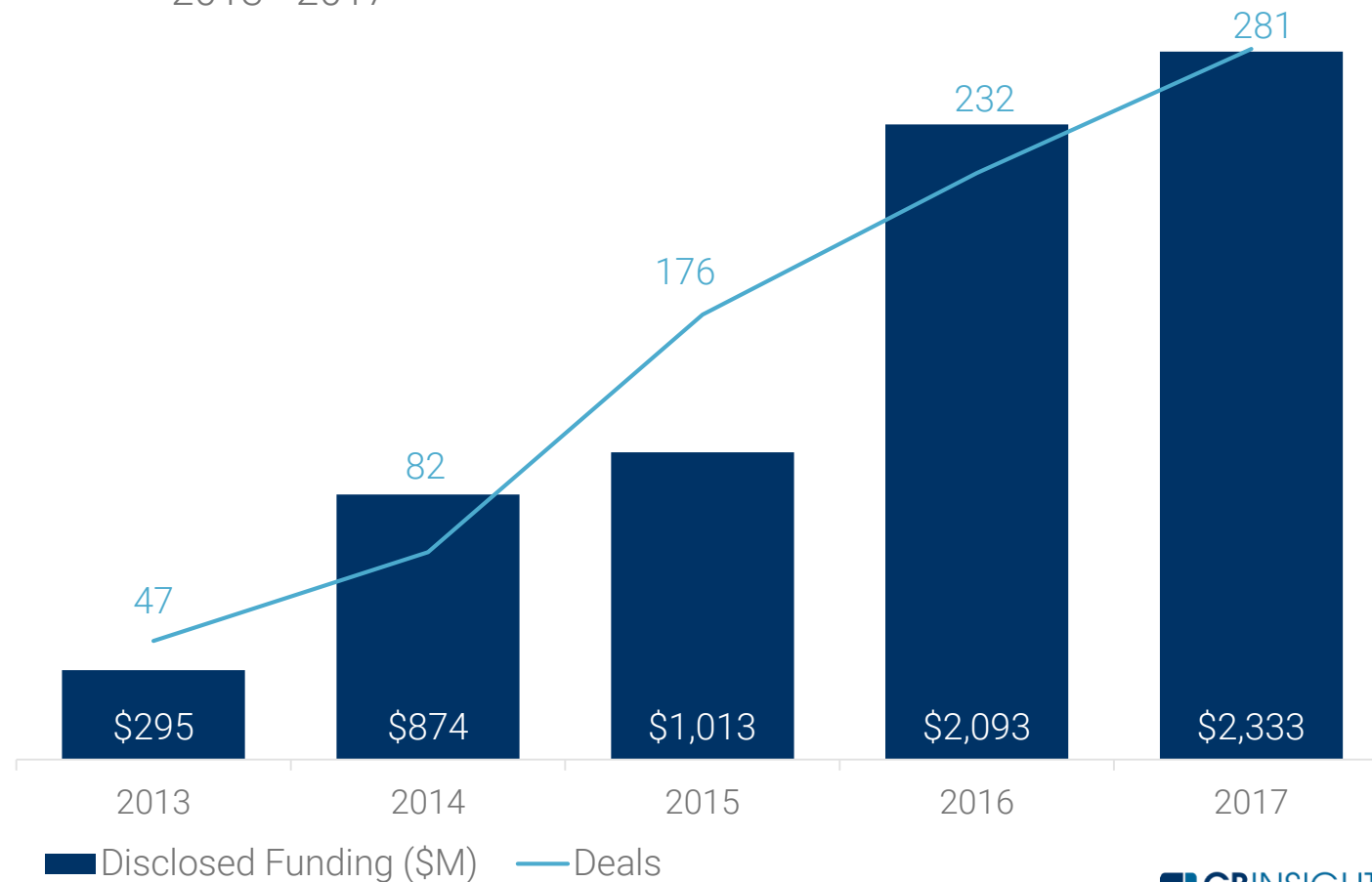
THE AUGMENTED & VIRTUAL REALITY (AR/VR) STACK: 110+ STARTUPS BRINGING THE NEXT COMPUTING PLATFORM



AR/VR investment is still climbing

Disclosed funding totaled more than \$2.3B in 2017, with 21% year-over-year deal growth.

AR/VR annual financing history 2013 - 2017



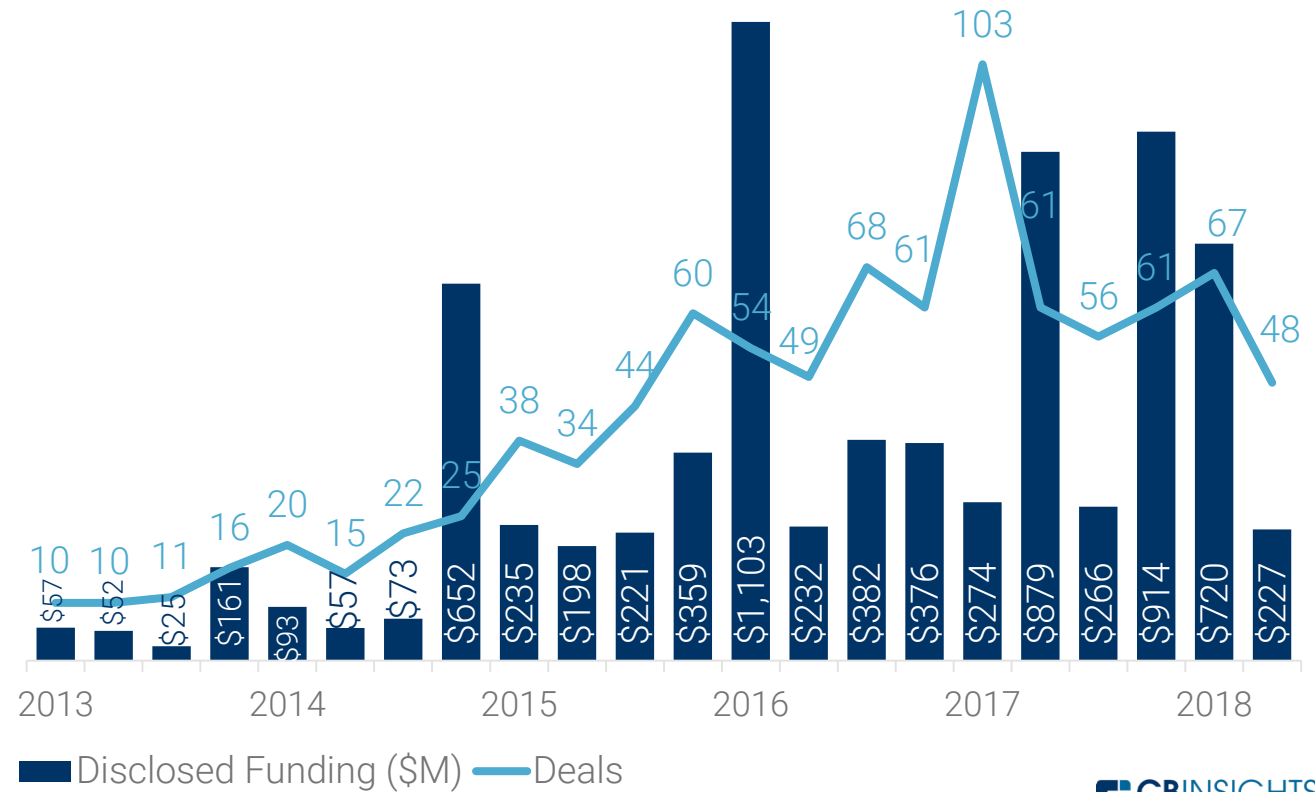
A downswing in deal making

While yearly totals ballooned at an annual scale, investment volume has been dwindling in recent quarters. Q2'18 represented a 28% decline



