Fun With Virtual and Augmented Reality

Pokémon GO and Beyond

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LIVE LINKS

SEARCHER'S VOICE

I t's almost 1:00 a.m. on a Friday summer night. I wake and realize my son is not in the house. I text, "Where u?" He replies, "Walking Pokémon." Our neighborhood is safe, so I don't worry. Still, what kind of game would compel a young person to take to the streets after everyone else is soundly slumbering?

Pokémon GO is the free app for Android and iOS that was launched on July 6, 2016, by Niantic, a company that spun out of Google. July 6 was a Wednesday. By Friday, the popularity of the game exploded. News stories appeared chronicling the misadventures of Pokémon GO players including the inadvertent discovery of three bodies in disparate spots and the story of two men who pursued their Pokémon off a bluff above a beach near San Diego. Indeed, by July 13, SurveyMonkey called Pokémon GO "the biggest U.S. mobile game ever" ("Pokémon GO Usage Statistics Say It's Biggest U.S. Mobile Game Ever," Robbie Allan, SurveyMonkey Intelligence, July 12 2016; surveymonkey.com/business/intelligence/pokemon-GO-usage-statistics).

What makes this game so wonderful is that it bridges the gap between the real and the virtual world. It uses smartphone geolocation to track players on a map as they walk around. Occasionally, an animated Pokémon monster appears on the phone screen. With a tap, the player focuses on the character, which activates the phone camera. The map animation drops away, and the player sees the animated Pokémon floating in the camera's real-world view. An animated "Poké Ball" appears at the base of the screen. With a swipe, the player flings the ball at the Pokémon, attempting to catch it. Once players have caught enough Pokémon, they may walk to a "gym" (often a church, library, or bar) to battle for dominance. On the way, they might pause at a "PokéStop," usually a local landmark, to pick up some more Poké Balls (pokemon.com/us/pokemon-video-games/pokemon-GO).

This mix of real and game worlds, known as "augmented reality," or AR, in which computer images are superimposed on a view of the real world, has lured young people off the couch and into the neighborhood. Pokémon GO takes advantage of the technology available on our modern mobile phones: GPS, clock, fast 4-G network, touchscreens, and the camera. *Vox's* editor-in-chief Ezra Klein says, "Pokémon GO isn't really a game. It's a new technology" (July 12, 2016; vox.com/2016/7/12/12152776/pokemon-GO-augmented-reality-beginning).

In his post "Pokémon GO Isn't a Fad. It's a Beginning," Kline quotes venture capitalist Chris Dixon: "The next big thing will start out looking like a toy." Pokémon GO is a game, but it's also "the first widespread, massive use case for augmented reality—even though it's operating on smartphones that aren't designed for AR."

Jack Karsten and Darrell M. West of the Brookings Institution agree. "Pokémon GO is more than just a game—it's a primitive portal into technology that is transforming our world," they write. "Pokémon GO uses augmented reality (AR) and GPS to connect to real-world places, creating a cartoon-monster scavenger hunt with profound implications" ("Why Pokémon GO's Technology Is No Fad," July 22, 2016;
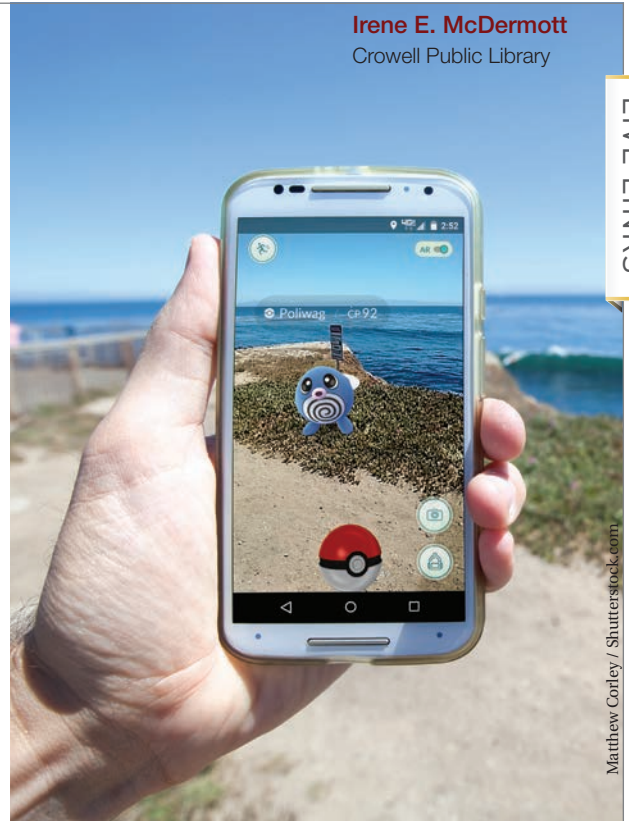
What VR and AR Need Now Is 5G

Remember when there was only 3G (third generation) cellular connectivity? 2013 saw the implementation of 4G LTE (Long-Term Evolution) mobile networks, a high-speed protocol that transmits data 10 times faster than 3G. This made it much easier to send and receive video through cellphones.

