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VRTO

Top VR and AR Talent Meets in Toronto

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Virtual and Augmented Realities exist today. Consumer platforms are for sale; the torrent of content creation continues to swell as do the toolkit options enabling that content creation. Some of these were displayed at Toronto's inaugural VRTO Conference, which saw local and internationally acclaimed experts and enthusiasts meet for two days of industry and technology updates. One of the most valuable things precipitating from the VRTO Conference was not content or technology; it was something far more tangible and important – ethics. Experts and enthusiasts spent part of the Conference refining a code of ethics that will help secure your rights as VR and AR sensing technology begins to collect more of your personal data. If you are looking to attend the biggest VR/AR conference, VRTO was not for you. But if you wanted to participate in town hall discussions and have access to industry experts influencing the future of VR and AR industries, the VRTO Conference hit the virtual nail on the head.

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Reasons to Read this Report

1. Learn about Toronto's inaugural VRTO conference;
2. Some current virtual reality (VR) and augmented reality (AR) adoption drivers;
3. An update about China;
4. VR's potential influence on education;
5. Ethic considerations as VR and AR become mainstream, and;
6. Find out one way investors can benefit from the growing VR and AR markets.

Introduction

VR and AR are technologies that can revolutionize the way people work, socialize, and have fun. With this in mind, we attended the first VRTO Conference to see what enthusiasts are thinking about VR and AR. Content creation, emerging markets, and hardware and software were prominently featured. But what surprised us was the discussion surrounding ethical and surveillance issues surrounding these technologies.

VRTO and Organizer Thoughts about VR and AR

Some investors may not realize that Toronto is an emerging hub for virtual and augmented realities (VR/AR). One reason for this is that most Toronto companies are start-ups and privates, and although they may not be household names, we do run into them at major conferences such as the Consumer Electronics Show (CES), Game Developers Conference (GDC), Augmented World Expo (AWE), and the E3 gaming conference in Los Angeles.

Thankfully, VRTO, Toronto's virtual reality meetup group, decided to host a conference to showcase local and international companies and developments. The VRTO Conference builds upon Toronto's regular virtual and augmented reality tech meetups. These meetups showcase the city's virtual and augmented reality innovators, inventors, investors, and content creators, making Toronto an important hub for these disruptive technologies. Organizers told us that VRTO was designed to answer hard questions by creating narrow filters and new approaches for discussion. Although they anticipate that the industry will experience growth spurts and growing pains, they expect virtual reality to become pervasive and develop into things that we can't possibly have imagined. For now, those involved in virtual and augmented realities need to press on with open minds.

*Augmented reality demonstrations were prominent at the VRTO Conference.*

Why Sophic Capital Attended the VRTO Conference

Sophic Capital attended the VRTO Conference to have conversations with VR/AR operators and experts. We've attended E3, GDC, CES, and AWE multiple times. Besides having fun playing the best video games and getting to try out the latest technology, we find that the best value we extract from these conferences is the opportunity to talk to industry enthusiasts and experts. These are people who live and breath VR and AR - and VRTO was no exception. The conference attracted an international audience that offered a broad range of ideas, opinions, and technology. This was VRTO's inaugural event, and based upon our travels to the large, established conferences, we assure you that in terms of content and speakers, VRTO exceeded our expectations. In fact, VRTO was better, in that everyone was accessible. So if you have an interest in VR or AR, make plans to attend next year's VRTO Conference.

VR/AR Adoption Drivers

Sophic Capital has written extensively about VR adoption in the gaming community and the emergence of AR in the enterprise. In terms of VR, many VRTO Conference attendees continued to believe that wireless headsets using smartphones would likely drive mass adoption due to their lower price-points than high-end platforms like Oculus and HTC Vive. However, they conceded that high-end platforms wouldn't go away, especially for the gaming world. A few shared that they could see the high end platforms ditch the standalone gaming computer for a wearable machine. Social applications would also drive adoption – attending concerts with friend avatars where we can tune out everyone but our friends and the band, for example.

AR will take more time to evolve than VR. One presenter discussed his experiences developing applications with Microsoft's HoloLens. He stated that he prefers HoloLens over Meta's headset, but neither is consumer ready. His preference for HoloLens stems from the fact that it has one gesture, a click motion that simulates a mouse interaction, whereas Meta has several hand gestures. In a society where more is considered "better", this is not the case according to the developer. People tend to navigate towards what is familiar, and everyone on the planet who has every used a computer knows how to click a mouse. In other words, HoloLens replicates what we already know. Other enthusiasts concurred with our opinion that mass adoption would likely occur once form factors mimic reading glasses, or at least something more reasonable than the bricks on peoples' faces today.
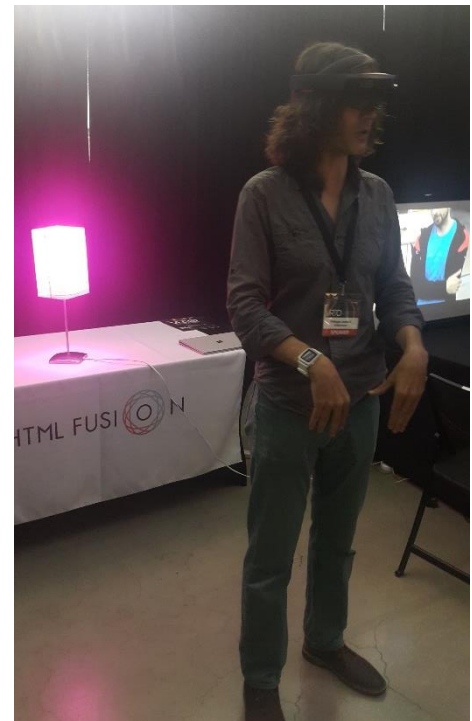
HTML Fusion representative at VRTO controls a lamp with HoloLens by clicking in the air.

