3D STEREOSCOPIC NAVIGATION OF METRIC AND HIGHLY TEXTURED ARCHAEOLOGICAL MODELS

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Abstract:

The key idea of this work is an innovative interactive viewer of 3D highly textured and metric archaeological models. Following is the stereoscopic visualization to heighten the 3D model perception.

Being very powerful the programming environment allows to render in real-time the model from two different points of view and develop tools well-suited for stereoscopic visualization.

Strong point of the proposed VR solution is its VVVV visual programming interface that is a powerful application for real time video synthesis, characterized by physical interfaces that facilitate the handling of large media environment and allow to interact in real time with motion graphics, audio and video. In particular this research takes advantage of VVV performance in terms of its real-time rendering engine and UV texture mapping control.

Experimental results show how the proposed VR solution allows a powerful user interaction in terms of input device and visualization chances (i.e. multi-screen, stereoscopic systems).

Starting from photogrammetric models and high resolution texture this research achieves different main goals:

- *3D model import into the VVVV environment simultaneously with its UV mapping parameters (Fig.1)*
- *Interactive control of the light type and direction (Fig.2)*
- *Different navigation modes and input device setting in order to handle camera motion and its orientation in the 3D world*
- *Stereoscopic visualization: anaglyph and stereo active methods (Fig. 3,4,5)*

Experimental results shows how is possible to guide the user into a complete immersive experience making use of advanced projection systems (Cave Automatic Virtual Environment, Fig 6) and stereoscopic visualization solutions.

