

The ARtefactKit

Paradata

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What is it?

The ARtefactKit is a multi-sensory augmented reality application that allows the user to compare an excavated artefact with a number of different artefacts from a 3D virtual reference collection to aid in identification and examination. It uses multi-sensory approaches to further augment the experience, allowing the user (in this case) to hear, smell and see the real animals - reminding them not only that the bone they have excavated comes from a real animal, but also forcing them to think more deeply about the other multi-sensory aspects of the animal and how they may have affected humans in the past.

Where does the idea for it come from?

The idea for the ARtefactKit was born out of a frustration with the 1000s of 3D models constantly being uploaded onto SketchFab that can only be spun and twisted around on a computer screen, and lack any other kind of sensory engagement. I wanted to show a more active interaction with the real and virtual artefacts, as well as show that they have a multi-sensory context. In addition, 3D online reference collections are quite hard to use when you are holding the bone up to a screen to make the comparisons – the ARtefactKit allows both hands to be free and to examine the virtual and real objects side by side.

What has this got to do with the Bones of Our Past?

The practical aspects of the ARtefactKit for accessing remote faunal reference collections are immense. Often people have to travel long distances to access physical reference collections and while 3D models or high resolution photos already exist, the use of AR to literally put them on your own table opens huge opportunities for multi-user teaching and also for the remote exchange of 3D objects.

By using the dynamic connection to the linked open data held in OpenContext it is possible to connect that one bone to similar bones from sites across the world – not only providing instant comparanda, but also putting that bone in context with the world's assemblages. The same interface could be used to interrogate any online database.

Beyond the useful practical aspects of the app, I wanted to address the disconnect from the physical animal that we often feel when excavating or analysing faunal remains. It is very easy to forget that the dry piece of bone we hold in our hands was once part of an animal – and that animal was itself part of a wider network, both with its own kind but also via its interactions with humans. By using modern reference collections, and providing sounds and sights of a modern deer herd, I hope that I was able to evoke a feeling of the Bones of Our Past being very much the Bones of Our Present. These multi-sensory aspects are not intended to accurately recreate the animal – but instead to provoke new thought processes and to remind us to think with our different senses.

How does it work?

The application is built within Unity3D using the relatively new Apple ARKit AR engine. ARKit allows for very robust placement of augmented objects in the real world – which allows an entire 'virtual lab' to be placed on your table. Using a number of different downloaded or self-crafted scripts and plugins (such as the Google VR plugin to allow for the Head Mounted Display view) I was able to build everything within Unity.

I acquired the 3D bone models from the Department of Human Evolution at the Max Planck Institute and extracted them from the supplied 3D PDFs. While there were some bones available on SketchFab it was quite hard to find a very full collection – luckily I was lent a Red Deer bone from Moesgaard Museum, which was one of the species I was able to download. It highlighted the difficulty of obtaining a good free-to-use 3D faunal reference collection.

To create the immersive 360 degree video I visited the local deer park, placed my camera on the ground and then had to gently herd the deer towards it. I felt it was very important to include the sounds and the immersive nature of walking with the animals – unfortunately the video playback is not particularly smooth in the app, but I think it gives a good impression. This act of creation already made me engage with the animals in a different way (observing the rut and the importance of the stag and his relationship to his rivals and his females) – and hopefully this comes across in the app.

Of course I had to use the Dead Man's Nose device to create the smells (see my 2015 Heritage Jam entry), as when walking with the deer in the woods the smell of musk was very evident. So I bought a small phial of it and loaded it into the Dead Man's Nose to evoke the right atmosphere.

As the app runs on a mobile telephone (it can be adapted to run on Android as well as iOS) it can be

used by zooarchaeologists in the lab to examine more exotic species they are not used to, but also by archaeologists in the field to quickly check an identification, or by teachers in the classroom to demonstrate artefact identification techniques.

What happens next?

I believe the potential for an application of this nature is huge. I would like to undertake further development in collaboration with a faunal specialist as well as field archaeologists and students. Faunal assemblages are a particularly good case study, but the app could easily be adapted to work with other types of artefact. For example, you could surround yourself with different types of amphora all filled with the different goods they would have carried – and compare your amphora rim with each one as you walk around them smelling the wonderful contents, both making the identification in an intuitive way, but also thinking about the deeper multi-sensory context of each artefact.