F8: Connectivity, artificial intelligence and more from day two

Day two of F8 2017, saw chief technology officer Mike Schroepfer, director of connectivity programs, Yael Maguire; director of applied machine learning, Joaquin Quiñonero Candela; chief scientist of Oculus research, Michael Abrash; and VP of engineering and building 8 Regina Dugan present their keynote thoughts.

Director of connectivity programs, Yael Maguire at F8 event

The annual Facebook event where developers and businesses come together to explore the future of technology, drew a major online audience.

In the opening keynote, Schroepfer talked about the company's goal to develop technology that will help everyone build global community. To do that, it is investing in three foundational technologies over the next 10 years: connectivity, artificial intelligence and virtual reality.

Connectivity

Rather than look for a one-size-fits-all connectivity solution, Facebook is investing in a building-block strategy — designing different technologies for specific use cases, which are then used together to create flexible and extensible networks.

Today it highlighted new milestones in its efforts to reach people who are unconnected and increase capacity and

performance for everyone else. The team set three new records in wireless data transfer: 36 gigabits per second over 13 kilometres point-to-point using millimetre-wave (MMW) technology; 80 gigabits per second between those same points using optical cross-link technology; and 16 gigabits per second from a location on the ground to a circling Cessna aircraft over 7 km away using MMW. Additionally, its Terragraph system being tested with San Jose in the city's downtown corridor has become the first city-scale mesh millimetre-wave system capable of delivering fibre-like multi-gigabits/s of performance and reliability.

It also announced Tether-tenna, a new kind of "insta-infrastructure" where a small helicopter tethered to a wire containing fibre and power can be deployed immediately to bring back connectivity in case of emergency.

Artificial Intelligence

AI is a powerful tool, and Facebook is leveraging it to build amazing visual experiences for people.

AI has revolutionised the ability of computers to process and understand images and videos. It is easy to forget that only five years ago, computers saw images as just a collection of numbers, with no particular meaning to them. Now computers can understand every single individual pixel of an image. These advancements enable new experiences. For example, Facebook is working on using AI to help people discover the videos they care for the most.

The company believes AI belongs to everyone. That's why today it announced that it is open sourcing Caffe2 — a framework to build and run AI algorithms on a phone — and building partnerships with Amazon, Intel, Microsoft, NVIDIA, Qualcomm, and others.

Another way it is giving this technology back is through an AI-infused camera across Facebook, Instagram and Messenger. With the ability to run cutting edge AI and computer vision algorithms on the device, this camera can now understand users' surroundings, recognise people, places and things. It can annotate and enhance images and video. The new Camera Effects Platform gives developers a way to build new tools for creative expression, and we shared a few demos of ideas that have come out of our research.

Virtual Reality

Facebook is investing in VR across mobile and PC hardware, software and content — from Oculus Rift and Gear VR to Facebook Spaces.

At the conference, it introduced the newest designs for the Surround 360 camera that allows people to produce amazing high quality videos for VR. It creates some of the most immersive and engaging content ever shot for VR. The new camera technology lets users move around within the video scene and experience the content from different viewing angles. This means users can move their head around in the world and see it from different angles, bringing the feeling of immersion and depth to a whole new level.

Augmented Reality

On day one of F8, Mark Zuckerberg talked about how the camera is the first augmented reality platform. On day two, Abrash shared a vision for the path to full AR — where augmentation enhances users' vision and hearing seamlessly, while being light, comfortable, power-efficient and socially acceptable enough to accompany them everywhere.

He talked about the rise of virtual computing — which encompasses both virtual and augmented reality — as the next great wave after personal computing. Virtual computing is just starting to form, but it will give users the ability to transcend time and space to connect with one another in new ways.

In order to make virtual computing as much a part of everyday life as the smartphone is today, the company is going to need see-through augmented reality, which will likely be transparent glasses that can show virtual images overlaid on the

real world.

The set of technologies needed to reach full AR does not exist yet. This is a decade-long investment and it will require major advances in material science, perception, graphics and many other areas. However, once that is achieved, AR has the potential to enhance almost every aspect of users' lives, revolutionising how we work, play and interact.

Building 8

Building 8 is the product development and research team at Facebook, focused on creating and shipping new, category-defining consumer products that are social first, and that advance Facebook's mission. A breakthrough innovation engine modelled after Darpa and shipped at scale will power products from Building 8.

At F8, Facebook announced two technical projects aimed at the development of new, breakthrough communications platforms.

It is working on a system that will let people type with their brains. Specifically, it has a goal of creating a silent speech system capable of typing 100 words per minute straight from the user's brain – that is five times faster than one can type on a smartphone today. This is not about decoding random thoughts. Think of it like this: You take many photos and choose to share only some of them. Similarly, you have many thoughts and choose to share only some of them. This is about decoding those words one has already decided to share by sending them to the speech centre of one's brain. It is a way to communicate with the speed and flexibility of one's voice and the privacy of text. Facebook wants to do this with non-invasive, wearable sensors that can be manufactured at scale.

It also has a project directed at allowing people to hear with their skin. It is building the hardware and software necessary to deliver language through the skin.