Give Us Development Tools

The VRTO Conference showcased several content creation tools. At our third GDC (this past spring), we wrote how the focus had shifted from hardware to content creation (please see **Virtual Reality – Get Real!**). Throughout the VRTO Conference, organizers continued on this theme with several breakout sessions showcasing development tools. JanusVR is a real-time, collaborative 3D browser that allows people to create virtual reality websites; a WebVR demo showed how to integrate popular VR platforms to work with browsers; and HTML Fusion taught coders the HoloLens programming basics.

China Emerging as a Virtual Reality Adopter

Several VRTO Conference attendees reinforced China as a VR superpower in terms of development and adoption. We've concurred for some time, as we wrote in our CES Focusing on Tech Report, and a recent forecast from Beijing-based IResearch pegs an $8.5 billion Chinese market in 4 years. Last December, HTC, the creator of the high-end Vive VR headset, announced a pilot with China's ShunWang Technology, Inc. for VR demos in China. ShungWang's software is used in over 100,000 Internet cafes in China – about 70% of the market. At E3 in June 2015, we didn't see any Chinese VR headset OEMs. At CES 2016 in January, Chinese OEMs prevailed (Bloomberg reports that there are at least 200 Chinese VR start-ups). And more Chinese enterprises are investing in the technology - in June 2016, the Chairman of Suning Holdings, a Chinese holding company, announced plans to build 300 VR hubs **within 3 months**. Suning will integrate the hubs into their stores to allow users to try VR HMDs before purchasing.

VRTO Highlighted that VR will Evolve Experiential Learning

The education system has not evolved much since Frederick the Great, King of Prussia, developed the current system of education in the 18th century. He created the idea that children the same age would receive the same lessons then advance to higher learning upon successful completion of studies. The typical learning process consisted of oration and memorization, which neglect the important tenets of creativity and motivation.

The Internet was the greatest education innovation since Frederick's time. The Internet was widely adopted by the 1990s, and it lowered the cost of distributing information almost to $0. Information is convenient and accessible to the point that one recently graduated student we spoke with said that he never spent a dime on textbooks during 4 years of university. Instead, he relied upon Google and YouTube to supplement the syllabus. This demonstrates that although the method of information distribution changed, the learning methods of oration and memorization had not.

Virtual reality represents the greatest innovation to education. VR's immersiveness will foster experiential based learning that inspires creativity and motivation. When humans do something, we retain

Frederick the Great

over 75% of the information. VR can bring a student into World War I battlefields or, as we can attest, a fascinating journey to the moon on the Apollo 11 mission (how can you not be awed and inspired when you stick your head out the capsule's window as you blast into orbit from the Kennedy Space Center)?

The Father of Wearable Computing Talks Tech and Ethics

Steve Mann, Chief Scientist at augmented reality firm Meta, opened the VRTO Conference discussing ethics, his work on making sensor technology visible, and the human response to technology. Dr. Mann stated that it won't be long until we all wear computerized eyeglasses like Microsoft's HoloLens. And as seen in the picture below right, Dr. Mann practices what he preaches, giving his keynote while wearing his Eye Tap headset. He's gone so far as to have his passport picture taken with his headset.

We have a right to know when, what, and where we're being sensed. This was one of the ethics topics discussed by Dr. Mann and a panel of experts. "Metaveillance", or sensors sensing sensors," lacks in society. The idea behind metaveillance is that cameras and sensors are constantly monitoring our actions, yet we can neither access the collected information nor utilize our own sensors (cells phones and cameras) in many places. And the funny thing is that in most cases those who collect the data don't know what to do with it. They collect for the sake of collecting with no idea why.

VR and AR will compound data collection, and Dr. Mann and his panel emphasized that humans have the right to know what is done with the data. One of Dr. Mann's current priorities

is drafting a code of ethics regarding matters concerning surveillance. He presented his initial tenets and encouraged panelists and audience members to debate and refine them. The outcome was a doctrine that will be presented at upcoming VR/AR conferences for further revisions.

