Reeselle Dela Cruz & Bernice Malong

Reality Bytes

It’s Real life, Only better.

Reality Bytes

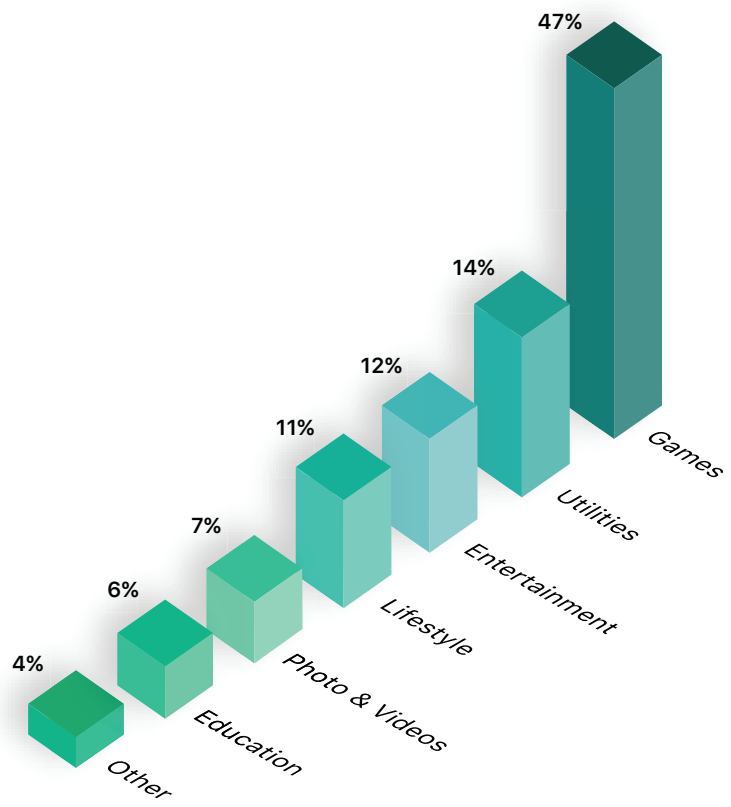
Reeselle Dela Cruz & Bernice Malong

Augmented Reality (AR) is now one of the key technologies of the future, transforming the way the average person connects and visualises the world with their device. Essentially AR is an immersive experience for the user, where various elements are overlaid onto their real-world environment, which they can interact with in real-time. First originating as a buzzword in fiction and the tech-industry, AR was first conceptualised by Frank L. Baum in his novel 'The Master Key' (1901), inventing glasses that mapped data on the people around him. Later in 1992, Louis Rosenberg developed that idea and created Virtual Fixtures AR system for the US Air Force. Today, advancements in both technologic and scientific fields have enabled the use of AR available to not only corporations for professional use, but the general public for entertainment purposes as well. Apple joined the bandwagon, currently owning the world's largest AR platform with hundreds of millions of AR-enabled devices.

In 2017 Apple introduced the **ARKit** at the Worldwide Developers Conference, beginning their journey with AR in IOS devices. The ARKit was designed as a developer tool for IOS 11 with the purpose of anchoring virtual objects in real-world 3D spaces, recognising surfaces in the real world. This framework operates using the IOS device camera, motion sensors and processors to create immersive interactions. Using a technology called 'Visual Inertial Odometry', the ARKit is able to track the surroundings of the device, using the data to analyse the space layout and detect horizontal planes like floors and tables. Apple has come out with three updated versions of the ARKit, with the latest ARKit 4 that was introduced in September 2020, alongside other powerful frameworks such as the RealityKit and AR Creation Tools to enhance the users AR experience. The latest ARKit introduces a new Depth API that enables instant AR and a greater experience without any coding changes. These new advanced scene understanding capabilities built into the iPad Pro's LiDAR (Light Detection and Ranging) Scanner allows the API to use per-pixel depth information to map out the environment with 'people occlusion' for accurate real-

First 6 months after release in 2017.

Percentage of ARKit-only app downloads by category.



world user experience. The RealityKit was designed specifically for the ARKit to improve accuracy and functionality in AR, with built-in features such as photo-realistic rendering, physics-based rendering and native ARKit integration.

