INFERENTIAL FOCUS

*in*FOCUS Context Update

inF 1701

January 10, 2022

AR Technologies Bridge the Physical and Digital Worlds

We have all become accustomed to buying or receiving new technology products with no instruction manuals included. In most cases, how to use that new gadget is characterized as intuitive and easily figured out by trial and error. And for the most part, figuring out how to use new digital consumer products is a benign activity. Yet for technicians in the defense community and the manufacturing sector, trial and error is not an option, and having to constantly walk back and forth to consult physical manuals or computer monitors can be too time-consuming and expensive. To solve the problem of this inefficient process, in December the Defense Advanced Research Projects Agency (DARPA) issued a $5.8 million contract to a team from PARC (a Xerox company), the University of California at Santa Barbara, the University of Rostock in Germany and augmented-reality (AR) developer Patched Reality to take existing paper and video manuals and automatically convert them for use in AR systems. The teams are looking to deliver two different systems to DARPA: an artificial intelligence (AI) system that will be able to extract task information from texts, illustrations and videos, and a second system that will take that information and create AR guidance based on it. Beyond some of the AR technologies already in use by companies today, this system will be able to deliver tasks and information in a personalized way based on the user's skills and emotional state. Such advanced uses of AR technology, bridging the physical and digital worlds for highly complex tasks, will offer personalized instructions to individual workers while offering efficiencies for corporations or government entities. (*C4ISR.net*, 12/20/21)

Similarly, Taqtile's Manifest AR platform places instructions for managing complex industrial equipment directly in workers' sight lines via devices including Microsoft's HoloLens Series, Magic Leap headsets and various computer browsers, as well as Apple's iOS and Google's Android operating systems. The company claims that its platform unites step-by-step procedures, access to remote knowledge experts, real-time IoT data and anywhere-anytime availability in one platform. It is being used by SpaceX, UPS and Novartis. Meanwhile, various corporate uses of AR in consumer-facing businesses continue to push forward quickly, enabling efficient ways to facilitate contactless commerce as well as satisfying the Digitally Trained Individual's desire for convenience, speed, access to information and novelty.

The Original Context

In March 2021, we wrote about the ways in which augmented-reality technology was being used to bridge the physical and digital worlds. That timing marked one full year of living with a global pandemic, which, among many other effects, created new consumer expectations for contactless commerce and pushed forward AR technologies to facilitate such transactions. In addition, we noted, "Consumers have elevated expectations that companies will provide omnichannel capabilities and access to information and content…wherever they may be and whenever they want them." Finally, "It is the way they are used to align companies' offerings with Digitally Trained Consumers' desire for convenience, speed, access to information and novelty that will keep the momentum going after the pandemic has passed." (**inF 1605**)

New Observations: Enhance Interactions with Digital Products for Greater Consumer Purchasing Satisfaction

- In 2020, customers returned a much higher percentage of purchases made online than purchases made in stores. Consumers collectively returned products worth $428 billion, or 10.6 percent of total retail sales, according to the National Retail Federation, but for e-commerce alone, approximately $102 billion worth of goods, or 18.1 percent of total e-commerce sales, were returned. Of brick-and-mortar purchases alone, nine percent were returned. Companies and retailers are focused on developing AR technology to help reduce the return of products purchased online.

- In August 2021, Kohl's and Nextech AR Solutions announced a partnership using Nextech's 3D Web AR for e-commerce to create thousands of new 3D software renderings of products for sale by the retailer. Kohl's customers will use their choice of 3D creation to review products dynamically at any angle and against any desired backdrop. Kohl's 3D models will also appear in organic Google search results from which shoppers may immediately interact with the products and offer reviews.

- Last year, Kohl's partnered with Snapchat to create the Kohl's AR Virtual Closet, which is essentially a virtual dressing room. Once "inside," customers can mix and match items, virtually try them on and purchase directly while on the app.

- Over this past summer, Gap purchased Drapr, a company whose software enables consumers to create 3D avatars and virtually try on clothing to determine the best size and fit.

- In August, Perfect Corp. announced a partnership with more than 400,000 Avon representatives in Mexico to integrate AR and AI through Agile Face facial analysis in its YouCam Makeup app. The technology allows Agile Face to identify facial features and then recommend beauty products, hair colors and makeup styles. Sephora's shopping app and Ulta's GLAMlab also use AR to enable consumers to virtually try on makeup.

- Gunner Kennels used Shopify's 3D-AR technology to allow customers to interact with 3D representations of its heavy-duty pet kennels and, using the AR feature on their mobile device, to virtually place the crate beside their pet to better judge size requirements.

(*PYMNTS*, 8/26/21 and 8/31/21; *Nasdaq.com*, 11/11/21)

New Observations: Make It Easier for Developers to Create Killer AR Apps

- In November, at the Augmented World Expo, Qualcomm revealed its Snapdragon Spaces XR Development Platform to help developers more easily create apps to take advantage of AR devices that people wear on their heads, including AR glasses and full AR headsets. Snapdragon Spaces is intended as a platform for use by software developers that will be hardware agnostic.

- Niantic recently opened its platform to the public in a new software-development package called Lightship Augmented Reality Developer's Kit. The Lightship ARDK features many of the systems used to make its AR games, Pokémon Go and Pikmin Bloom.