AR/VR quarterly global financing history

Q1'13 - Q2'18



CBINSIGHTS

Magic Leap makes a big dent in the landscape

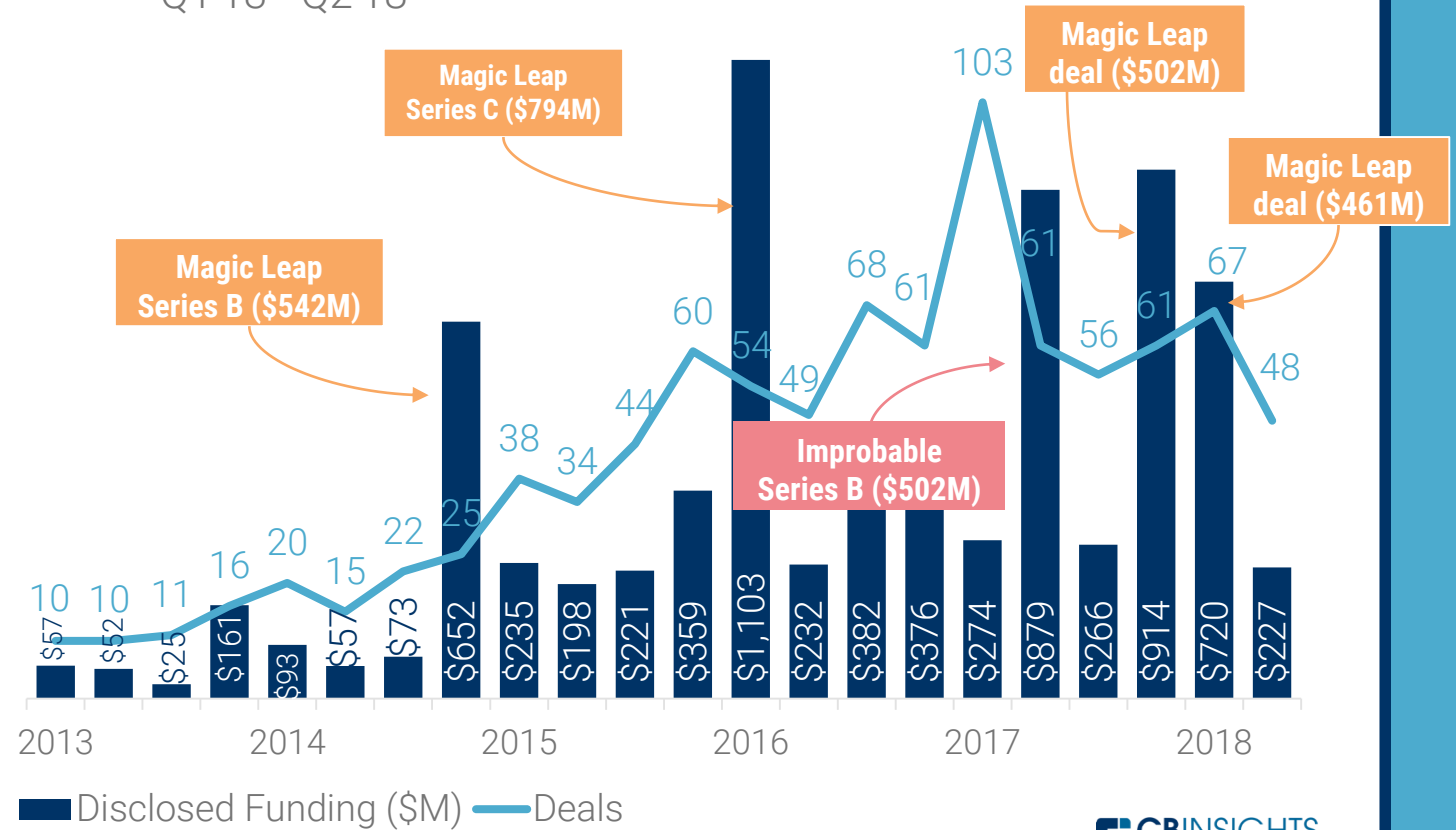
Raising in \$400M+ mega-rounds since its Series B, Magic Leap has an undeniable impact on the funding.

Also notable was game engine Improbable raising over \$500M from SoftBank and prior backers.



AR/VR quarterly global financing history

Q1'13 - Q2'18



Thesis-driven funds dominate the most active list

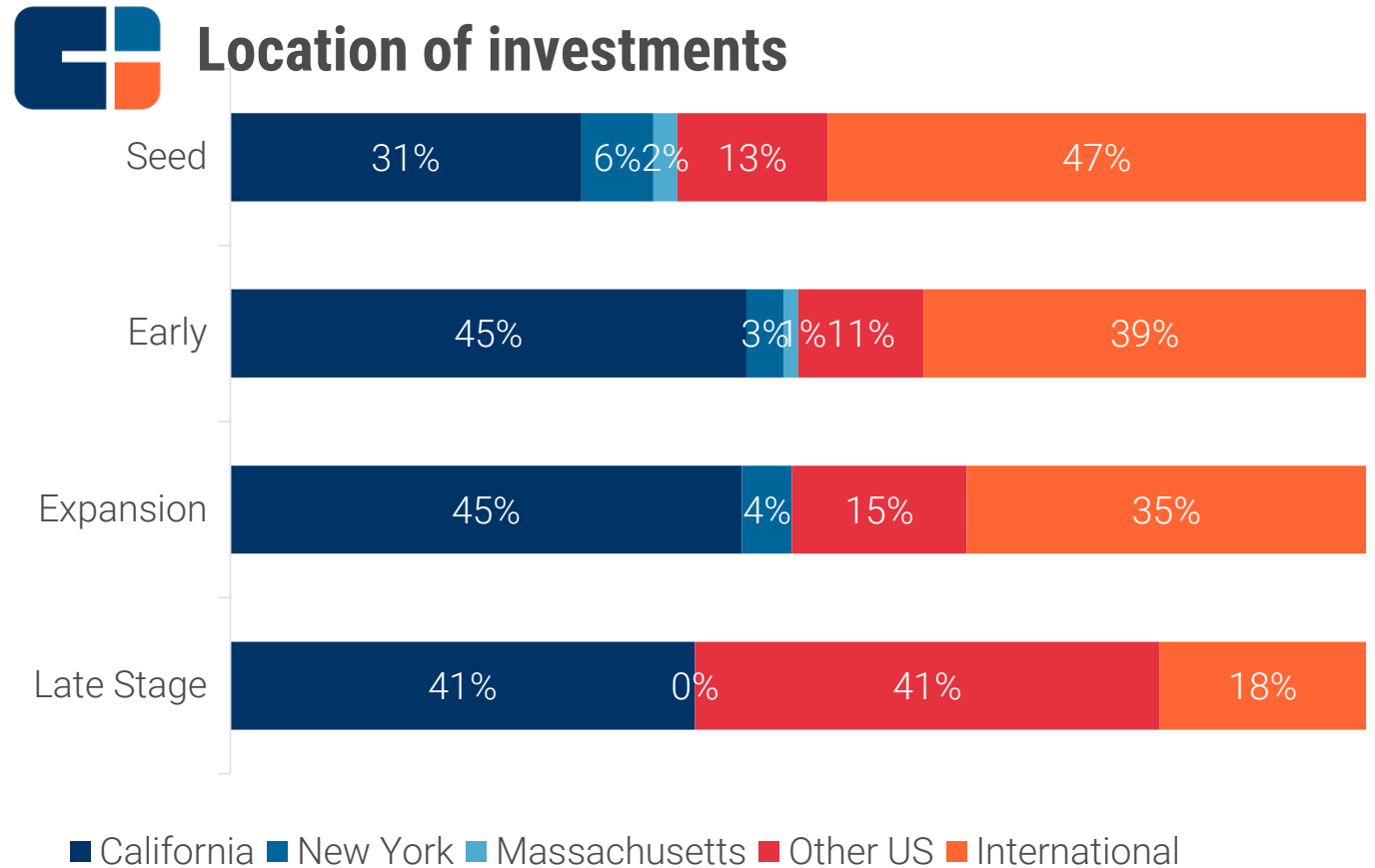
Boost, Vive X, and Rothenberg Ventures, which all claim long-standing focus on AR/VR, are among the most active. Also among the most active are AR/VR-specific funds like Presence Capital and Venture Reality Fund.

MOST ACTIVE INVESTORS IN AR/VR

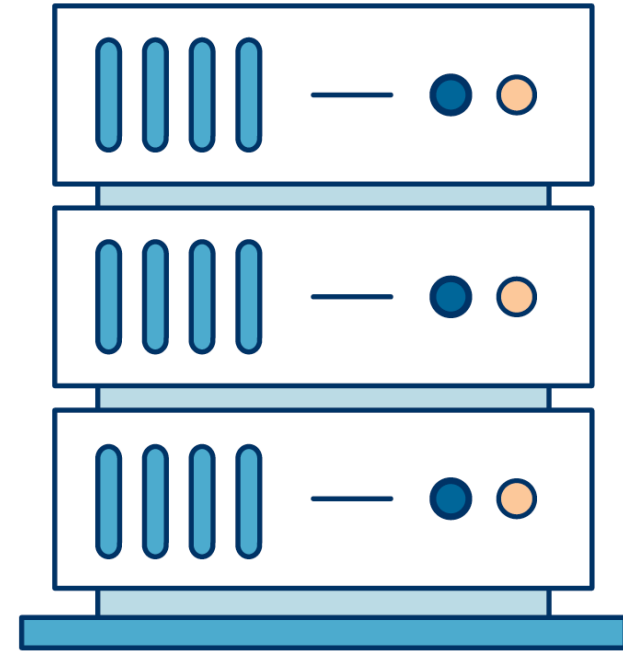
Rank	Investor
1	Boost VC
2	Vive X
3	Rothenberg Ventures River Accelerator
4	Rothenberg Ventures
5	Techstars
5	Presence Capital
7	The Venture Reality Fund

California is where the AR/VR hub

Aside from Seed, where non-US companies make up the bulk, California is the dominant location for startups raising capital.