Yet, the vast and fast data transfer needed for AR and VR will require a new network protocol: 5G (or fifth generation). Bonnie Cha writes that 5G will provide "significantly faster data speeds: Currently, 4G networks are capable of achieving peak download speeds of one gigabit per second, though in practice it's never that fast. With 5G, this would increase to 10Gbps" (What Is 5G, and What Does It Mean for Consumers?" Recode, March 13, 2015; recode.net/2015/3/13/11560156/ what-is-5g-and-what-does-it-mean-for-consumers).

5G will feature very low latency. "Latency," explains Cha, "refers to the time it takes one device to send a packet of data to another device. Currently with 4G, the latency rate is around 50 milliseconds, but 5G will reduce that to about one millisecond. This will be particularly important for industrial applications and driverless cars."

The problem? 5G does not yet exist. "What's happening now is that all the players in the wireless world, from chipset makers to carriers, are jockeying to be able to define 5G and establish themselves as 5G leaders," writes Sascha Segan ("What Is 5G?" PCMag.com, June 21, 2016; pcmag.com/ article/345387/what-is-5g). She notes, "The final 5G standard, and the bands that 5G networks can use, are expected to be locked down by 2020."

brookings.edu/blogs/techtank/posts/2016/07/22-pokemon-GO-technology-no-fad). And it runs for free on equipment that many already own.

OTHER AR APPS

Pokémon GO is the most popular of the smartphone-based AR apps. Yet there are others that have been quietly available, some for years.

Niantic (niaticlabs.com), the company that makes Pokémon GO, offers two additional free apps, available for Android or iOS, that use augmented reality. The first is Field Trip, which alerts smartphone users to points of interest around them. The other is the precursor to Pokémon GO: Ingress, a massively multiplayer online (MMO) location-based game, uses GPS to engage players on missions against each other's teams. Ingress debuted in 2012.

Snapchat quietly entered the augmented reality arena with its Lenses feature, which lets users add dog ears and other filters to their selfies and even to swap faces with others (support.snapchat.com/en-US/a/ lenses1). Those who prefer a pretty face to a silly virtual one may try the free Makeup Genius app from L'Oréal. It superimposes makeup looks on a live camera view of your face, allowing you to try on different products and looks and to click through to buy the makeup. (It does smoky eyes and bold lipstick well, but unfortunately does not include concealer for those under-eye bags!)

Since 2009, Yelp has offered an AR feature within its app called Monocle. Monocle turns on the smartphone camera and superimposes listings for nearby restaurants. All these apps are available for free download for iOS and Android.

Still, as Sunny Dhillon sniffs, "Current generation smartphones do nothing to dynamically make sense of the world around them through computer vision or depth sensing. … Calling Pokémon GO AR is like calling mobile 360 video VR. Both are incredibly low-end, basic demonstrations of what each technology will be capable of in the next five years. Pokémon GO is a location based game, not an AR game" ("Stop Referring to Pokémon GO as Augmented Reality," VentureBeat, June 9, 2016; venturebeat.com/2016/07/14/stop-referring-to-pokemon-GO-as-augmented-reality).

REAL AUGMENTED REALITY

If AR smartphone apps aren't "real" augmented reality devices, what are? And how can we get one?

The first "true" AR device was Google Glass, the infamous apparatus mounted on a pair of eyeglass frames, that existed from 2012 to early 2015, when it was abruptly pulled from the market. The device could run web apps on its tiny screen and record events in the wearer's vision. That raised privacy and distraction concerns: Google Glass was banned from movie theaters and Las Vegas casinos before it disappeared.