- Nvidia has announced a development platform called Omniverse, which enables cloud collaboration among designers with disparate 3D design tools, and uses a system called CloudXR to stream them to smartphones.

- In May, Snap unveiled its fourth generation of Spectacles, the company's first true augmented-reality glasses, which have dual waveguide displays capable of superimposing AR effects made with Snapchat's software tools. The frame features four built-in microphones, two stereo speakers and a built-in touchpad. Front-facing cameras help the glasses detect objects and surfaces so that graphics more naturally interface with the real world. The

glasses are not yet for sale but have been given to select developers and artists who have used them for projects like virtual galleries.

- Chinese AR-glasses-maker Nreal has raised $100 million to fund international expansion and to develop new products. The company currently has on its platform 8,000 developers who can make apps for Nebula, Nreal's own operating system.

(*The Verge*, 11/9/21; *Venture Beat*, 11/11/21; *Fast Company*, 7/8/21; *PYMNTS*, 12/1/21)

New Observations: Smart Glasses Are Where Size Matters

- Nreal hasn't launched products in China. The company currently sells its lightweight flagship Nreal Light glasses in a number of markets, including South Korea, Japan and Spain. The Nreal Light glasses connect to a smartphone. Users may then experience mixed-reality (*i.e.*, XR) apps, where digital images are superimposed on the real world.

- Tilt Five's augmented-reality glasses use tiny projectors to beam video onto a specialized gaming table, which then reflects 3D imagery back to the wearer. The company offers a lightweight headset with a wide field of view.

- Vuzix, which has created AR headsets for businesses and the Department of Defense, recently unveiled its new smart glasses, called the Vuzix Shield, which put battery, computer, cameras and the display projector in the temples of the glasses.

- Lenovo's ThinkReality A3 glasses use Lenovo's Motorola phones for processing and connectivity for navigating extended-reality (XR) applications. ThinkReality A3 glasses will be the first to commercialize Snapdragon Spaces (mentioned above) next year.

- Chinese electric-car start-up Nio has partnered with Nreal for AR glasses to go with its new sedan, the ET5, which is set to begin deliveries in September 2022. The custom glasses, sold separately, are able to project a screen for so-called "heads up" driving. Nio's investment arm, Nio Capital, is an investor in Nreal.

- When Meta was still called Facebook, it formed a partnership with EssilorLuxottica to create high-tech eyeglasses. In September, the collaboration produced a new "sunglasses" product called Ray-Ban Stories, which incorporates a camera and open-air headphones in a narrow, lightweight space. Users can record surroundings, take calls and enjoy basic AR content. This is seen as a precursor to future Meta AR eyewear.

- In October, Mark Zuckerberg explained how Meta's AR eyewear, still in development, will be lightweight and provide easy access to the company's metaverse.

(*The Verge*, 5/20/21; *Fast Company*, 11/18/21; *CNBC*, 9/22/21 and 12/19/21; *Wall Street Journa*l, 12/4/21; *Women's Wear Daily*, 12/22/21)

New Observations: Connecting to the Metaverse

- In late November, Nextech AR launched a software-as-a-service (SaaS) platform to enable the creation of 3D models that can be used to showcase products in AR as well as within virtual worlds.

- In the jump from physical interactions to a virtual world, Nextech's plans include offering a "Metaverse Studio," an SaaS product for retailers, brands and other clients to create their own metaverses and potentially recreate the social experience of in-person shopping.

- Obsess is a start-up that bills itself as an experiential-shopping software company. Obsess is used by Levi's, Tommy Hilfiger, Ralph Lauren and other brands to create 3D virtual stores that integrate AR and VR technology. The virtual stores sit on the retailers' websites and are accessed by the customer from any device, but no headsets are needed. The virtual stores may be digital recreations of physical stores down to the smallest details or may be entirely new virtual environments through which customers can browse, interact and purchase.

(*PYMNTS*, 12/1/21; *Yahoofinance*, 12/21/20)

The year 2021 was one in which the development of AR gained momentum as a solution to the increased consumer desires for contactless commerce stemming from the global pandemic. The technology also offers companies avenues to align with the Digitally Trained Consumers' desire for convenience, speed, access to information and novelty, which means that this new way of operating will keep its momentum going after the pandemic has passed. As the year progressed, further new developments by tech companies opened up developers' platforms for use by outside AR software developers, thereby clearing the way to create new AR products. Meanwhile, several of the tech companies focused on augmented reality are on the verge of introducing new hardware products, such as smart glasses, which can bring expanded experiences to users bridging the physical and digital spheres. When the new AR software and hardware developments are introduced, the result may push the metaverse closer to "reality."

Implications

- Virtual AR capabilities offer companies ways to realize more efficient sales.
- Fewer consumer returns of products purchased online increases gross margins for retailers.
- Brands have the ability to offer interactive content via AR apps, thereby creating a greater bond with the Digitally Trained Consumer.
- AR content becomes yet another stream of content vying for consumers' time and attention.
- AR development platforms that are open to outside developers allow for increased numbers of AR applications to be created. Those apps that rise to the top in usage will point to areas of future demand.
- Auto insurance policies will, of necessity, incorporate liability coverage for the AR content generated for in-car driver use.
- Tech companies that provide the software for AR headsets and glasses will benefit.