Augmented Reality

Bridging the gap between the real and virtual consumer experience
Augmented Reality – Bridging the gap between the real and virtual consumer experience

Video games and movies have long been entertaining us with ever-more sophisticated and realistic computer-generated special effects. The latest trend in computer-generated experiences is Augmented Reality (AR), which is pulling graphics out of computer displays and television screens to integrate these into our real-world environment. With projected growth of 95 per cent a year from 2011, to reach revenues of USD5.2 billion in 2017, will AR succeed in blurring the line between the real and virtual user experience?

What is AR?

Simply put, Augmented Reality enables superimposition of computer generated data onto our direct experience of reality. It aims to enhance the user’s current awareness of reality by supplementing the real world with 3D virtual objects.

The term – Augmented Reality – was originally coined in 1990 by former Boeing researcher Tom Caudell. The technology gradually spread to other platforms such as mobile applications in 2008. New AR mapping and social tools such as Taggar – launched in 2013 – have made AR sociable by creating the ability to share hidden, “mutually” personal images, objects or locations.

How does AR Work?

AR can be achieved by applying two simple methods:

- **Marker-based systems**
  This method uses the physical world as a reference point to overlay graphics. For instance, placing a 2-dimensional printed marker in front of

1 Augmented Reality, Mashable, Inc., retrieved on 30 March 2015
2 Taggar is here to make augmented reality sociable: Hidden messages in objects only your mates can find, Pocket-lint Ltd, Luke Edwards, 6 December 2013
3 Augmented Reality: A different view of learning, University of Exeter, retrieved on 30 March 2015
a web camera. The computer then comprehends this instruction to produce an overlapping illusion on-screen as if it were directly on top of the marker in the real world.

**Markerless systems**

This method involves using a combination of devices including electronic devices, accelerometer, compass and location data – such as the Global Positioning System (GPS) – to determine the position of objects in the physical world. At the same time, it detects the location of the physical world along with its axis.

**What are the applications of AR?**

The AR applications market is expected to register exponential growth – from USD181.3 million in 2011 to USD5.2 billion by 2017, at a compounded annual growth rate of over 95 per cent.

Many industries are already adopting this technology but the most obvious application of AR lies in mobile communications. The combined revenues from paid downloads, post-download items and advertising is expected to climb. Moreover, users who have used AR applications in their smartphone generally have positive feedback for developers such as Google, Apple and Microsoft, to name a few.

According to a wearables technology survey conducted in 2015, 52 per cent of businesses reported that AR technology is crucial in the wearable tech field. And it should be noted that 71 per cent of those aged between 16 and 24 prefer ‘wearable technology’ that allows them to carry out their daily activities with relative ease.

Prominent examples of various AR applications include:

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4 Augmented Reality Meets Business, NiID Technologies, retrieved on 30 March 2015
5 Time to Get Ready for the Wearables Explosion, Spendsetter, Kristina Dolan, 15 December, 2014
Google Glass

Google glass – a type of wearable voice-controlled android device – resembles a pair of ‘glasses’. It was first released in United Kingdom in January 2015. It allows users to take hands free pictures, videos as well as send messages. The user is able to see real world surroundings and use the glasses to perform multiple mundane activities such as driving, walking safely on roads and participating in sports as it provides an enhanced sense of the real world.

These glasses have built-in Wi-fi and Bluetooth connectivity to provide location-based inputs to the users. For instance, a user would be automatically facilitated with flight status information on entering an airport. This device can further be controlled by the user using voice commands as well as the touchpad located on its frame.

Surgical procedures

Virtual Interactive Presence or VIPAAR uses an AR system set to improve the efficiency and effectiveness of surgical procedures. The surgical team at the University of Alabama successfully performed the first AR surgery using VIPAAR in collaboration with Google Glass in 2013.

VIPAAR is set to become an invaluable tool for teaching residents or helping surgeons learn a new medical procedure. This will be executed through virtual guidance as well as demonstration of the correct positioning of instruments. This platform takes surgery to new heights by

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6 More Tech Companies Ready to Supercharge Your Virtual Reality, Mashable, 27 March 2014
7 Ibid
8 Augmented reality technology to change surgical procedures? Spire Research and Consulting Pte Ltd., 20 March 2014
enabling a surgeon in one location to be experientially involved in a surgery taking place in another.

**Archaeology**

Finding new ways to lure visitors to the museum with AR technology is fast becoming a reality. For instance, Stockholm's Medelhavsmuseet (The Museum of Mediterranean and Near Eastern Antiquities) collaborated with the Interactive Institute Swedish ICT in 2013\(^9\) to show a virtual unwrapping of the mummy of the ancient Egyptian priest Neswaiu. A touchscreen monitor uncovers various layers of the mummy in response to the swipe of a finger. The visitors can explore the mummy by turning and twisting the bones in 3D space\(^10\).

**Benefits of AR\(^{11}\)**

Although the use of AR is still in its infancy, it is now being deployed in various industries to enhance and accelerate product design, manufacturing, maintenance as well as commercialization. The industries set to benefit the most from AR include:

**Military\(^{12}\)**

The Military has already kick-started research in the field of AR technology to ease processes such as training, maintenance as well as the simulation of actual military operations. AR can also contribute to standardization in manufacturing of artillery, so as to reduce costs. For instance, Osterhout Design Group (ODG) – based in San Francisco – have been working to develop smart glasses for the military. These glasses ease military grade workflow such as displaying high-definition video, recording video and laying visuals over the real world.