What corporates are doing



AR IS A CORE TECHNOLOGY

“I regard it as a big idea like the smartphone I think AR is that big, it's huge. I get excited because of the things that could be done that could improve a lot of lives. And be entertaining. **I view AR like I view the silicon here in my iPhone, it's not a product per se, it's a core technology.** But there are things to discover before that technology is good enough for the mainstream.”



Tim Cook, Apple CEO

When will Apple drop the headset?



Apple Is Ramping Up Work on AR Headset to Succeed iPhone

"Apple Inc., seeking a breakthrough product to succeed the iPhone, aims to have technology ready for an augmented-reality headset in 2019 and could ship a product as early as 2020."

- [Bloomberg](#) November, 2017

Different pieces of evidence suggest Apple has been investigating virtual and augmented reality applications for more than a decade. And new [revelations](#) suggest Apple is going to have a standalone AR headset by 2020. The product will have its own rOS, or Reality Operating System, which will be the spiritual successor to Apple's mobile platform.

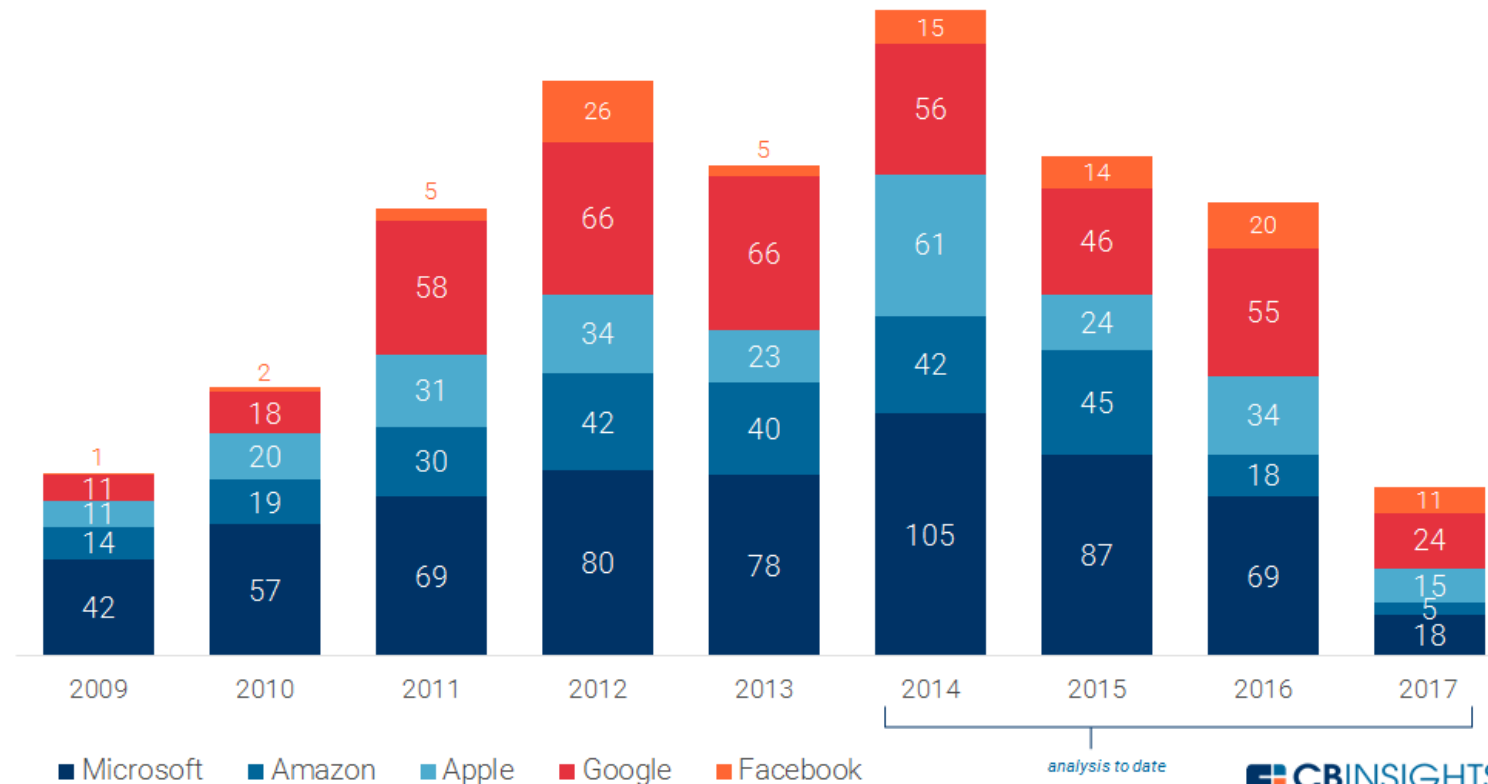
FAMGA is developing AR/VR in-house

Facebook, Microsoft, Google, and Apple are aggressively patenting tech related to AR and VR



AR/VR patent application activity, Apple vs. Microsoft, Amazon, Google, Facebook

2009 - 2017 YTD (11/11/17)



FAMGA has acquired related tech and platforms

Select FAMGA acquisitions in AR/VR

facebook

oculus



VR VANA

SMI
Sensomotoric Instruments

metaio

PrimeSense

Polar Rose

Microsoft

AltspaceVR™

Licenses IP from:
ODG

Google

LYTRO

Owlchemy
Labs

EYEFLUENCE™

THRIVE AUDIO

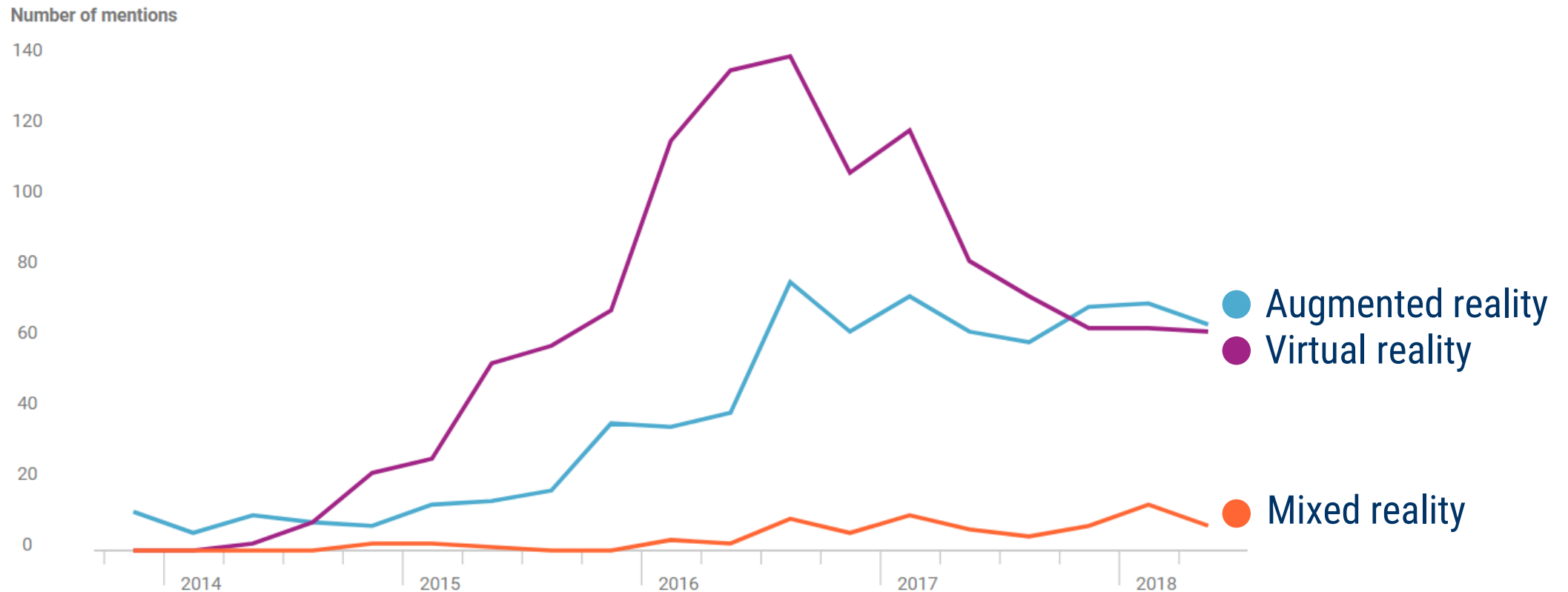
SKILLMAN & HACKETT

amazon

twitch

C-suites are now equally interested in AR & VR

Mentions of AR, VR, and MR on quarterly earnings calls. Q1'13 – Q2'18



Trends

AR NEEDS VR, AND VICE-VERSA

“With AR, you can tell what is real and what is not. Mixed Reality (MR), such as what Microsoft HoloLens and Meta 2 offer, integrates computer-generated images with what is really there so well that it is hard to tell them apart. **VR and AR are essential ingredients in mixed reality. Over time, we predict, that MR will be the prevailing term** in an industry that currently has so many terms it causes confusion.”

