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Augmented Reality: *The New Kid On The Block*

— Diana Marques



Figure 1: Visitor in the Bone Hall viewing the AR content for the Mandrill. When using the tablet, a visitor sees a 3D model of a fully fleshed animal superimposed on the skeleton. Photo by Nico Porcaro.

What does Augmented Reality (AR) bring us that other technologies have not thus far? Its name says it all: the capacity to enhance the environment around us, without detachment from reality. AR is most commonly featured on mobile devices: while the device's camera captures the surrounding objects and spaces, the device's screen shows the virtual content superimposed onto the object, aligned in real time. Magazine covers and birthday cards can be animated, street signs in a foreign country translated, and human anatomy can be visualized in three dimensions for instructional and educational purposes.

From a technology development point of view, it is not brand new, given it was theoretically conceived and prototyped in the 1960s. But the evolution of hardware in the last two decades paved the way to more mature AR applications and in the last few years the interest and investment in this technology grew noticeably in a number of fields. The gaming and entertaining industries, the usual suspects, have embraced it (think Pokémon Go, the free-to-play global phenomenon game from summer of last year),

but its value for the education and cultural sectors, editorial, biomedical visualization and others has been recognized and put to the test. This technology even promises to revolutionize the way we shop, by placing virtual representations of the furniture we are considering over the empty living room, and virtual pieces of clothing onto our image in the mirror.

As part of my doctoral dissertation in Digital Media, I was involved in developing illustrations and animations, as well as designing the user experience and interface of a mobile AR application called Skin & Bones. Companion to a permanent osteology exhibit at the Smithsonian's National Museum of Natural History, the app uses the technology to virtually skin and bring to life specimens that otherwise many visitors do not engage with (Figs. 1-2). For any science illustrator, the Bone Hall is a true haven — give me art supplies, bread and water and I can lose myself in there for days! But the non-expert museum visitor often finds the extensive number of skeletons lacking context and thus repetitive. Associating virtual representations of the animals with their real bones, even allowing visitors

Editor's Note: This article is derived from Diana's workshop at the Asheville Conference. While nothing can match learning in person from a master artist, we are grateful to her for sharing her methods with our wider GNSI family.

to see the animals move and feed, not only delights the visitors but also supports the connection with the objects on display. All of this happens without physically altering an historical collection, which would incur a high cost, not to mention disagreement with the exhibit curators¹.

Skin & Bones is an example of a native app (meaning it was custom designed and developed from the ground up), a method for delivering augmented content that depends on the expertise of software developers. However, an easier and less costly method is to use one of several already-developed AR browsers, some of which can even be used for free. These platforms don't require any particular skill beyond preparing and then dragging-and-dropping the content to be augmented. Even though most AR browsers are somewhat finicky to use — all the assets have to be prepared exactly according to the instructions, which tend to be detailed and vary greatly from browser to browser — if all goes well, in a matter of minutes the AR content is ready to be viewed.

In this fashion, we can create a virtual image gallery that is augmented over our printed business card, we can play a video of the animal behavior or hear the sound of its call over an original illustration on display at an exhibition; we can even look at a virtual tridimensional representation of a complex anatomical structure that is difficult to convey on paper. All the user needs is a mobile device (phone or tablet) equipped with the app that corresponds to the AR browser employed to create the experience. Whereas downloading a native app gives the user an experience that is exclusive to a certain context, albeit usually more advanced and sophisticated, downloading the app of an AR browser unlocks all augmented experiences that have been built on that platform².

Most AR experiences are either image-based or location-based. With image-based content, the image, video, 3D model, text, audio, or link to URL is superimposed onto a printed image. With location-based AR, it is our position, dictated by the GPS coordinates that the mobile device reads, that triggers the content. The latter is used mostly in outdoor experiences, for example in assisting with navigating to a particular destination.

¹ Skin & Bones can be downloaded to iPhones and iPads from the App Store or using this link: itunes.apple.com/us/app/skin-bones/id929733243. To see the AR experiences without visiting the Bone Hall, print the photos of the skeletons made available in the app, or display them on your computer screen, and point the device to them when visiting the Skeleton Works menu choice in the app.

² A few examples of AR browsers to explore: Wikitude, Aurasma, BlippAR, Layar.

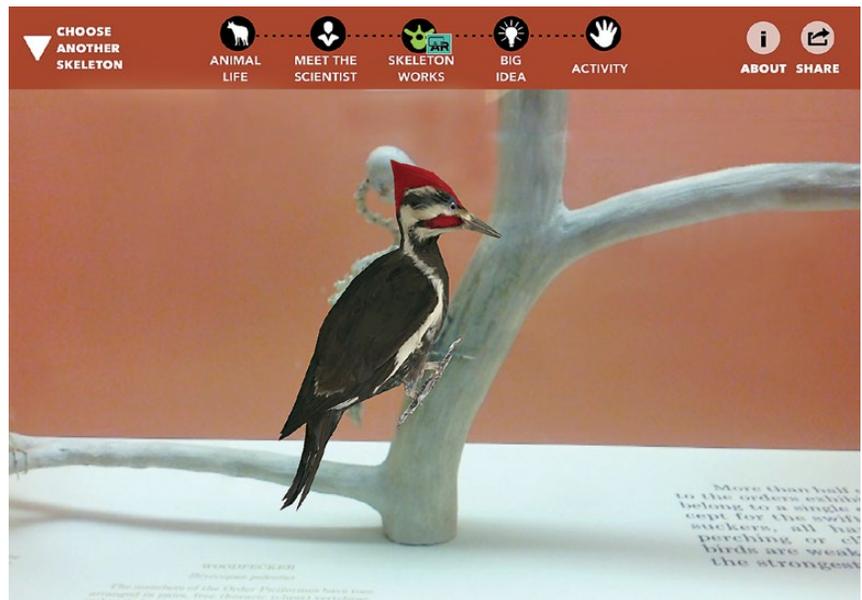


Figure 2: Skin & Bones iPad screen capture of the AR experience for the Pileated Woodpecker, showing a frame of the animation triggered from the skeleton. In the animation, the skeleton becomes fully fleshed and feathered; then the skull is isolated to illustrate the tongue mechanism that is specialized for catching insects.

Object-based AR, such as what is used in Skin & Bones, is a less common form of the technology for its complexity, yet very effective since the virtual content can be triggered in 360° degrees around the object. Were the skeletons in the Bone Hall free-standing rather than inside display cases, users could loop around the Mandrill and see it up close from every angle – how amazing that would be!

As visual science communicators, the day may come when you are asked to produce static and animated visuals to take part in an AR experience. You may be in a position to recommend the technology for its value in merging the observational and interpretational aspects of an experience. Having a basic understanding of what it is about, how it operates and the tools available is to your advantage. Consider as well its potential in promoting a freelance business: direct a client to a website when s/he clicks on the virtual link hovering over a business card or flip through a virtual gallery of illustrations.

AR may never live to the high expectations that technologists and investors currently have, but it seems to have proven that is more than an ephemeral fad. Time will tell.

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