More important the developed approach enhances the 3D navigation preserving metric accuracy and texture resolution.
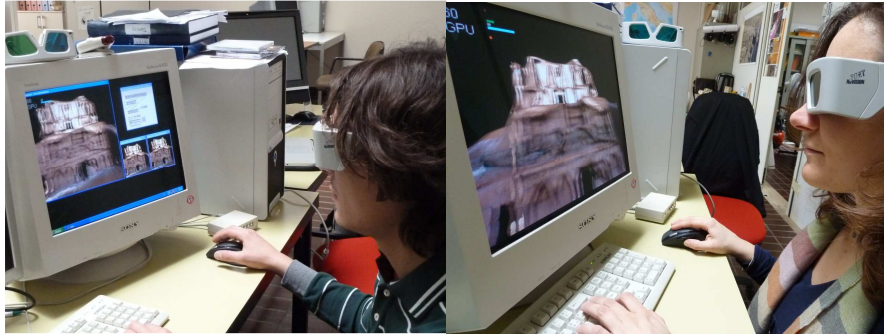
Being very flexible the proposed tool enables detailed 3D documentation of Cultural Heritage and gives the chance to realize specific solutions for museum installations.
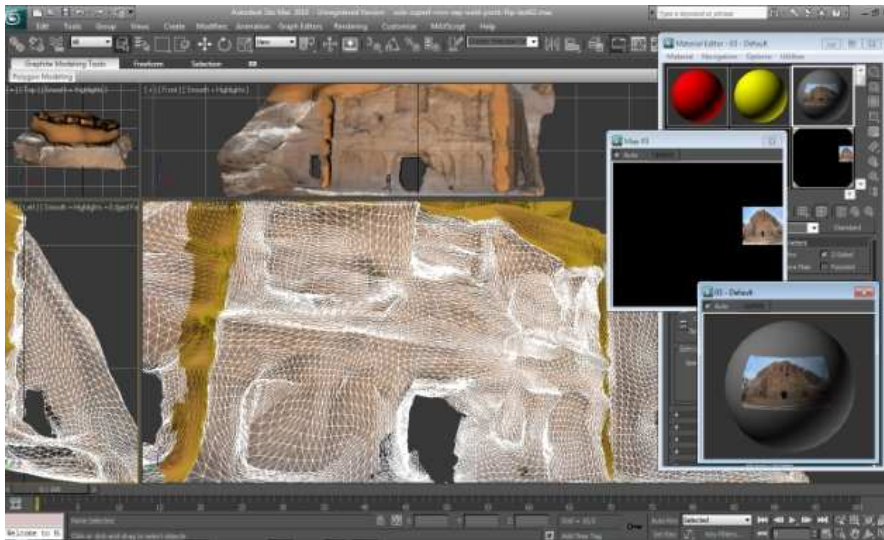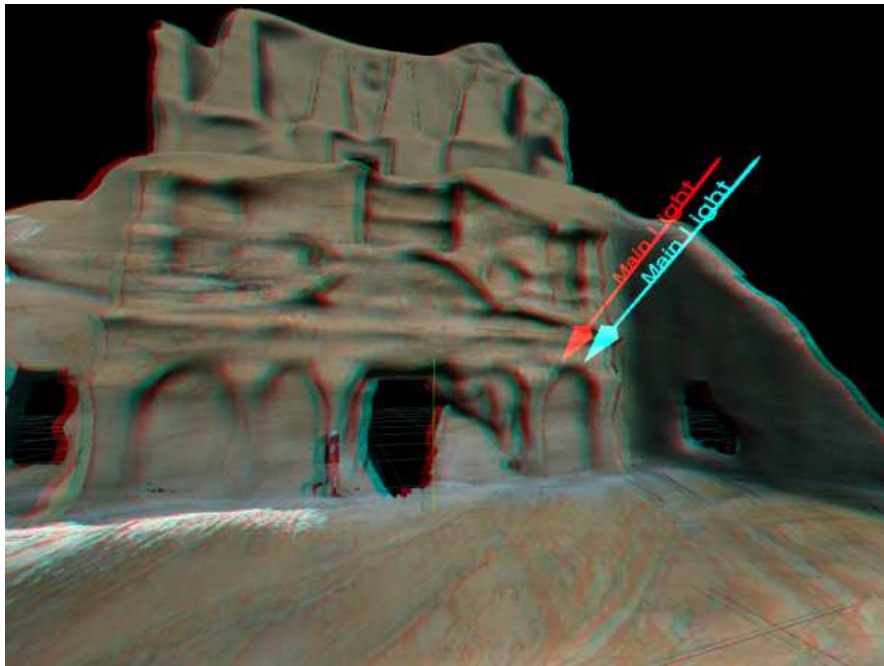
Fig.1 Original photogrammetric model with hd photorealist texture : 3DStudio Max environment
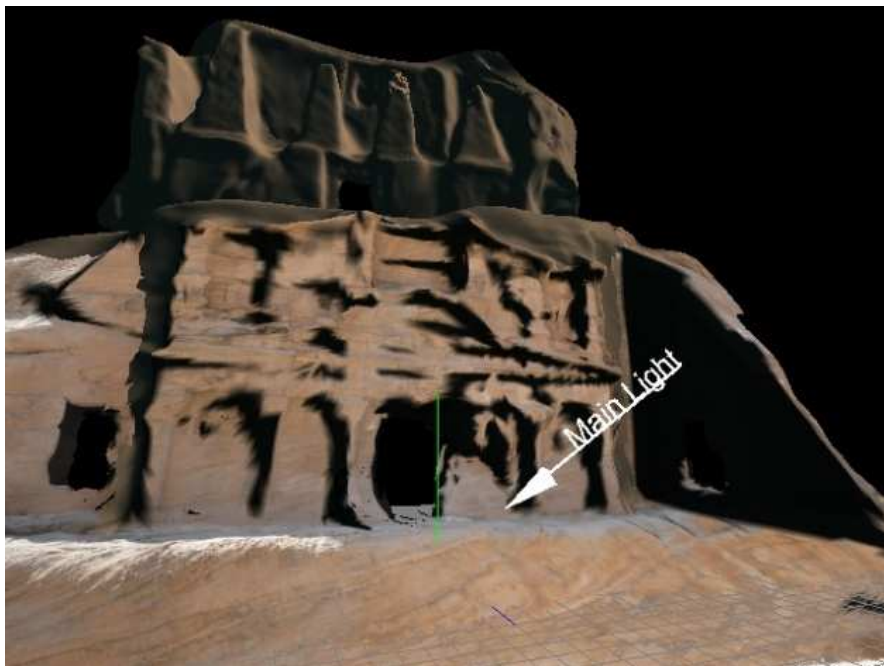
Fig.2 Imported model : VVVV environment and light direction control