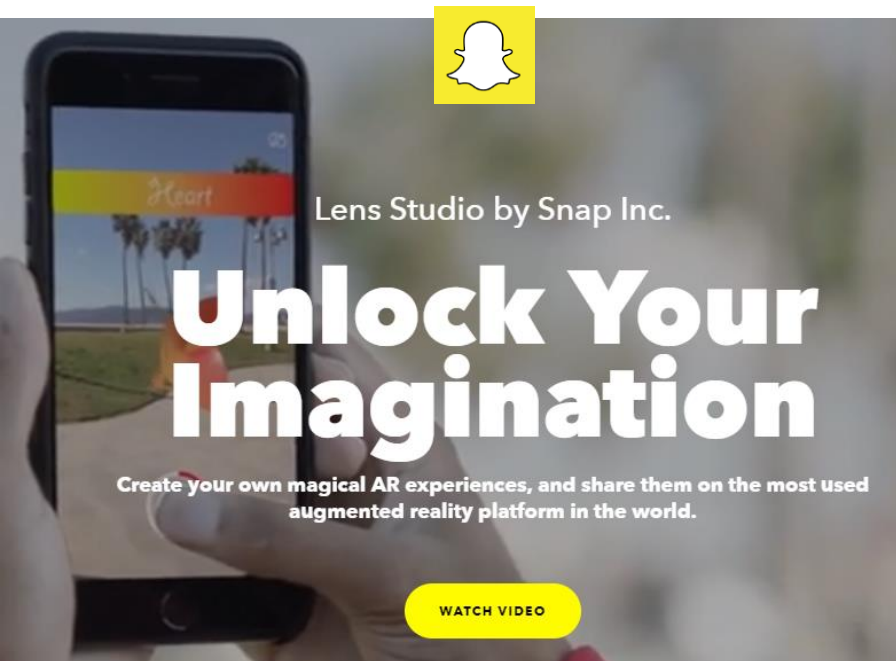


Robert Scoble & Shel Israel, *The Fourth Transformation* (2017)

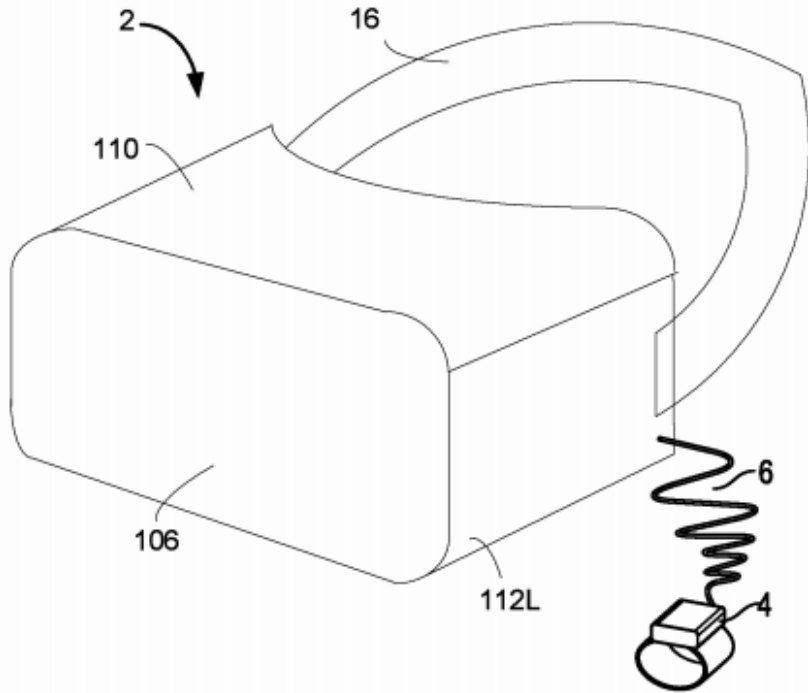
Think of it as the new video: “artificial reality”

There’s much hand-wringing about whether products should be called AR or VR or MR.

Samsung, Snap, HTC, Google’s ARCore, Apple’s ARKit, are allowing developers to unlock new video experiences, in addition to true AR. Yet, the first hit headset might not have true AR.



Beyond simple VR: MSFT patents 'changing opacity' will superimpose real world

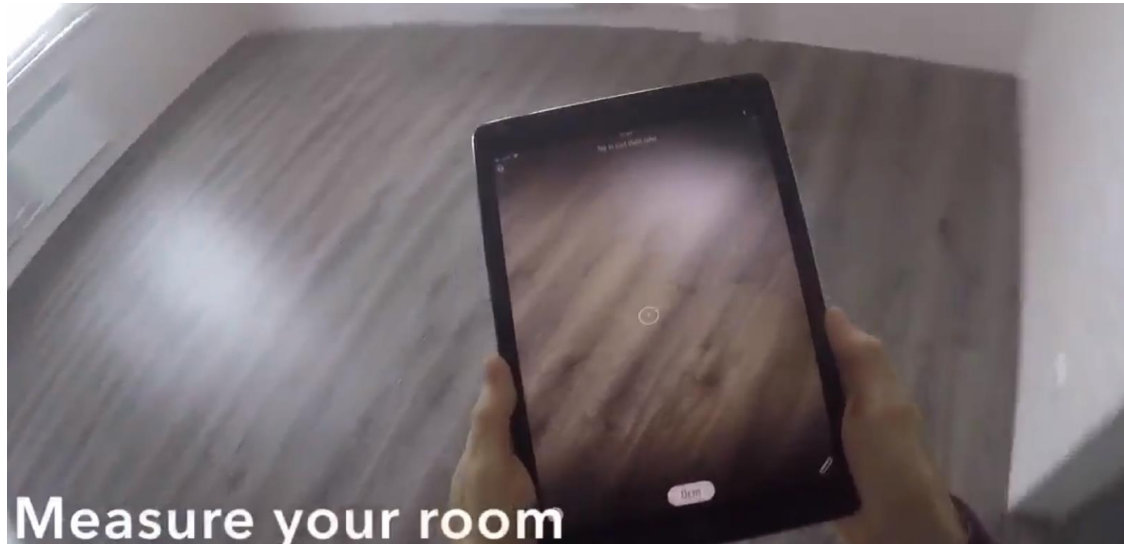


Well-known for pushing its mixed-reality headsets (with hardware partner Lenovo) pushes enclosed VR with the option of front-facing cameras for splicing in real-world footage. A recent patent pursued protection for its “changing opacity” technology.”

Francis Ford
Coppola's use of
dissolve and
superimposed image
in *Apocalypse Now*
brought new
symbolisms