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\(^9\) Unwrap a real mummy – Museum visitors explore historic artifacts using state of the art 3D reality capture and visualization technology, Mynewsdesk, Thomas Rydell, 19 June 2013

\(^10\) Museum Invites Visitors To Unwrap A Mummy Virtually, Fast Company & Inc, Mark Wilson, 27 March 2014


\(^12\)Osterhout Design Group packs a ton of cool tech into next-generation augmented-reality smartglasses, VentureBeat, Dean Takahashi, 2 January 2015
**Education and training**

AR is one of the top ten most significant emerging technologies in education. Merging real and virtual objects triggers interest among students, which in turn increases receptivity. The best application of AR technology in education is to augment the content of the books with multimedia elements such as 3D models, animations, videos and webpages. Virtual characters may also be introduced in the AR realm which include teacher-like avatars, guiding characters or even avatars of real teachers\(^\text{13}\).

Many educational institutions have already included this technology in their curriculum. For instance, the City University London combined techniques to develop resources through the Creating Augmented Reality in Education (CARE) project for healthcare students in 2013. This included a series of ‘health walks’ which used GPS functionality in conjunction with AR to create awareness amongst students for health risks near their locality\(^\text{14}\).

**Travel and tourism**

This global travel and tourism industry is on a rapid growth curve. In Europe, the travel and tourism industry makes up 1.8 million enterprises and contributes more than 5 per cent of European Gross Domestic Product (GDP). AR technology can unleash more growth in this industry by engaging visitors through interaction. For instance, Tuscany (launched 2013)\(^\text{15}\) and Discover Hong Kong City Walks (launched 2014)\(^\text{16}\) applications offer visitors an AR-based guide as well as mobile tourist guides to simulate a real experience of being in their country.

\(^{13}\) Drivers and Bottlenecks in the Adoption of Augmented Reality Applications, Avestia Publishing, Antti Heikkila, Danai Skoumetou, Hector Martinez, Jenni Hyppola, Seppo Laukkanen, 2014
\(^{14}\) Augmented reality in education: teaching tool or passing trend?, Guardian News and Media Limited, Judy Bloxham, 11 February 2013
\(^{15}\) Discover Tuscany 1.0, BingAPK, 2014
\(^{16}\) App Discover Hong Kong City Walks, App Download, 30 May 2014
Retail and marketing

With e-commerce diffusing into various emerging markets worldwide, interaction with physical products remains the only gap in the online sale of products. This is where AR comes into the picture. AR can significantly enhance the traditional methods of retail and marketing activities online. This is achieved by enabling the e-shopper to interact with virtual objects to simulate a bricks-and-mortar shopping experience.

For instance, customers can use AR technology to purchase clothes using virtual fitting rooms. Bloomingdale – a renowned brand in apparel retail – successfully tested virtual dressing rooms during New York’s Fashion Week in 2012. Known as Swivel, these fitting rooms use the principles of natural physics on clothing. The 3D garment moves in accordance with the movement of the person, twisting and turning to provide a clear virtual look. It is the closest option to a real fitting experience 17.

Why AR? 18

AR technology is gradually picking up momentum as the technology matures and the applications proliferate. Even though it is a relatively new technology, there are various factors driving its growth:

Cost reduction

Using AR technology helps to minimize costs in several ways. For instance, it helps to channelize the manufacturing process, reduce error margins as well as make procedures safer. The money spent in repeat processes is thus avoided.

Experiential quality

AR technology is “fresh”, engaging and user-friendly. Adoption of this technology is easy as it makes the user experience more enjoyable. In

17 Bloomingdale’s tests virtual dressing rooms in stores, Vertical Web Media, Amy Dusto, 25 September 2012
18 Ibid
training and education applications, it increases engagement in learning processes, thus promoting retention. In entertainment applications, it adds a new layer to the user experience, making it more attractive.

**Risks inherent in AR**

In spite of the huge potential, investing in AR technology can prove to be a costly mistake if marketers are not clear about their goals. A few pointers for investors include:

- **Target audience**
  Marketers should know their target market segment very well. For instance, AR must be targeted at a tech-savvy demographic segment.

- **Alternatives**
  At times, customers actually want to experience the real product — for example, when buying a car, customers would still want to do a test-drive. AR only provides a virtual experience which further triggers the desire to feel the real deal. One must, wherever the market demands for this, have the physical samples of products and demonstrations ready at hand. AR can never be a perfect substitute for this.

- **Being mindful of gradual integration**
  Using AR in business may not yield the desired results in one go. It might take a while to diffuse well among the customers by first attracting early adopters. AR takes some “getting used to.” Moreover, AR has to be strategically integrated and woven into the marketing strategy in order to optimize results. Like all other emerging technologies, using AR in business calls for both skill and patience.

**Future outlook**

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19 The pros and cons of augmented reality, iMedia Connection, Steve Olenski, 4 August 2011
20 Ibid
AR is well placed for a bright future. Already widely used in cell phones and video game systems, AR has taken the mobile user experience to a whole new level. In the coming years, it is set to change the way we access, experience as well share digital information.

Furthermore, advancing technologies, growth of content and proliferation of smartphones will bring AR into the mainstream. Cloud computing is potentially a big driver of AR application development.

It is time for all product marketers to think about the future applications of AR to add to their total customer experiences.