THROUGH THE PAINTER'S EYE: INTERACTIVE 3D PRESENTATION OF PAINTINGS ON THE WEB

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Abstract

In this paper, we present a complete framework for capturing, processing and interactive rendering of well-known paintings on-line. Rather than displaying the artworks in a typical gallery manner, a free-viewpoint video engine was used to interactively tell the story behind those paintings. The user is encouraged to navigate the 3D scene in the search for the painter's viewpoint.

Keywords: Free-Viewpoint Video, WebGL, Painting.

1 Introduction

In order not to overwhelm the artwork, the ideal room for exhibiting visual art is believed to be as simple as possible. The so-called 'white cube', with its white walls and ceiling, is the common display room for modern and contemporary art. Although the artworks might be presented by genre or period, it is challenging for non-expert viewers to comprehend the connection between paintings.

In this paper, we propose to escape the 'white cube' concept in three different directions. First we aim to put the paintings back into their original context; secondly, to link tightly the paintings which each other when appropriate; thirdly, to encourage the viewer to discover the paintings in a new light. The key novelty of this work resides in the use of a free-viewpoint video engine as a means of presenting a coherent story between a set of individual paintings.

2 Storyline and scene capturing

The story that links five portraits from famous painters was used as a base for a scenario for the multi-camera shoot. The paintings were chosen so an actor can take the pose of a portrait and easily change his body posture to match the next painting. Guided by a feedback from a monitor overlaying live video and the original painting outline, the actor was able to take easily the exact pose. The actor was recorded simultaneously by 15 fully calibrated cameras, in a studio with chroma-keying backdrop.

3 Interactive storyline rendering

After capture, the actor's silhouettes in all video streams are segmented and used to carve a 3D model of the actor, using Image-Based Visual Hulls. Following the free-viewpoint video paradigm, the mesh is only textured at render time by

blending several of the original video streams based on the current viewpoint of the user. Such a rendering method can be more photo-realistic, as subtle viewpoint-dependent shading from the video streams are passed onto the rendering. A WebGL implementation of the free-viewpoint video [1] has been adapted to make our application available on-line.

Figure 1: WebGL-based rendering engine. Top: virtual environment showing the empty frame metaphor and extra information. Bottom: painting storyline.

The rest of the virtual set, modelled manually, puts the painting, and therefore the viewer back into context.

The user is encouraged to find the original painter's viewpoint by exploring the 3D virtual scene following the 'empty frame' metaphor. The video is paused, and an empty frame is inserted in the virtual environment, as illustrated in figure 1. The user can then navigate through the scene and frame the actor as the painter originally did. Once the correct viewpoint is found, the original canvas appears and the video can be played further to the next painting. Therefore in this interactive application the user is encouraged not just to observe but also to think along.

Using free-viewpoint WebGL-based rendering technology we developed an innovative pipeline for capturing and interactive presentation of artworks.

References

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