The ARKit was designed to transform the way we connect and visualise the world, granting instant access to AR experiences straight from Safari, messages and mail. Apple users all over the globe have installed over 13 million AR-based apps from late 2017 to 2018. As the kit enables developers to build apps using the device's built-in sensors within the camera, the potential of this technology is limitless for both casual and professional developers to utilise and for users to enjoy. The most successful apps tend to hail from categories such as utilities, lifestyle, games and entertainment; with almost half of the installs coming from games. The developer tool has created endless AR experiences both for entertainment and practical uses, with apps such as: 'Complete Anatomy' that intricately visualises the human body using motion capture , 'iScape' which visualises landscape design ideas for outdoor living and the ever popular 'Pokemon Go'. AR has also benefited numerous industries through this developer tool, with constant updates, like the new 'Quick Look' addition which, enables the user to preview a product in their own home before making a purchase, which has been put in action with Ikea in their furniture placement app.

Essentially, augmented reality is an interactive experience of the user's real, encompassing world, where various objects and elements are spatially able to interact with and respond to their environment in real-time. Apple in particular, designed their own 'ARKit' using IOS device cameras for the AR experience and have developed and supported applications to accommodate professionals in their industries and for general leisurely use. AR presents limitless possibilities for future Apple plans and the tech industry, enhancing the productivity and experiences of users.

IKEA Place app demo.

What it looks like in action.

References:

Augmented Reality - Apple Developer. Apple Developer. Retrieved 1 October 2020, from https://developer.apple.com/augmented-reality/.

Augmented Reality - Imaging and Computer Vision. Imaging and Computer Vision. (2019). Retrieved 1 October 2020, from https://research.csiro.au/icv/augmented-reality/.

Feigl, T., Porada, A., Steiner, S., Löffler, C., Mutschler, C., & Philippsen, M. (2020). Localization Limitations of ARCore, ARKit, and Hololens in Dynamic Large-scaleIndustry Environments. VISIGRAPP.

Linowes, J., & Babilinski, K. (2017). Augmented reality for developers (pp. 132-135). Packt Publishing.

Marr, B. (2018). Facebook And Apple Are Serious About Augmented Reality. Forbes. Retrieved 1 October 2020, from https://www.forbes.com/sites/bernardmarr/2018/08/08/facebook-and-apple-are-serious-about-augmented-reality/#47cb77ad6b4b.

Augmented reality.

How it works with Apple.

Overlaying content.
Digital content is placed, anchoring to a point within the virtual map.

The Virtual Map.
The iPhone intuitively creates a digital model of the environment, mapping the surfaces and objects whilst keeping track of where the user is in relation to them.