Fig.3 Stereoscopic navigation with shutter glasses

Fig.4 Anaglyph 3D model navigation frame: the Nabatean triclinium and obelisk tomb in Petra, Jordan
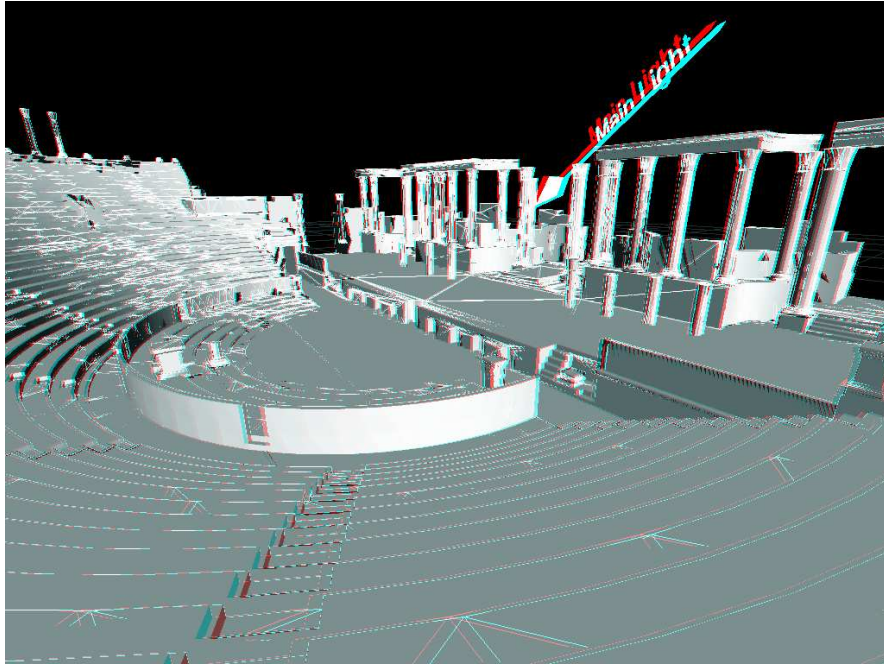
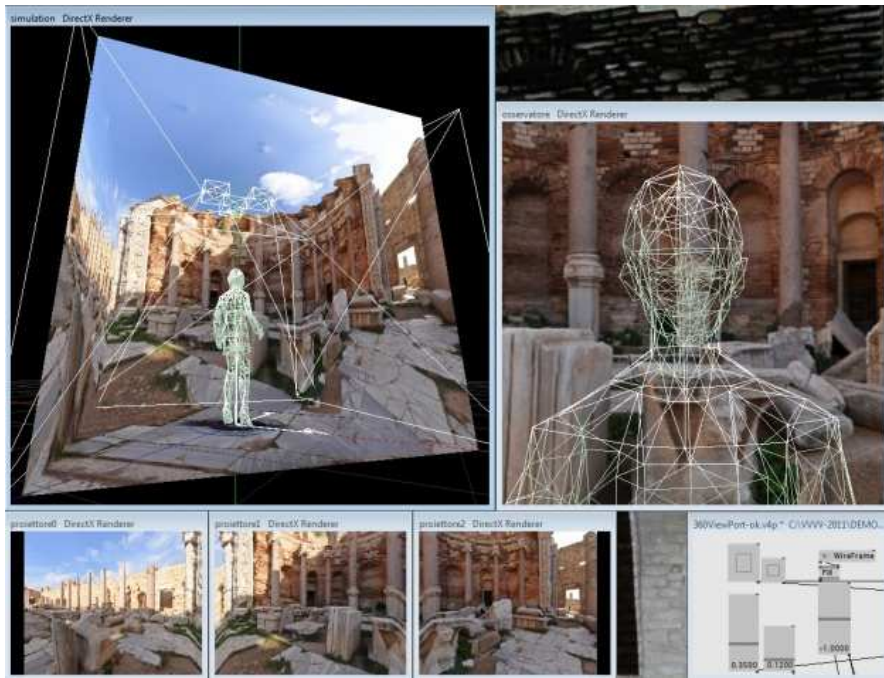*Fig.5 Anaglyph 3D model navigation frame: roman theatre in Leptis Magna, Lybia*

Fig.6 Simulation of a Cave Automatic Virtual Environment (CAVE)