XR and the Future of Cities

Insights from Exploring Future Reality hosted by

NYC MEDIA LAB

How will XR change our cities?

VR, AR, and MR (XR collectively) are helping us reimagine cities. Non-profits, universities, and urban designers around the world already use this technology to create community, reduce waste, increase interaction, and nudge citizens toward healthier behavior. And we have only just begun to explore the possibilities.

Research firm **Statista** estimates that the market for AR and VR will grow from $17.8 billion at present to $215 billion by 2021. That will usher in a Cambrian explosion of new gear, applications, and accessibility. "Within the next four years, everyday glasses are going to be augmented reality devices. No one will be thinking about it as technology any more than we think about the web as technology," said Ken Perlin, professor of computer science at NYU.

To understand the profound impact this will have on society, we can look to those areas where XR is already making its mark.

Insights from NYC Media Lab's **Exploring Future Reality** conference, November 30th, 2017

Research based in part on panels with:

- **Jasmine Bowie,** *Youth and Community Programs Director, BCJC*

- **John Bryant,** *Tech Lab Associate, BCJC*

- **Courtney Cogburn,** *Assistant Professor, Columbia University*

- **Jeremy Goldberg,** *Deputy CTO, NYCx*

- **Ken Perlin,** *Professor of Computer Science, NYU*

XR will alter human interactions

XR may help us with our manners. AR and MR, for example, might bring back good old-fashioned eye contact, because viewers with an ever-present heads-up display will have less need to reach into pockets or stare down at devices.

"We evolved over millions of years to have all this hardware in our heads for interpersonal interaction, which isn't being used when we text," said Perlin. That instinct to connect, along with computer-assisted reminders for things such as names, past conversations, and birthdays, might make humans much more adept at communication.

But increased access to more data could also lead to greater distraction. Human attention spans are already stretched thin, and Perlin can also imagine a culture where people only appear to listen while scanning their Facebook feeds. If that occurs, Perlin doesn't believe that the technology will be to blame. "That's really a function of us," he said.

In a future with widespread XR, cities may look very different from how they appear today, and perhaps appear unique to each and every individual viewer. AR and MR creators such as Microsoft, maker of Hololens, and the startup Magic Leap, maker of Lightwear, have created technologies to overlay images on real-world objects such as walls, furniture, and vehicles. That opens the possibility of virtually reskinning everything in our environment. In his book *The Inevitable*, futurist and founding editor of Wired magazine Kevin Kelly imagines that leading to a world in which XR users can virtually recolor cars, change storefronts, and otherwise customize everything in view.

Three prototypes that emerged from NYC's university ecosystem--Situationist, You Are Here, and VillageLive--offer a glimpse of this future. All provide AR apps for art and historical walking tours of New York City with relevant content such as images and stories superimposed onto present-day buildings.
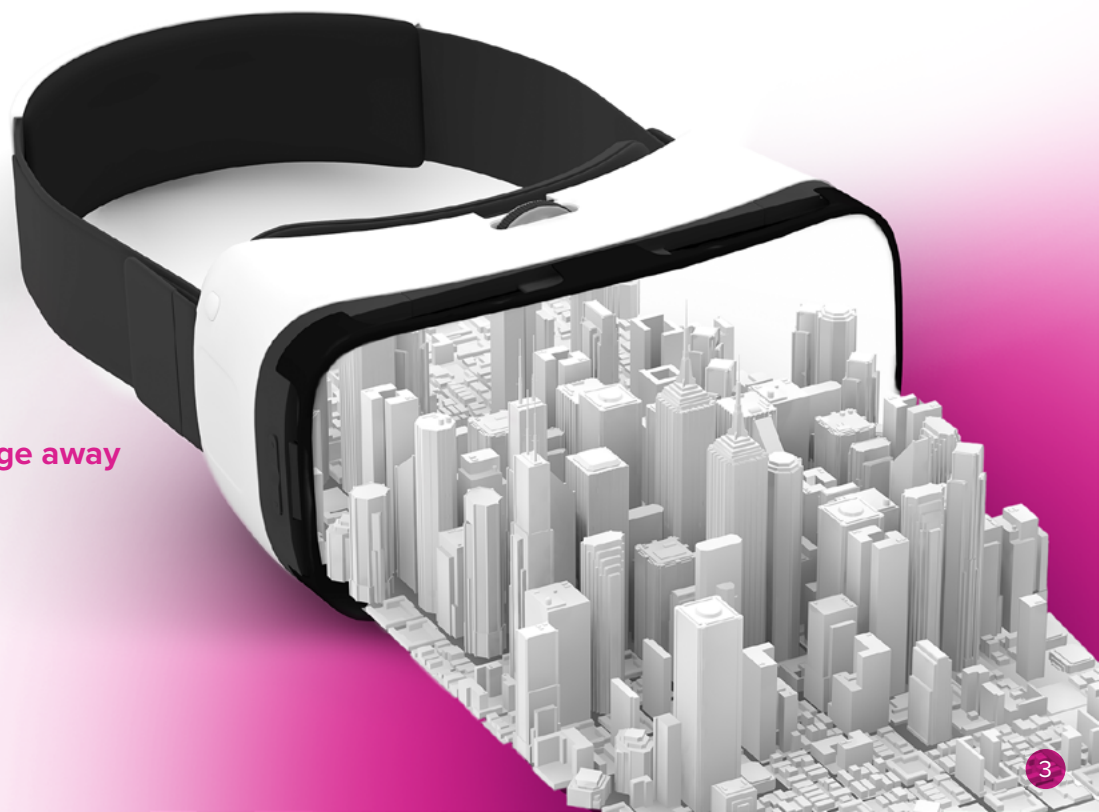
No handheld screens