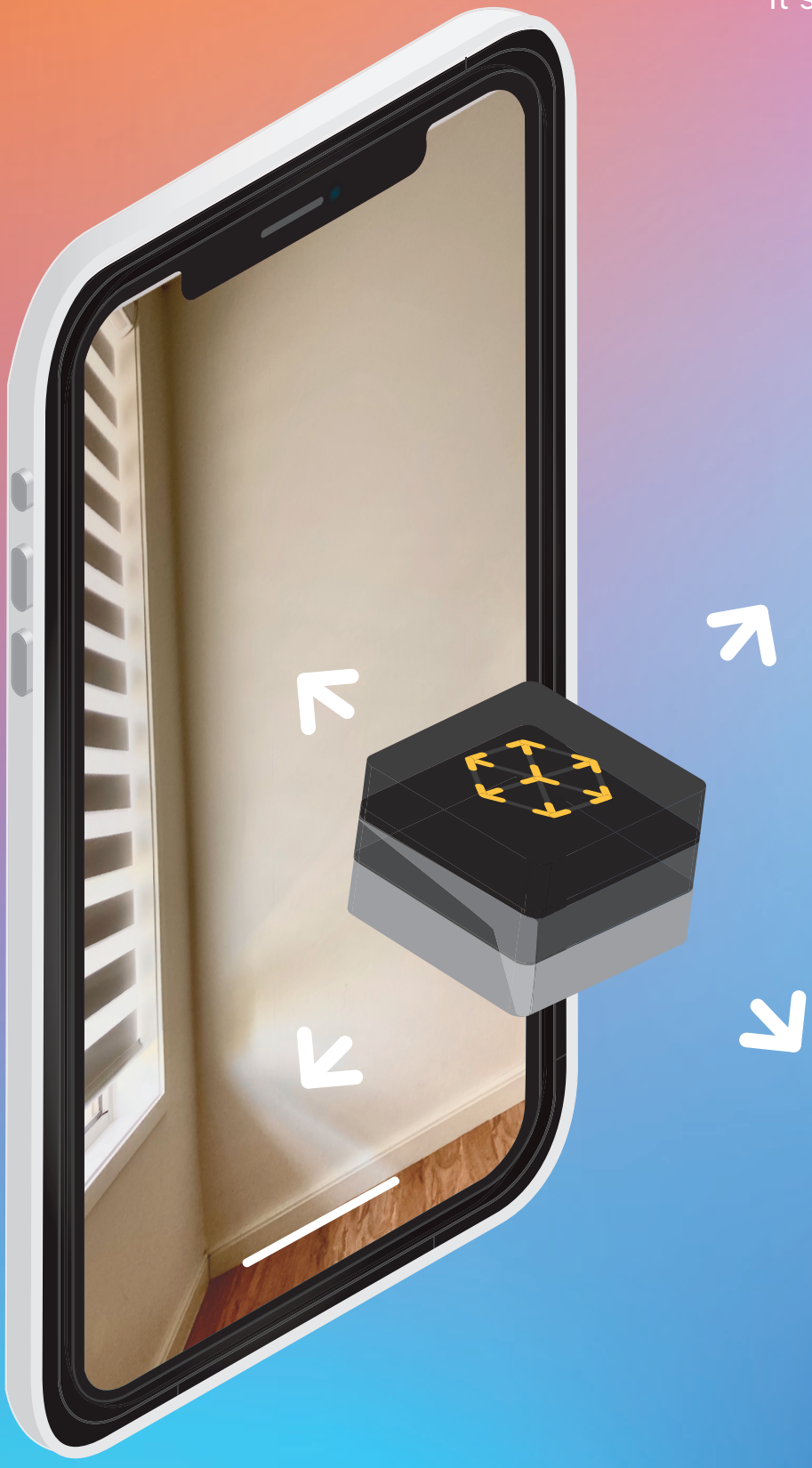
Simultaneous localisation.
The user callibrates the layout through recording their environment using the camera; detecting horizontal planes like floors and tables.

AR-enabled hardware.
The iPhone is equipped with motion and depth sensors to accurately track and analyse the user's surroundings.

Reeselle Dela Cruz & Bernice Malong

Reality Bytes

It’s Real life, Only better.



Reality Bytes

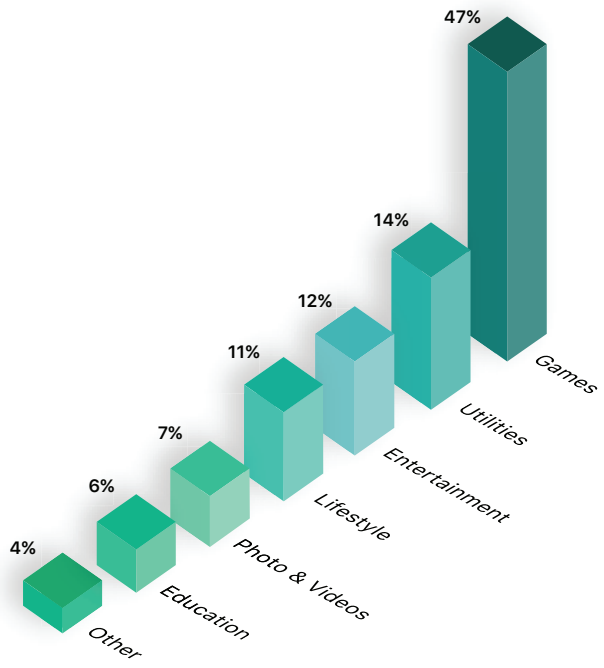
Reeselle Dela Cruz & Bernice Malong

Augmented Reality (AR) is now one of the key technologies of the future, transforming the way the average person connects and visualises the world with their device. Essentially AR is an immersive experience for the user, where various elements are overlaid onto their real-world environment, which they can interact with in real-time. First originating as a buzzword in fiction and the tech-industry, AR was first conceptualised by Frank L. Baum in his novel 'The Master Key' (1901), inventing glasses that mapped data on the people around him. Later in 1992, Louis Rosenberg developed that idea and created Virtual Fixtures AR system for the US Air Force. Today, advancements in both technologic and scientific fields have enabled the use of AR available to not only corporations for professional use, but the general public for entertainment purposes as well. Apple joined the bandwagon, currently owning the world's largest AR platform with hundreds of millions of AR-enabled devices.

