

Virtual Reality at York: VR and the Management of Historic Sites

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Abstract: The paper explores potential uses of VR in Archaeology from a solely archaeological perspective. Indeed, the evolution of VR techniques has influenced archaeological practice much less than expected and its use is mainly circumscribed to commercial applications and popularization. Everyday tasks have been much more influenced by less sophisticated computer applications. Through a number of examples taken from unpublished MSc theses at the University of York, the paper attempts to examine the functional everyday applications of VR and to highlight its future role within heritage disciplines.

Introduction

Virtual reality can be considered commonplace in archaeology today, however its impact is arguably less pronounced than one might have imagined when it was first used to represent the past in the 1990s. Geometric examples of temples and remains painted in primary colours gave us a glimpse of what was achievable then, with no hint of the levels of visual reality that are now possible a decade later. One might have imagined that this technological revolution in automatic data capture (reflectorless recording, 3d laser scanning) combined with effortless rendering and 3d visualisation tools would have redefined today's archaeology. The reality is that for most archaeologists, current methods and practice have been influenced more by data transfer technologies and Internet development than the evolution of virtual reality. Where high-level virtual reality is used to form impressions of the past, popular media is not far away as this juxtaposition of the latest technology and the ancient world is very commercial. However, behind this public face of archaeology the practitioners, researchers and teachers of the subject use virtual reality modelling technology very little. The simple spreadsheet, database or Internet-based communications have

had an immediate and lasting effect on the everyday task of examining the past. It is debatable, however, as to whether VR technologies are just as integral to forming the backbone of archaeological computing. As we struggle to define a solid role for VR in archaeology we inevitably pursue more compelling images and more detailed models. This pursuit can be very costly for the profession, both in terms of technology and in labour and it is still unclear as to the benefits of the outcome. It is also important that the archaeologist remains in control of these tools as relying upon non-archaeological professionals for data visualisation can compromise the outcome of a project, potentially decreasing data integrity.

Virtual Reality development therefore might benefit from its re-evaluation from a solely archaeological perspective. What do we the archaeologists want VR to enable us to do? One possibility is that we concentrate more on exploiting advances in the development of hardware and software to develop strong desktop applications for virtual reality. The following examples, provided by MSc in Archaeological Information Systems students at the University of York, attempt to examine the functional everyday applications of desktop VR and its possible roles within archaeology and heritage.

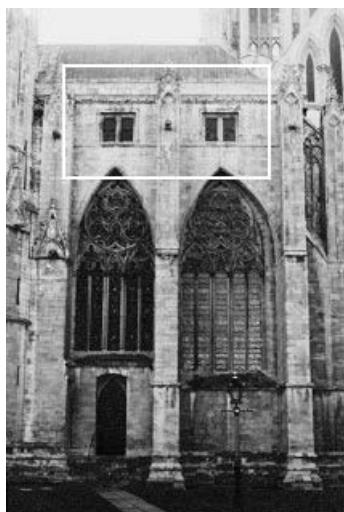


Fig. 1. York Minster, Mason's Loft exterior.

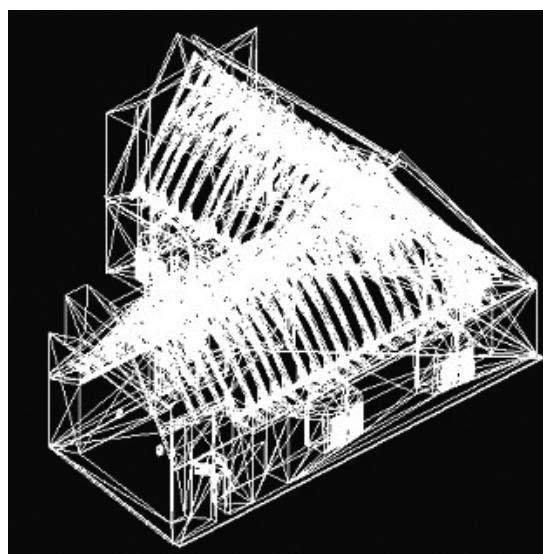


Fig. 2. Mason's Loft interior – 3d Model.



Fig. 3. Mason's Loft – Scissor-braced roof.

Case Studies

York Minster – Mason's Loft VR Project (Syspa 2002)

The Mason's Loft is found in the upper reaches of York Minster. Due to the difficulty of access and poor condition of its floors, the loft is closed to the public and can only be visited for specific research purposes. Wooden templates are also stored in this space making viewing very difficult. It would be almost impossible to open the loft to the public as health and safety legislation would require modifications to be made to the fabric of the building to secure safe access. Any such modifications, if permitted, would also be prohibitively expensive with a building such as the Minster. Simple desktop VR imagery and flythrough animations are an ideal way of providing public access to otherwise inaccessible spaces. Most sites of historic interest will pose similar problems to its managers and curators with regards to organising viewings of rooms too difficult to reach, too dangerous to traverse or simply too damaged to withstand mass inspection.