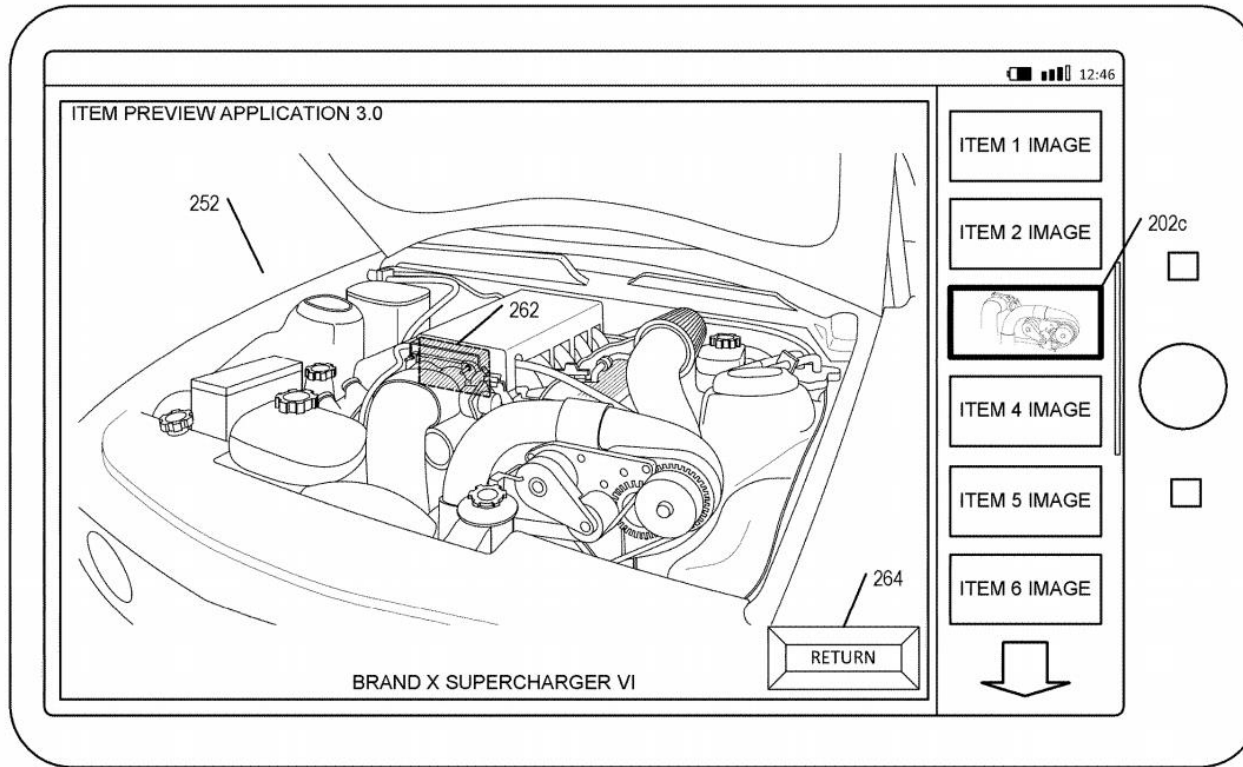
APOCALYPSE NOW
© ZOETROPE STUDIOS

Real apps are being made with platforms



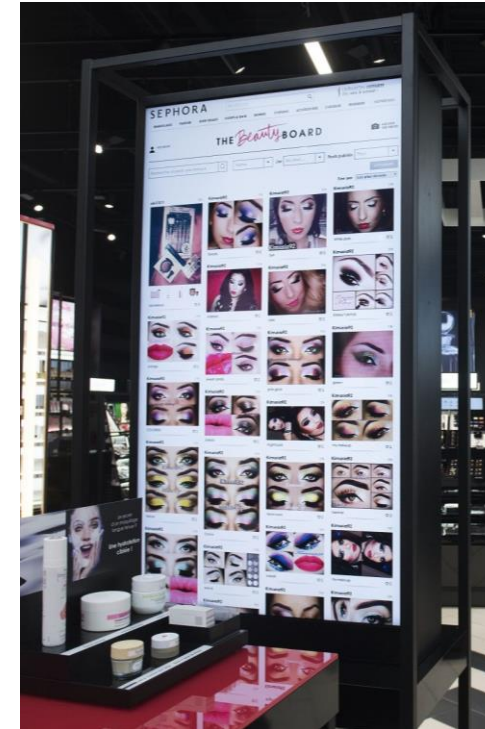
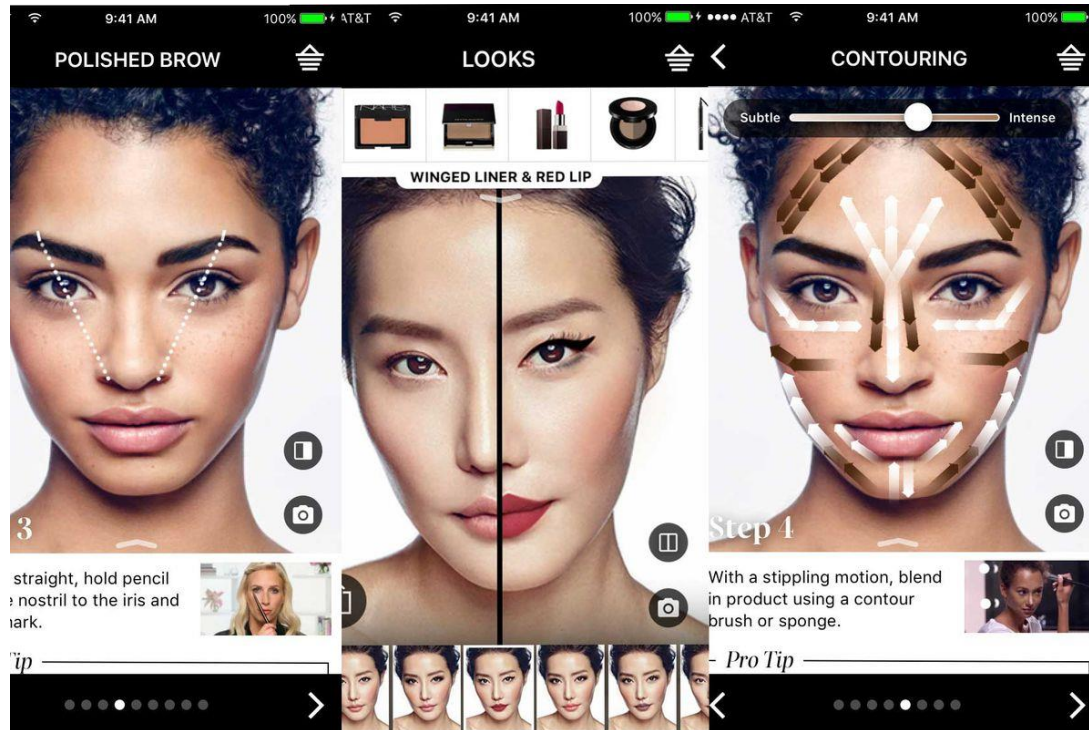
Developers are making measuring apps (pictured left). Meanwhile, ARCore is allowing furniture retailer Wayfair (pictured right) to have mobile AR-enabled shopping so customers can see furniture. Amazon, eBay, Target and more are experimenting here.

Amazon AR patent suggests selling auto parts



Amazon's recent AR patent grant, titled "[Vehicle Component Installation Preview Image Generation](#)," describes a system that uses augment reality to let users preview the image of an auto part as if it's connected to their car.

Case study: beauty & cosmetics



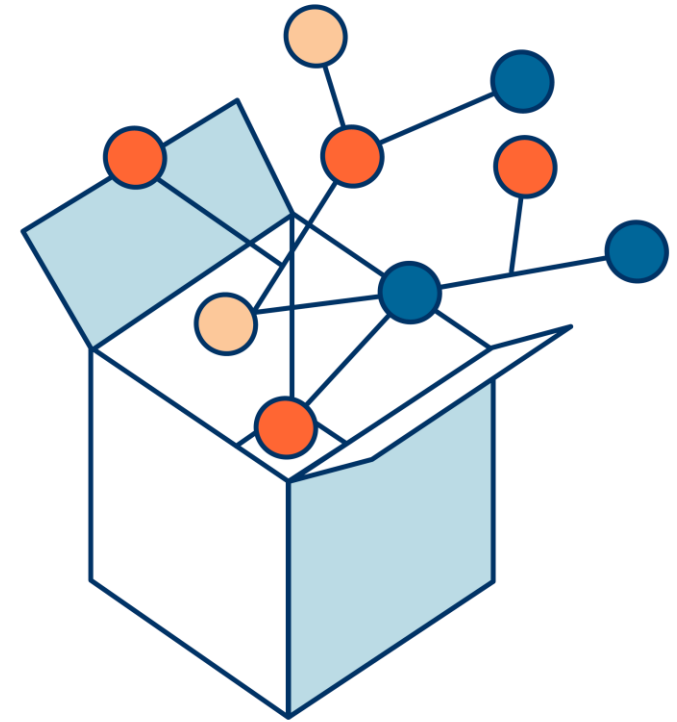
Sephora's Visual Artist is an AR tool that allows customers to try on thousands of shades of lipstick, eyeshadow, false lashes, and many other makeup products via mobile app and at select Sephora stores.



Autodesk, the software developer of AutoCAD, is a bellwether for the future of prototyping and collaboration technology. The company's exploration into making an AR/VR game engine foreshadows the larger role it envisions for immersive computing in the design process.



Startup innovation in AR/VR



THE DAVID TO APPLE'S GOLIATH HAS RELEASED A NEW HEADSET



Funding

\$2.35B

Finally releasing the much-hyped One headset, Magic Leap has planted a flag, although reception to the design remains mixed.

SELECT INVESTORS

Andreessen Horowitz, Google, Alibaba, AT&T

**AT&T takes stake in AR company
Magic Leap at a \$6.3B valuation
and exclusive distribution deal**

"the investment gives AT&T exclusive rights to work with Magic Leap across a range of areas covering network access, content distribution and devices."

- [TechCrunch](#) July 11, 2018





Inbox
Starred
Important
Chats
Sent Mail
Drafts
All Mail
Spam (221)
Trash
More
Out

michael@meats.com
Notes on last night's event

11:55 AM

information@suitsforyours.com
Summer's coming! Suits on sale now!

11:08 AM

thuy@gnd.com
Event update: LET'S CELEBRATE

8:12 AM

accounts@gmail.com
Your order has been shipped

8:35 AM

tcampbell@gmail.com
You'll get a kick out of this

8:44 AM

jbennet45@gmail.com
Guy's trip - Aruba?!