The discussion brought up the question of what we would do with the data if we had access to it. What if Google handed us a petabyte of data? What would we do with it? How could we extract information from the data? Which brought the panel to suggest that it's our right to know what companies collect about us, and they must present the data in a format that is understandable. That brought up the counterpoint that we can choose not to use Google to avoid having our data collected. However, is that a realistic option? Can we live without Google?

And while technology advances allowing us to collect more data with better sensors, the technology actually becomes worse. Dr. Mann highlighted bank machines as some of the simplest virtual reality sensing machines but also the worst. When we push an ATM button, a delay occurs between the action and the machine's response, which is usually

Mann or machine? Dr. Steve Mann demonstrates one of his metaveillance devices (a sensor that senses another sensor).

a beep. "Feedback delayed is feedback denied," according to Dr. Mann, and as machines get more complex, this degradation of technology compounds. In the old days, plugging a computer into a VGA terminal generated an immediate picture on the screen. Now, with HDMI, the response can be several seconds. Technology needs to be an extension of the human body; technology that doesn't balance the body to act as a natural extension is bound to fail.

Ethics and technology are always hot topics, especially when a new, disruptive technology is introduced. It was refreshing to see the industry starting to address these key issues. What is clear is that we are right at the beginning and there is a lot of work to do around the ethics of VR and AR. Addressing these issues in the early stages is easier than after mass adoption occurs.

How to Invest in the VR and AR Spaces

Spectra 7 Microsystems (TSX:SEV, OTCQX:SPVNF) designs ultra-thin interconnects for the virtual reality and augmented reality markets. Spectra7 is not a virtual reality headset manufacturer but instead makes chips that reduce the weight and thickness of cables used on VR headsets. The Company's chips accomplish this without sacrificing the high speed video, data and audio quality required for the best user experience. Spectra7's VR7100 DisplayDirect™ specifically targets virtual reality headset cabling by condensing four bulky cables (HDMI, USB, audio, and power) into a single, ultra-thin virtual reality cable.

Spectra7's VR7100 facilitates dramatic cabling reduction

Why is this important? Many virtual reality headsets are tethered to a computer or other hardware, and four cables introduce significant weight and mobility issues. Less is more in terms of cabling, and Spectra7's VR7100 achieves this without sacrificing performance. In fact, the VR7100 provides more performance in a smaller package making it one of the most important components in high-end virtual reality hardware. But we're not the only people who hold this opinion…
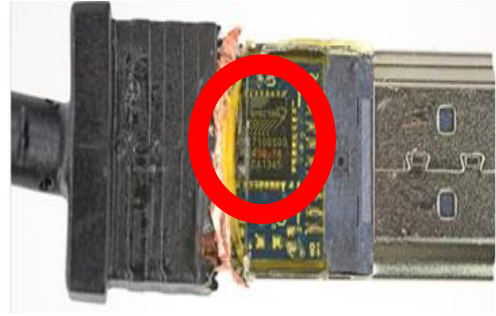
Spectra7's VR7100 inside the Oculus Rift
Source: iFixit.com

Spectra7 Microsystems' VR7100 powers Facebook's Oculus virtual reality headset. iFixit's teardown of the Oculus Rift uncovered the chip (top right photo) and caused them to comment that it was, *"Hot stuff!"*

On June 5, 2015 Spectra7 announced the availability of AR-Connect™, the industry's first and only integrated cable, connector and embedded chipset product line for augmented reality vision systems and wearable computing devices. In the same press release the Company announced multiple design wins and over $1 million in orders in the second half of May alone. Based on what we saw at the Augmented World Expo conference in June 2015, several augmented reality glasses could use Spectra7's technology to reduce the number of cables and achieve an industrial design that is palatable for mass adoption.

AR-Connect™ enables augmented reality glasses to connect to a smartphone, proprietary processing device, or a desktop graphics/laptop processing unit with a single unified and ultra-thin link. Interconnect weight, diameter, speed, and low distortion are critical to augmented reality interconnects. Spectra7's AR-Connect™ interconnects enable original equipment manufacturers to meet these design goals with the Company's patented embedded high speed active signal processing technology. The Company's technology delivers a dramatic reduction in the number of cables required by up to a factor of four, increases video throughput by up to 100%, and enables up to a tenfold increase in sensor/gesture backhaul data throughput while simultaneously reducing the cable conductor cross sectional area by up to 90% compared to discreet, passive interconnects.

Conclusion

Toronto's inaugural VRTO Conference saw many local and international thought leaders who reiterated that VR and AR are real and growing. China is emerging as a major adopter, content and creation toolkits are plentiful, and privacy/monitoring ethics were at the forefront of discussions. The VRTO Conference excelled in that people were accessible and open for discussions. Overall, it was a successful event.

Acronyms Used in this Report

AR	augmented reality
AWE	Augmented World Expo
CES	Consumer Electronics Show
GDC	Game Developers Conference
VR	virtual reality
VRTO	Virtual Reality Toronto

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