Virtual Kashgar: 3D Modelling and Animation Studies
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The ongoing studies into a Virtual Kashgar are represented here as three digital animation projects. These projects, the first of which began in 2006, investigate the application of 3D modelling and animation technologies to archaeological and historical interpretation at Kashgar, Western China.

These projects employ the cutting edge graphic technologies used in computer games and major motion pictures to model animated forms and architecture in cinematically styled virtual landscapes. The digital research involved in creating the animations is not the making of the animations per se but the construction of the virtual world from which they derive. Although the resulting images and animations are the most readily communicable summary of the research process, they are only two of the many ways that the interacting collection of models might be expressed. Other outputs include interactive 3D games, virtual collaborative spaces and investigative simulations. These future possibilities however depend upon firm foundations. It is hoped that the research into modelling landscapes, environments, architecture and automated figures summarised below are the first steps toward such endeavours.

The studies overviewed here are made through the collaboration of the Monash Faculty of IT and the Monash Asia Institute.

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<th>The Mori Tim Stupa</th>
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The Mori Tim Stupa

In 2005 the Monash Asia Institute undertook a preliminary archaeological survey in the oasis of Kashgar in Western China. The aim was to identify the major archaeological areas and assess their state of conservation. Further research is underway in re-assessing the archaeological evidence in the oasis against the reports of early explorers and investigating the extent of the pre-Islamic settlements and the configuration of the network of irrigation. 3D reconstructions of landscapes surrounding the historic monument of Mori Tim were used to support and augment ongoing research and GIS surveys.

The reconstruction process aimed to test varied visualisations of the architecture of Mori Tim as its original form might have appeared, according to several contrasting hypotheses. The visualisation results incorporated not only the architectural geometry of the monuments but also digital terrain layers to visualise the historical landscape and environment of the site. The reconstructions were created by Michael Lim and Tom Chandler with art historical and archaeological advice from Andrea Di Castro.

The process followed here is intended as an aid to the communication and interpretation of the site. Making a virtual model of the reconstructed site allows for the exploration of possible scenarios in visual form and forces assumptions to be expressed with more precision than they might be otherwise. In this light, the modelling and testing of various reconstructions, some less plausible than others, served to open up new questions in the comparison of decorative and architectural features. This rapid prototyping of visual representations was made all the more easy because of readily interchangeable models assembled within the 3D space.

The results were presented at the Asian Studies Association of Australia (ASAA) Conference. University of Wollongong, 2006 and the Fifth International Convention of Asia Scholars (ICAS5), 2007 in Kuala Lumpur.
References


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The Aba Khoja Mausoleum

In 2007, Faculty of IT Hons Student Nils Gliessenberger undertook an architectural visualisation project with advice from the Monash Asia Institute of the Aba Khoja Mausoleum at Kashgar. Using selected references sourced from architectural diagrams, historical references and contemporary photography, a large scale virtual model of the Mausoleum and its environs (including the cemetery) was assembled and then tested as renders in several graphically distinct layers.

The purpose of this research project was the investigation of photorealistic and non-photorealistic 3D graphics and the effect these different styles, individually and combined, have upon information acquisition in Virtual Heritage and user-controlled choices. To this end, a set of elaborate 3D visualizations of the site were constructed, each with a different level of realism. The varying degrees of surface texturing and virtual lighting systems were then assessed to determine the impact of rendering styles upon visual interpretability.

References


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Animating a 5th Century Camel Caravan

In 2008, under advice from Tom Chandler and Andrea Di Castro, Monash Faculty of IT graduates Nils Gliessenberger and Ben Alexander created a fully animated sequence of a camel caravan skirting the fringe of the Taklimakan desert. This project sought to extend the visualisation capabilities of the Virtual Kashgar project by researching animated characters and atmospheric effects. The animated characters were given a specially crafted internal skeleton and considerable efforts were made to simulate the complex interaction of windblown hair and fabrics, using the latest 3D animation technologies. Additionally, much of the digital research was concerned with the emulation of natural light, windblown sand (particle effects) and sounds.

Building upon the previous studies in digital terrain creation and architectural modelling, the testing of fully animated forms opens new research avenues into the virtual interpretation of history.

References
Yatsenko, Sergey A. The Late Sogdian Costume (the 5th - 8th cc. AD) in Ėrān ud Anērān Webfestschrift Marshak 2003, http://www.transoxiana.org/Eran/Articles/yatsenko.html