9:18 AM

chuck@itmail.it
Technical support case #487613

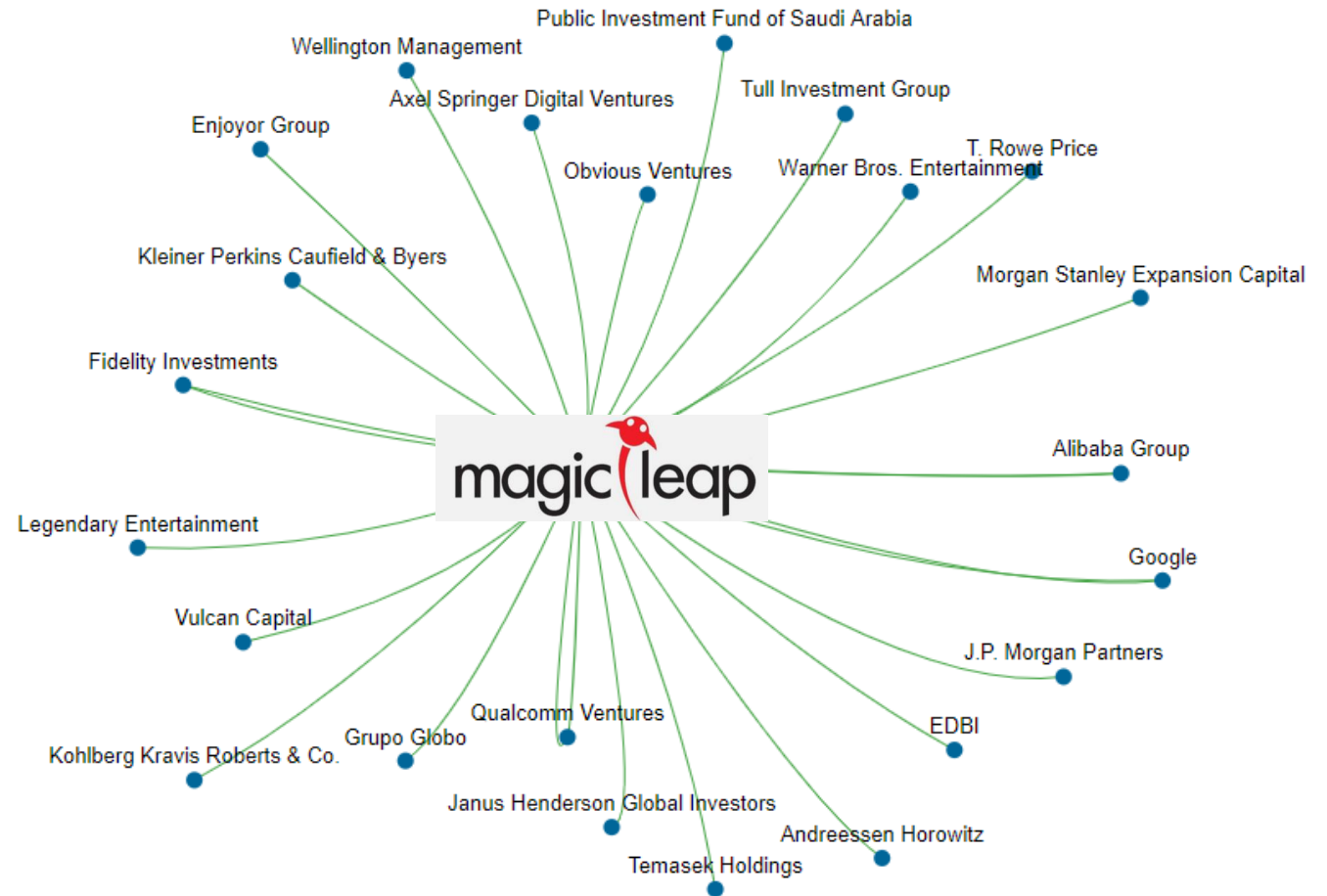
9:23 AM

18 March 8:30 am

Magic Leap continues to raise from blue-chip names

Google led the round last October, and the company added a partnership with telecom AT&T. Movie studios, asset managers, tech giants, and institutional venture names are all backers.

Magic Leap's Investors

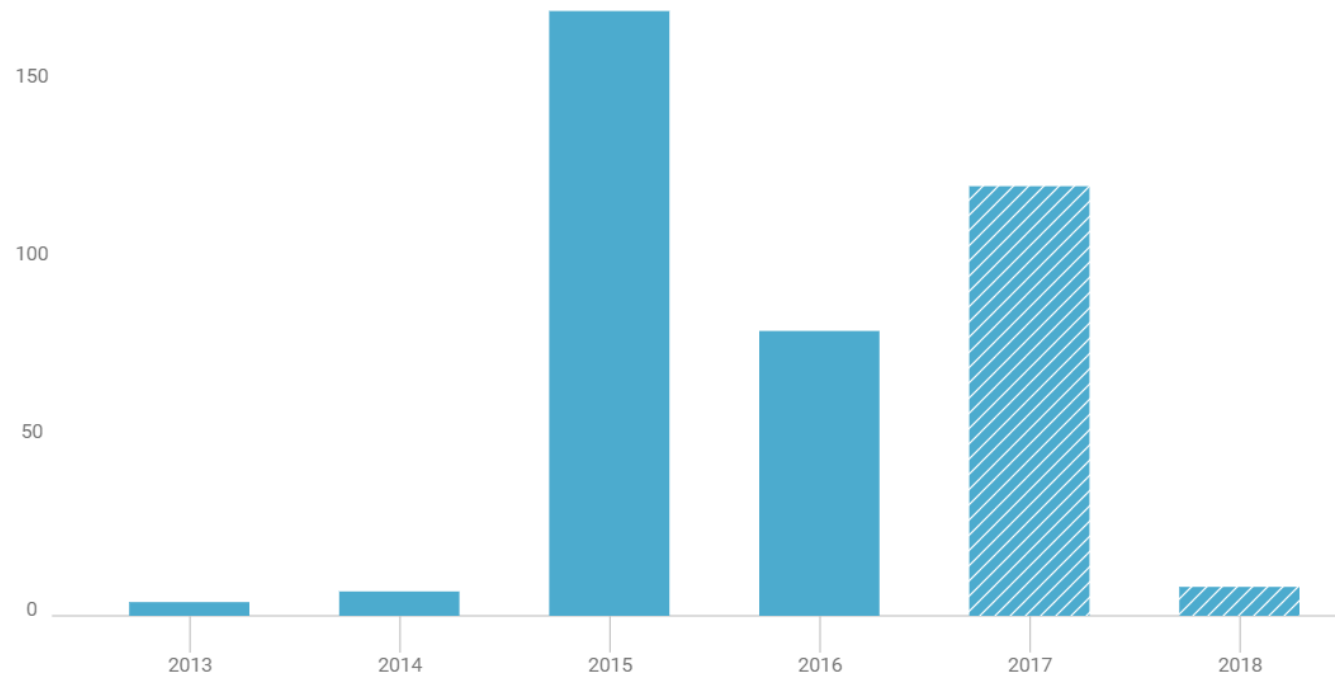


Magic Leap is aggressively patenting

Magic Leap is reaching about 100+ patents (applications and grants) per year.

Magic Leap Patents

Number of Patents



Source: [CB Insights](#), totaling patents and grants

WE'RE NEARING COMMERCIAL READINESS

“Just as multi-touch in 2006, which then became the interaction model of the whole world, mixed reality is sort of in that stage. **It's in the stage of prototypes that work. Not in the stage of shipping commercial product, but pretty close.** There are two ways to think about it: You can make every wall a screen, you can put Minecraft on the table...I think what gets more interesting is if the computer is actually looking at stuff. So I can stand in front of someone and ask ‘Who is this person?’”



[Benedict Evans](#), a16z

BIG DEALS COME FROM THE WHOLE AR/VR STACK

Biggest deals of 2018 so far

Rank	Company	Company Description	Round	Date	Amount (\$M)	Round Investors
1	Magic Leap	Magic Leap is a developer of novel human computing interfaces and software.	Series D - III	3/7/2018	461	Public Investment Fund of Saudi Arabia, Undisclosed Investors
2	Wright Flyer Live Entertainment	Wright Flyer Live Entertainment is a Japan-based media company offering specialized virtual reality videos on YouTube.	Corporate Minority	4/5/2018	93	GREE
3	Mantis Vision	Mantis Vision develops technologies and products that bring 3D to mobile devices, homes and businesses. Its software and hardware component solutions, based on its core MV4D 'motion capable' 3D range-imaging technology, are designed to enable user-generated content creation (UG3D) throughout the 3D ecosystem.	Series D	7/16/2018	55	Luenmei Quantum, Samsung Catalyst Fund
4	SNOW	SNOW is a selfie app that uses AR to allow users to create fun photos of themselves. Snow Corp also owns camera apps Foodie and B612.	Series A	1/22/2018	50	Sequoia Capital China, Softbank Capital
5	3vjia	3vjia is a technology company based in China that applies 3D virtual reality technology to the home industry.	Series B	3/27/2018	47.75	Red Star Macalline
6	High Fidelity	High Fidelity offers open source software for shared Virtual Reality. Deploy a shared virtual space as easily as deploying a website. Build complex interactive experiences using standard formats, tools and languages. Share computers and scale to huge audiences.	Series D	6/28/2018	35	Blockchain Capital, Breyer Capital, Galaxy Digital Ventures, IDG Capital, Vulcan Capital
7	Scandit	Scandit is an enterprise mobility and data capture company specializing in barcode scanning solutions that are meant to transform business processes across industries including healthcare, logistics, manufacturing, and retail. Through software technologies and cloud services, Scandit empowers organizations to build, deploy and manage mobile apps for smartphones, tablets and wearable devices. The resulting solutions offer a lower total cost of ownership than traditional, dedicated devices.	Series B	7/26/2018	30	Atomico, Google Ventures, NGP Capital
8	DigiLens	DigiLens, fka SGB Labs, specializes in holographic optical waveguide technology and materials, serving the aerospace, security and consumer electronics industries.	Series C	5/17/2018	25	Continental
9	Upskill	Upskill, formerly APX Labs, develops enterprise software for augmented reality devices in industrial settings. Upskill's Skylight software product runs on many types of devices, integrates with existing business systems, and is used today in a wide range of industrial operations including manufacturing, field service, repair, training, and compliance.	Series C	3/6/2018	17.2	Accenture Ventures, Boeing HorizonX, Cisco Investments, GE Ventures, New Enterprise Associates
10	Vicarious Surgical	Vicarious Surgical integrates virtual reality with surgical robotics. As the next frontier for minimally invasive surgery, Vicarious Surgical is creating a technology that is far more capable than existing solutions at significantly lower cost.	Series A	1/16/2018	16.75	AME Cloud Ventures, Gates Ventures, Innovation Endeavors, Khosla Ventures, Marc Benioff

AR RELIES ON COMPUTER VISION TO MAP ENVIRONMENTS

UPSKILL

Funding

\$47M

Upskill develops enterprise software for augmented reality devices in industrial settings. Upskill's Skylight software product runs on many types of devices, integrates with existing business systems, and is used today in a wide range of industrial operations including manufacturing, field service, repair, training, and compliance.