In 2017 Apple introduced the **ARKit** at the Worldwide Developers Conference, beginning their journey with AR in IOS devices. The ARKit was designed as a developer tool for IOS 11 with the purpose of anchoring virtual objects in real-world 3D spaces, recognising surfaces in the real world. This framework operates using the IOS device camera, motion sensors and processors to create immersive interactions. Using a technology called 'Visual Inertial Odometry', the ARKit is able to track the surroundings of the device, using the data to analyse the space layout and detect horizontal planes like floors and tables. Apple has come out with three updated versions of the ARKit, with the latest ARKit 4 that was introduced in September 2020, alongside other powerful frameworks such as the RealityKit and AR Creation Tools to enhance the users AR experience. The latest ARKit introduces a new Depth API that enables instant AR and a greater experience without any coding changes. These new advanced scene understanding capabilities built into the iPad Pro's LiDAR (Light Detection and Ranging) Scanner allows the API to use per-pixel depth information to map out the environment with 'people occlusion' for accurate real-world user experience. The RealityKit was designed specifically for the ARKit to improve accuracy and functionality in AR, with built-in features such as photo-realistic rendering, physics-based rendering and native ARKit integration.

First 6 months after release in 2017.

Percentage of ARKit-only app downloads by category.



The ARKit was designed to transform the way we connect and visualise the world, granting instant access to AR experiences straight from Safari, messages and mail. Apple users all over the globe have installed over 13 million AR-based apps from late 2017 to 2018. As the kit enables developers to build apps using

the device's built-in sensors within the camera, the potential of this technology is limitless for both casual and professional developers to utilise and for users to enjoy. The most successful apps tend to hail from categories such as utilities, lifestyle, games and entertainment; with almost half of the installs coming from games. The developer tool has created endless AR experiences both for entertainment and practical uses, with apps such as: 'Complete Anatomy' that intricately visualises the human body using motion capture , 'iScape' which visualises landscape design ideas for outdoor living and the ever popular 'Pokemon Go'. AR has also benefited numerous industries through this developer tool, with constant updates, like the new 'Quick Look' addition which, enables the user to preview a product in their own home before making a purchase, which has been put in action with Ikea in their furniture placement app.

Essentially, augmented reality is an interactive experience of the user's real, encompassing world, where various objects and elements are spatially able to interact with and respond to their environment in real-time. Apple in particular, designed their own 'ARKit' using IOS device cameras for the AR experience and have developed and supported applications to accommodate professionals in their industries and for general leisurely use. AR presents limitless possibilities for future Apple plans and the tech industry, enhancing the productivity and experiences of users.

IKEA Place app demo.

What it looks like in action.

References:

Augmented Reality - Apple Developer. Apple Developer. Retrieved 1 October 2020, from https://developer.apple.com/augmented-reality/.

Augmented Reality - Imaging and Computer Vision. Imaging and Computer Vision. (2019). Retrieved 1 October 2020, from https://research.csiro.au/icv/augmented-reality/.

Feigl, T., Porada, A., Steiner, S., Löffler, C., Mutschler, C., & Philippsen, M. (2020). Localization Limitations of ARCore, ARKit, and Hololens in Dynamic Large-scaleIndustry Environments. VISIGRAPP.

Linowes, J., & Babilinski, K. (2017). Augmented reality for developers (pp. 132-135). Packt Publishing.

Marr, B. (2018). Facebook And Apple Are Serious About Augmented Reality. Forbes. Retrieved 1 October 2020, from https://www.forbes.com/sites/bernardmarr/2018/08/08/facebook-and-apple-are-serious-about-augmented-reality/#47cb77ad6b4b.

Augmented reality.

How it works with Apple.

Overlaying content.
Digital content is placed, anchoring to a point within the virtual map.

The Virtual Map.
The iPhone intuitively creates a digital model of the environment, mapping the surfaces and objects whilst keeping track of where the user is in relation to them.

Simultaneous localisation.
The user callibrates the layout through recording their environment using the camera; detecting horizontal planes like floors and tables.

AR-enabled hardware.
The iPhone is equipped with motion and depth sensors to accurately track and analyse the user's surroundings.