The Haunted Book

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Figure 1: Two examples of animated illustrations from the Haunted Book, and the Haunted Book setup. A video demonstrating the system is available at `http://chipchip.ch/interaction.html`

ABSTRACT

This paper describes an artwork that relies on recent Computer Vision and Augmented Reality techniques to animate the illustrations of a poetry book. Because we don't need markers, we can achieve seamless integration of real and virtual elements to create the desired atmosphere. The visualization is done on a computer screen to avoid cumbersome Head-Mounted Displays. The camera is hidden into a desk lamp for easing even more the spectator immersion.

1 INTRODUCTION

Magic books are not new in Augmented Reality. Since the pioneering work of Billinghurst and Kato [2], they have been used to enhance reading experience [3], visualize products in selling catalogues [2], tell stories [5], and teach. However, for robust registration, current applications rely on visual markers, which makes the illusion less convincing.

For the Haunted Book we describe in this paper, we used recent Computer Vision techniques [4] that provide the same robustness as ARToolKit while relying on natural features instead of visual markers. As a result, there is no need to engineer the book. It gives the spectator a more natural feeling, and let the artist give free rein to his imagination.

More specifically, we add animated elements to the illustrations of a poetry book. These elements, such as the raven in Fig. 2, match the illustration style and increase their impact.

In the following, we describe our work, give reactions of professional artists, and briefly describe the technical part behind the Haunted Book.

2 THE HAUNTED BOOK

The artist designed and produced the Haunted Book, inspired by old poetry books. The integration of very recent technologies into this

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old and dusty universe makes it unusual and particularly interesting. The Haunted Book is based on a poem written by Thomas Hood, The Haunted House. As the teller in the poem walking through the haunted house, the reader "walks" through the book and discovers hidden creatures.

The artist's interpretations of these hidden creatures appear as a skeleton's arm grabbing out of a letterbox, flying fish jumping out of an old cupboard, or loads of ugly insects running down a sofa. The animated engravings create a subtle and adapted way to enhance the illustrations by staying in the universe of the poem. The Augmented Reality technology used for the project allows this subtlety by staying discreet.

3 AUGMENTED REALITY TECHNOLOGY

The book registration is completely based on natural features, using the method described in [4] for which the code is available at [1]. The registration system relies on one single reference image for each page to augment, for which the artist designed animated layers using AfterEffects. At run-time, the system estimates the homography registering the captured frame and the correct reference image, and applies it to the animated layer for augmentation.

Since only one page at a time can be visible, the software keeps looking for the same page as long as it was detected successfully on the last frame. Otherwise, it looks for the next page. This keeps the delay short: In the worst case, the system would try all ten pages before finding the correct one, which takes less than a second and remains interactive.

Drawing the augmentation layer in 2–D, on top of a reference image, makes easy for the artist to create interaction between the real book and the virtual creature. For example, the candlestick printed on the book occludes the virtual bird's tail of Fig. 2. This effect is simply achieved by adding a static transparent layer in AfterEffects, making transparent the corresponding areas of the augmentation layer.

4 REACTIONS

To evaluate our artwork, we asked four professional artists the following questions:

- What is the artistic value of our work ?

- What brings the Augmented Reality part of the work ?

Figure 2: An example of animation from the Haunted Book.

- Would a similar work be possible with markers ?

We synthesize here their answers.

The artistic value of the work lies in its excellent detail design—visually as well as technically—and the creation of a universe. It addresses the clash of traditional culture of books with a new and very technical virtual realm. Many Augmented Reality works deal with what can be called the "Wow effect". Contrarily the most interesting point of the Haunted Book is the subtlety of the treatment and the coherence within the universe it creates. It takes the reader into a phantasmagorical universe, and reveals what may happen in the imagination of the reader, in the form of hidden elements suddenly revealed and interfering with the printed images.

In this work, Augmented Reality participates to reveal the phantasmagorical universe of the book. The experience is subtle, the animations are bringing an other vision of the pictures, and when they are gone, the reader looks differently at the pictures, thinking of what they plausibly "contain". The reader won't close the book the same way he would do with a normal one.

The technical part of the project has also a crucial importance. The apparent simplicity of the system relaxes the usual "high-tech" aspect of Magic Books that restrains them to "sci-fish" universes. No element is actually recognized by the reader as a "machine readable markup" which is a great evolution. Markers are by definition thought for the camera and not the reader' eyes, and one of the main strengths of the "Haunted Book" is the fact that it can be read also without a camera and AR. The printed images do not loose their interest when the animation appears, they are not just a hook for a virtual artifact, on the contrary, they are properly "augmented".

5 CONCLUSION

Our fruitful collaboration between artists and computer scientists resulted in an artwork, in the form of a book subtly augmented with animations. The computer vision and augmented reality techniques used purely rely on natural texture and allow seamless integration of real and virtual elements. The resulting atmosphere created by the haunted book convinced several professional artists.

This project demonstrates an innovative way of integrating ghost creatures in the real pages of a book. It creates a desire of searching for moving pictures through the pages. Augmented Reality allows the meeting of paper and computer screen, extracting a part of imaginary out of a reality our eyes can see and our hands can concretely feel.

ACKNOWLEDGEMENTS

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