SELECT INVESTORS

GE Ventures, Work-Bench, New Enterprise Associates, Salesforce Ventures, Boeing HorizonX



Support your manufacturing workforce with one AR solution



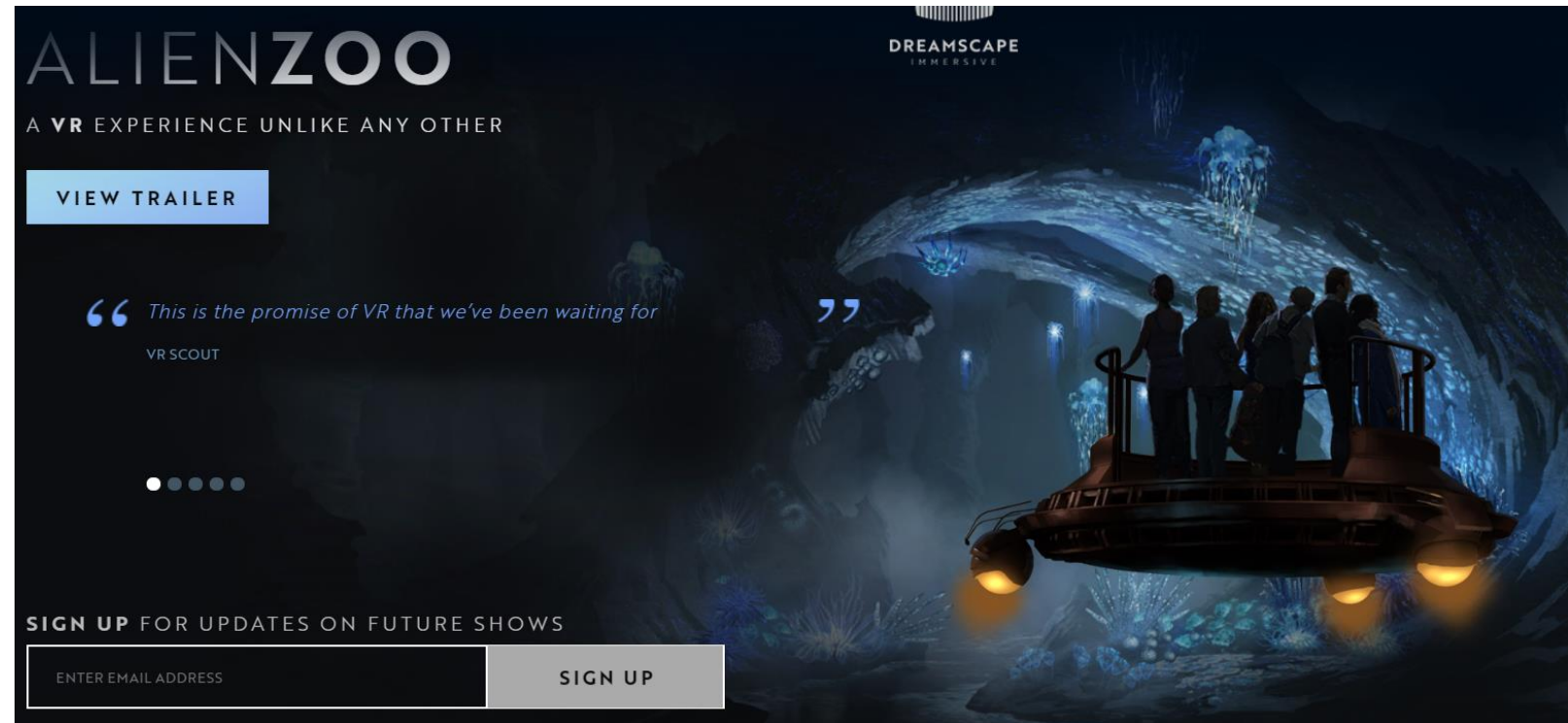
HOLLYWOOD WANTS A PIECE



Funding

\$41M

Dreamscape Immersive allows audience members to walk freely with friends within a virtual world, where they see themselves, interact with objects and each other, and experience worlds previously accessible only in their imaginations. The company plans to operate arcade-style experiences in movie theaters and retail shopping malls.



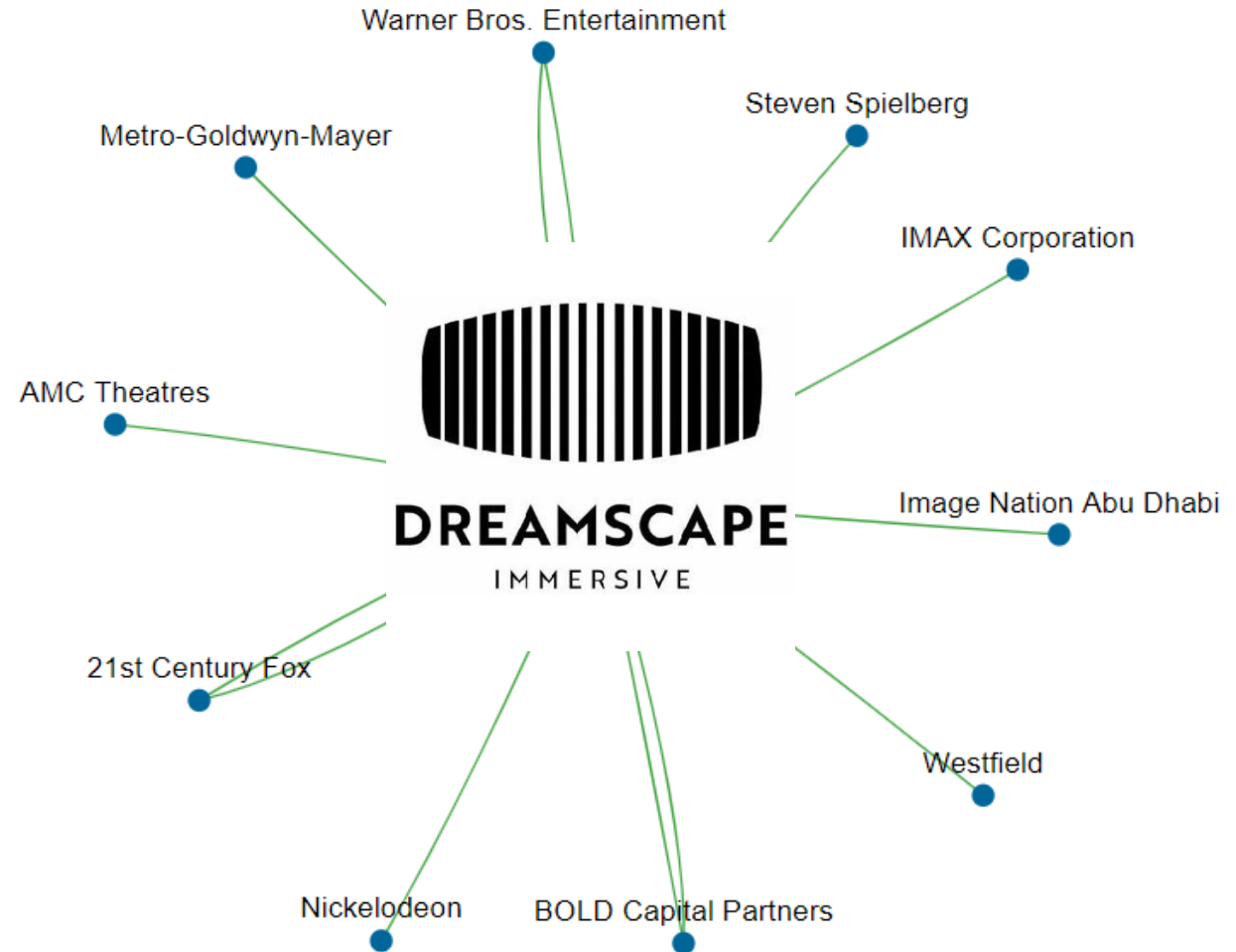
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GESTURE CONTROL AS A WAY FORWARD



Funding

\$94M

Leap Motion, formerly OcuSpec, is a motion-control software and hardware company developing a sensitive 3-D motion-control and motion-sensing technology.