AR street/traffic signage

AR indicators to throw garbage away

VR city planning

Re-skinned storefronts

Esports arena

XR will change distances and civic planning

Just like the telegraph and the airplane, XR is redefining distance. As immersive VR experiences rival those of real life, they're changing the nature of businesses dependent upon location and transportation such as sports arenas, movie theaters, holiday destinations, and fitness studios, for example.

Indoor exercise equipment provider Peloton, which has raised $445 million in funding, competes directly with gyms by recreating virtual exercise experiences in the home. And **Fortune** suggested that sports stadiums saw a decline in attendance throughout 2017 that might be attributable to the rise of esports and video games.

But rather than disappear, many of these location-based experiences will embrace XR in a hybrid environment. Travel brands such as Best Western, Marriott, and Lufthansa already offer VR apps to help customers virtually plan, try, and book real-world experiences.

As for Main Street, XR may contribute to the continued decline of commercial real estate. In 2017, U.S. retailers settled into a cautious detente with consumers who, though addicted to online shopping, still appreciate physical stores for trying things on and making returns. As retailers like Amazon, IKEA, and Nordstrom offer AR apps to virtually preview purchases, consumers will have less and less reason to visit.

The profusion of XR will also help democratize access to art and culture. Google's Arts & Culture app allows users to virtually explore over 1,000 museums worldwide, collapsing distance and time and sweeping away barriers such as ticket prices and crowds.

Civic planning is undergoing an XR revolution as well. As distances, commutes, and business districts evolve, so will demand for public resources. City planners from South Korea to Brazil already use VR GIS systems to visualize traffic, optimize zoning, reduce crime, eliminate waste, and improve public access. Citizens can provide instant feedback through virtual public hearings, and AR smart signage offers a way to make cities safer and crimes such as littering harder to commit.
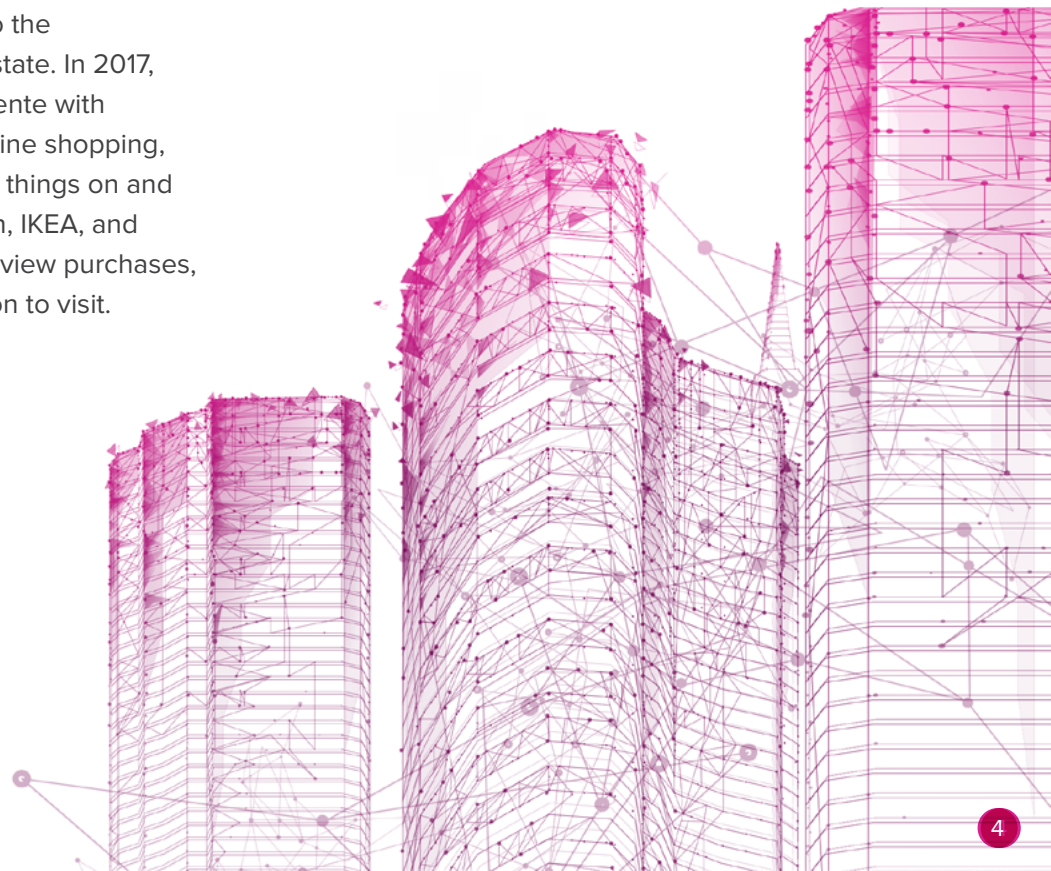
XR will impact communities

It's unclear at this stage what impact XR will have upon communities. In some sense, XR reduces the need to leave your home, potentially fortifying the the echo chambers we already experience on social media. At the same time, XR allows viewers to go anywhere, instantly, should they so choose.