The AR device on the market now, albeit in beta version, is Microsoft's HoloLens (microsoft.com/microsoft-hololens/en-us). Here is what Will Shanklin writes about this "pre-consumer developer hardware": "Unless you're a developer or filthy-rich early adopter, don't buy HoloLens right now. Its app selection is still small, and the consumer version will almost certainly cost less and improve on other things" ("Microsoft HoloLens Dev Kit Review: A Peephole Into the Future." *New Atlas*, Aug. 20, 2016; newatlas.com/hololens-review-developer-kit/45000).
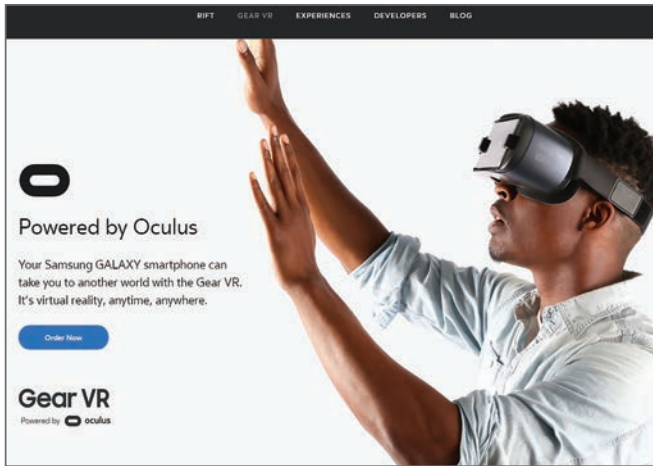
Samsung's Gear VR headset is powered by its Galaxy smartphone.
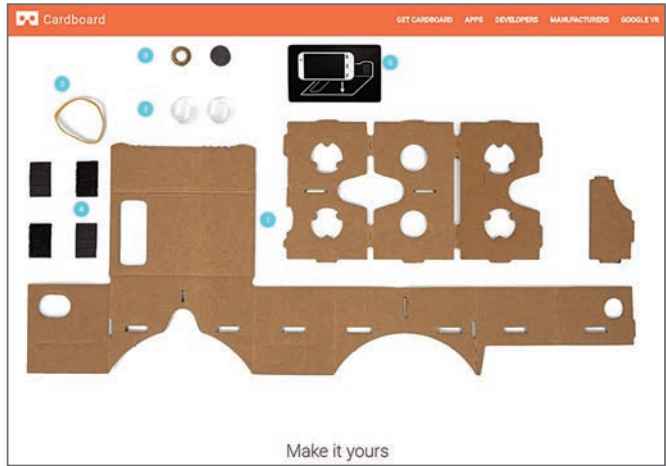
Experience virtual reality on the cheap with Google Cardboard.

Yes, the price tag is $3,000. Still, as Shanklin notes, "Not only does HoloLens overlay virtual objects on top of your real-world view, but it also knows where your floor, walls, lamps and tables are—letting virtual and real intermingle as if they were all bound by the same physical limits." The HoloLens Development Edition encourages users to build apps for their "mixed reality" device. (Microsoft uses this term as opposed to calling it "augmented reality.")

There is another AR gadget in the works: Magic Leap, from a "secretive" Florida-based startup (magicleap.com/#/home). It is said to project images directly onto the user's retina, making them appear remarkably real in one's view. Yet, as Rachel Metz writes, "It's clearly incredibly hard to make this kind of stuff work in a convincing way on a headset—once you've figured out how to make good-looking virtual images, there's the task of cramming all of the necessary computer hardware into a wearable device, making sure it looks good as the wearer is walking around, and figuring out a way to power it" ("Reality Check: Comparing HoloLens and Magic Leap," *MIT Technology Review*, March 20, 2015; technologyreview.com/s/535806/reality-check-comparing-hololens-and-magic-leap). Still, we can look forward to stunning advances in AR in the coming years.

VIRTUAL REALITY

I come home from work and greet my son. "Why are you holding an icepack to your cellphone?" "I was playing a VR game and it overheated," he replies.

When he bought his Samsung Galaxy S7 Edge last March, he took advantage of its offer of a free Gear VR headset. (Normally, the Gear costs about $100.) He snaps his phone into the front of the headset and then buys games available through the Oculus Store (oculus.com) or videos from Facebook 360. (Facebook bought the Oculus startup in 2014.) The games consume heaps of storage and processing power, hence the overheating of the phone after 30 minutes of play.

VR differs from AR in that it entirely covers the user's field of view. Also, dedicated VR headsets, unlike the smartphone versions, must be hooked to a powerful gaming PC in order to handle the visual processing.

The standalone VR headset Oculus Rift became available for sale in March 2016 for about $600. Its rival, Taiwan's HTC Vive (htcvive.com/us), came out in April 2016 for about $800. The Vive differs from the Rift in that it offers wand-like controllers that can be used as hands (or guns) and also has two "light boxes" that put the real space of the room into the VR experience.

A final way to experience VR via cellphone is Google Cardboard (vr.google.com/cardboard). For $15, Google will send you a fold-up viewer. Download the free Cardboard app (for Android and iOS) and slip your smartphone into the viewer to begin your VR experience on the cheap. Google recently announced plans to release Daydream, a combination store and operating system for virtual reality content.

REAL-WORLD USES

You may think that AR and VR are just for playing games (or even looking at porn!). Yet, AR via HoloLens is already being used for instruction over the web via Skype. VR is being used to help the very elderly cope with their restricted circumstances ("Virtual Reality Aimed at the Elderly Finds New Fans," Kara Platoni, NPR, June 29. 2016; npr.org/sections/health-shots/2016/06/29/483790504/virtual-reality-aimed-at-the-elderly-finds-new-fans). Oculus Rift has even been used to help paraplegics regrow nerves to regain partial functioning ("Paraplegics Are Learning to Walk Again with Virtual Reality," Ananya Bhattacharya, Quartz, Aug. 15, 2016; qz.com/757516/paraplegics-are-learning-to-walk-again-with-virtual-reality).

I am personally looking forward to the day when I can search for a book in the OPAC, slap on my HoloLens, and look up to see exactly where it is in the library. O brave new world that has such gadgets in't!

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Comments? Email the editor-in-chief (marydee@xmission.com).