SELECT INVESTORS

Andreessen Horowitz, Founders Fund, JP Morgan Chase & Co

Leap Motion open-sources North Star AR headset design and guide

- [VentureBeat](#) June 6, 2018

LEAP MOTION CONTROLLER

\$ 79.99



WE'RE STILL IN THE TROUGH OF DISILLUSIONMENT

The first hit headset may not be
“true” augmented reality.



AR WITHOUT BREAKING THE BANK



Funding
\$2M

MIRA develops a mobile, minimalist, untethered AR headset works seamlessly with a smartphone to allow users to discover and share engaging AR content.

SELECT INVESTORS

Sequoia Capital, Marc Benioff



NIANTIC IS BUILDING ON POKEMON'S SUCCESS WITH MULTI-PLAYER AR

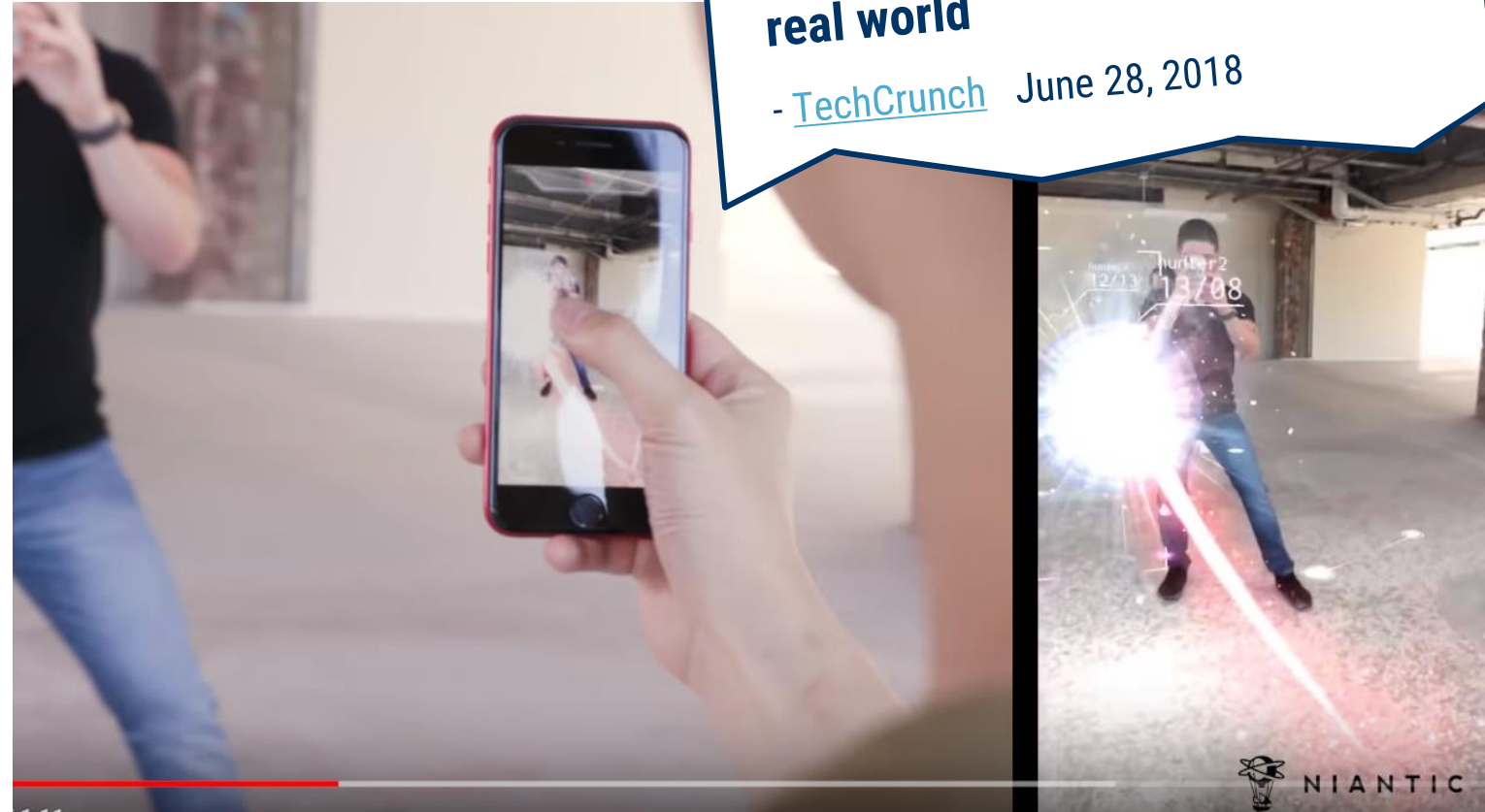


Funding
\$225M

Niantic is building an AR and real world game platform with a server architecture that enables massive scale supporting a global shared state rich interactions. Niantic is the developer of Pokemon Go.

SELECT INVESTORS

Google, Nintendo, Founders fund



Niantic's latest acquisition lets AR Pokémon hide behind the real world

- [TechCrunch](#) June 28, 2018

KICKSTARTING A DEVELOPMENT COMMUNITY

BLUE

VISION

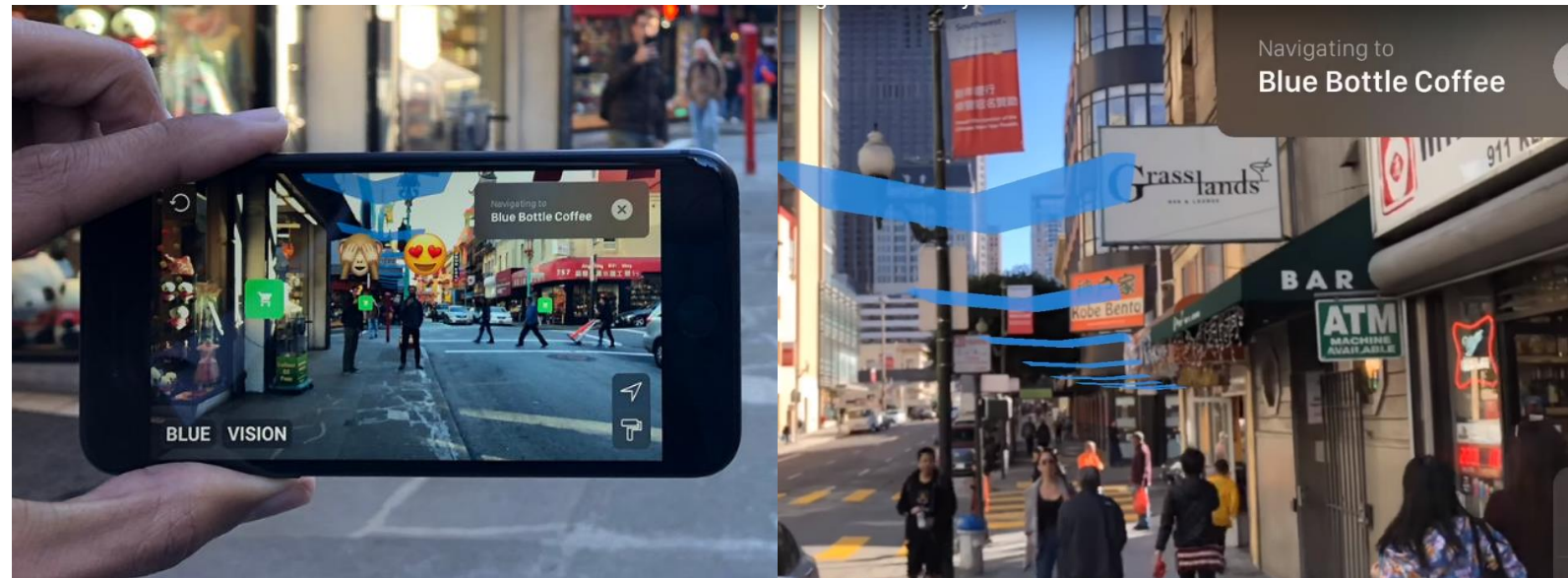
Funding

\$17M

Blue Vision Labs is developing an augmented reality project as a city-scale, cloud platform, where users can create persistent, interactive, and shared digital experiences.

SELECT INVESTORS

Google Ventures, Accel,
Horizon Ventures, SV Angel



SNAPCHAT SLAYERS EYE AUGMENTED VIDEO



Funding

\$50M

SNOW (스노우) is a selfie app that uses AR to allow users to create fun photos of themselves. Snow Corp also owns camera apps Foodie and B612.

SELECT INVESTORS

Sequoia Capital China,
Softbank Capital



Questions?

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npappageorge@cbinsights.com