The Brownsville Community Justice Center (BCJC) in New York City uses XR to address deeply rooted problems in the local community. The BCJC operates out of Brownsville, a Brooklyn neighborhood less than two square miles in size that is home to the highest concentration of public housing in the nation. Gang violence is so virulent that "it isn't safe to cross the street," said Jasmine Bowie, youth and community director at the BCJC, whose team is trying to address gang territory problems using VR apps.

The BCJC has developed a mobile game called FIREFLIES, which recreates the Brownsville neighborhood in virtual reality. In the game, residents who otherwise feel unsafe going outside, can meet each other, chat, and play games. "As you work together, you share and learn stories. It breaks down the walls that normally prevent neighbors from having conversations about real issues," explained Bowie. "It's allowing people to connect to their community in a way that they haven't been able to do their entire lives."

Another BCJC app helps spark economic development. B LIVE allows Brownsville residents to create e-commerce stores, opening the door to entrepreneurship where high rent and physical danger otherwise make it prohibitive. In the process, the app educates residents about managing their own businesses.

Other organizations use XR to connect social groups to one another. Courtney Cogburn, Assistant Professor of Social Work at Columbia University, in partnership with Jeremy Bailenson at Stanford University, built a VR experience that helps viewers understand structural racism by being immersed in scenarios where they are mistreated by employers and the police.

"For people for whom this is part of their social reality, who live this every day, they come out and say, 'That's it exactly.' And for people for whom this is not their reality, they're forced to confront facts. They say, 'I had no idea'" said Cogburn.

If these experiences are going to strengthen ties between communities, they'll have to do more than inspire empathy. Cogburn concedes that her VR racism education experience is designed for a limited audience of like-minded individuals. Whether XR experiences can educate and convert those who hold dissenting viewpoints remains to be seen.

Watch Courtney Cogburn's TED Talk:
Experiencing Racism in VR
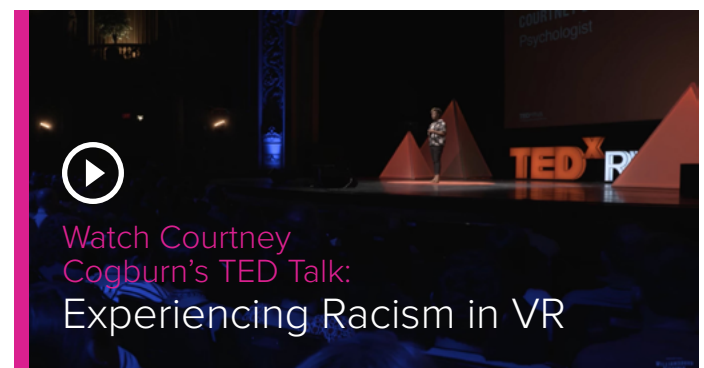
"Once it starts in the community, it stays in the community."
John Bryant, Tech Lab Associate, BCJC

As XR is used to impact communities, it's critical for designers to employ multi-disciplinary teams with diverse perspectives. Should XR become a source of public good, creators will have to responsibly weigh complex social quandaries similar to Facebook's struggle with fake news. "Who controls information is important," Perlin said. If XR becomes a resource and access to it is ever restricted or distorted, it has the potential to cut the flow of information that is crucial to healthy communities and a robust democracy.

John Bryant, Tech Lab Associate at the BCJC and creator of B Live, says that it's imperative that those from target neighborhoods are active participants in local initiatives. "Once it starts in the community, it stays in the community," Bryant said. "If a community sees its own residents want change, that's the first step to creating it."

The future
If current developments are any guide, cities of the future will look very different. The changes will be visual as XR users customize their environments, and interpersonal as XR devices give people more reason and a greater ability to connect.

XR will help to redraw city maps, both literally and figuratively. It will force businesses to reimagine the value of location for the consumer, and it will help city planners better meet citizens' needs. As devices grow smaller and more powerful, XR will become even more integrated. Visual devices will likely give way to conversational interfaces and perhaps even direct brain-to-device connections, as the startup Neuralink promises.

While many of these initiatives come from the private sector, the public sector is heavily involved as well. "We are your front door for industry engagement and partnership programming as it relates to technology that makes for a more equitable, resilient, and transformative city for New Yorkers," said Jeremy Goldberg, Deputy CTO of NYCx, a department of the New York City Mayor's Office that helps startups apply technology for public good.

Whether XR will better connect humanity and foster relationships between communities remains to be seen. But for the time being, social organizations, universities, and non-profits are hard at work imagining that future.

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