In this example 3d data points were collected via reflectorless total-station and combined with measured drawings and existing plans. AutoCAD 2000 was used for data processing



Fig. 4. Mason's Loft – North Transept Wall.

and modelling. Finally, Blender provided rendering, texturing and lighting to the final visualisation. The 'virtual' visitor is encouraged by such models to think about what lays behind some of the locked doors and 'restricted access' signs that are found when visiting many of our sites of historic importance

Knightshayes Court – Drawing Room VR Project (Dawson 2003)

Knightshayes Court, Devon is a Victorian property from 1869 and survives as a rare example of the designer William Burges. The building is in good state of repair and is

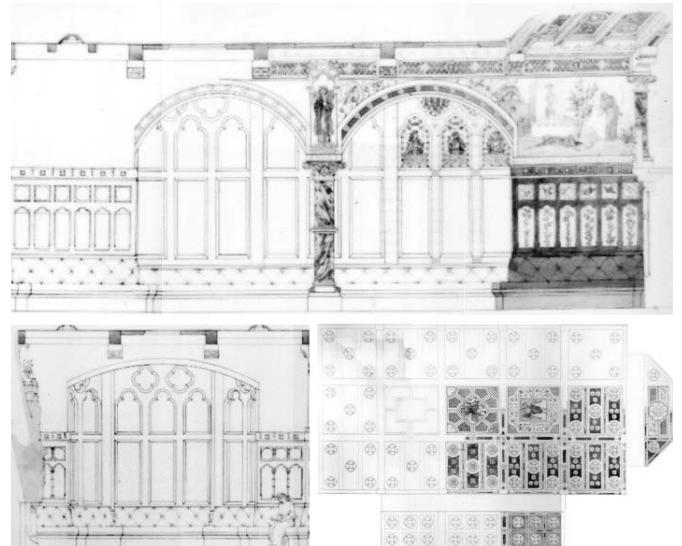


Fig. 5. The Paintings of William Burges.



Fig. 6. Knightshayes Court – Drawing Room reconstruction.

complete, however, in this example virtual reality was used to reconstruct decorative designs that were produced by Burges but never carried out. Here we have a structure that can be 'virtually' redecorated using Burges' surviving plans to investigate what the interior may have looked like had his plans been seen to fruition.

All measurements in this project were produced by hand recording methods in conjunction with existing architectural plans and rendered with Blender. This combination is



Fig. 7. Knightshayes Court – Drawing Room reconstruction.



Fig. 8. Knightshayes Court – Drawing Room reconstruction.

extremely cost effective and could, in theory, be achieved by even the smallest organisation or property. Virtual Reality as a tool for reconstruction is obviously often used in archaeology, but in the example of Knightshayes Court the visualisation is provided as a potential part of the management process of the property. Multi-period decoration and construction can be difficult and costly to reproduce



Fig. 9. Medieval Longhouse, Orkney.

physically, especially for smaller less well funded properties, therefore VR can provide a viable means to representing the transition of a site or structure through time.

Quoygrew, Orkney – Medieval Longhouse VR Project (Patrikou 2002)

Engaging public interest in the past and reaching new audiences are increasingly important aspects of archaeology today. It is our responsibility to help broaden the knowledge of those with new found interest in the subject and to encourage public participation and debate in matters regarding local heritage. Whilst television programmes and popular journalism may help promote this interest, further investigation by the public via archaeological reports and assessments can be problematic as these are rarely decipherable to those unfamiliar with the site plan or Harris Matrix. The inclusion of very quick and basic VRML models can be used effectively to show 3d relationships, to simplify data and to provide a basic level of interactivity thus helping to clarify data and engage the viewer. Virtual Reality in this case, does not have to involve the latest technologies or attempt to achieve the highest level of photo-realism to have a useful function. By concentrating on the technology of modelling rather than its use and application we risk overlooking simple and cheap solutions that can be employed effectively in many circumstances.

The examples here highlight a few applications of desktop VR in archaeology and heritage and aim to create resources that have defined goals and purpose. However, it would seem that we require new analytical tools for real investigation of models in order to push the usefulness of them further. GIS

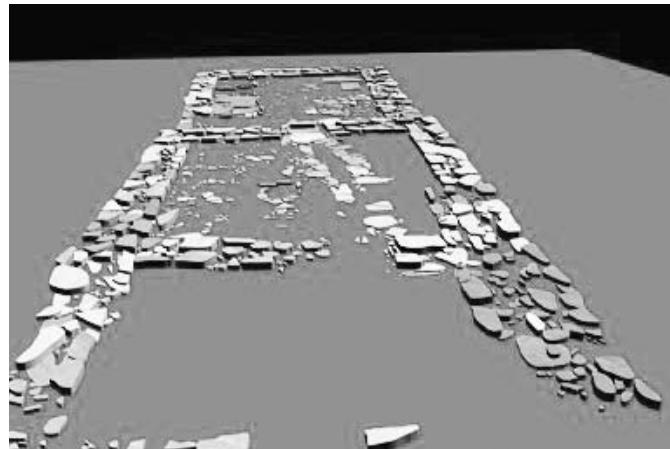


Fig. 10. Medieval Longhouse, Orkney – 3d model.

applications give us the opportunity to examine characteristics of the landscape such as cost surface, viewsheds, network analysis and so on. Whereas 3d modelling packages enable modification of structures, textures and lighting, but rarely go beyond this. Future development of archaeological virtual reality may benefit from incorporating tools specifically designed to examine characteristics of structures such as acoustic properties (Campos et al 2002), construction effort/cost or spatial/access analysis (Markus 1993). A more

analytical approach to the investigation of 3d modelling and virtual reality is critical if we are to progress further from the pursuit of increasingly sophisticated and expensive ways of replicating superficial appearance.

References

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