Encounter (Resonances)[*]

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ABSTRACT

This work is about the remediation of one of Mark Rothko's Seagram murals through the composition of several online sources and additional digital rendering. Based on reproductions of Rothko's "Red on Maroon" found on the Internet, and using computer graphics compositing associated with moiré and specular lighting effects, "Encounter (Resonances)" offers a new approach to the presentation of a piece of work that allows a viewer to perceive some of its very subtle nuances. The work echoes Rothko's mixed media layered painting technique by using reproductions of various color palettes and resolutions as metaphors for the layers of paint in his original works. While each of these copies may instantly remind us of the original work, the graphical rendering of "Encounter (Resonances)" combines them at three levels of representation (global shape, micro and macro structure), in an effort to encourage a level of prolonged engagement and gradual discovery in the artwork.

Categories and Subject Descriptors

J.5 [**Computer Applications**]: Arts and Humanities, Fine Arts

General Terms

Algorithms, Human Factors

Keywords

digital art, mediation, moiré effect, presence, interactive art

1. INTRODUCTION

In the 1950s, artists such as Mark Rothko began to question the divide between the onlooker and the canvas. He believed that the artwork itself could be a spiritual entity, rather than a symbolic metaphor. Through this philosophy, the relationship between the artwork and onlooker was

[*]We thank the Rothko family for allowing us to use images of Rothko's painting for our work. Copyright ©1998 Kate Rothko Prizel and Christopher Rothko.

[†]This work was originally carried at while the author was working at Idiap Research Institute, Switzerland.

transformed, and the paintings themselves encouraged a dialog between the observer and the work. For Rothko, the dialog was achieved by using very thin layers of paint which had an iridescent quality only when viewed in darkened intimate environments where observers could open their senses, suggesting that

> "Since I am involved with the human element, I want to create a state of intimacy - an immediate transaction. Large pictures take you into them. Scale is of tremendous importance to me - human scale." [1] [1]

Recently, the combination of art and digital media has given an important role to the augmentation of the human body. Though such connections may give a sense of presence and engage the onlookers in playful interactions, we believe they lack the establishment of a strong and deeper connection.

Today, copies of Rothko's work are disseminated to millions through many different media but Benjamin suggests that,

> "Even the most perfect reproductions, *one thing* stands out: the here and now of the work of art – its unique existence at the place where it is at this moment." [6].

"Encounter (Resonances)" is an interactive installation that explores the idea of remediation through the creation, emulation and augmentation of one of Mark Rothko's Seagram Murals from traces of it gathered from the Internet [5]. In the age of digital reproduction, art works such as Rothko's are iconified and brought to a wider audience through different media. This conflicts with the aesthetic of his art as digital prints continuously propagate an iconified version of his art which only captures the surface layer of his paintings. Aspects of the original artwork that appeal to our senses e.g. color, scale, texture, subtle light scattering due to the painting layers, and even the interaction itself are lost.

Furthermore, the iconification of Rothko's art as a composition of colorful forms goes against his aesthetic and encourages a democratized but damaged perception of his art in an age where bringing art into our homes to match the furnishings is the norm. Rothko went as far as to suggest that in interpreting his work, "...if you...are moved only by their color relationship, then you miss the point." [4]

"Encounter (Resonances)" addresses the idea of rebuilding the 'damaged' aura of Rothko's iconified art. A fleeting

[1]"Question and Answer session after Lecture at the Pratt Institute" in 1958, reprinted ibid.

Figure 1: An example of a reproduction of "Red on Maroon" (1959), which was found on the Internet.

Figure 2: A subpart of the masks used to vary layer transparencies (each mask is encoded in an independent color channel).

glimpse of the installation provides an instantly recognizable image of Rothko's painting. However, closer inspection reveals that the work is composed of many layers, that only choose to reveal themselves to those who are willing to engage with it. Like a meeting with a stranger, the installation has a facade around which superficial interactions can occur. It is not until an observer has shown a willingness to truly engage with the artwork, that it reveals more of its true self, which may be flawed and raw in its honesty.

In our work, we purposefully use the colors of Rothko's "Red on Maroon" (1959) (Figure 1) which have been taken from reproductions on the Internet. While these are not the original colors of the painting we try to recreate an artwork that can still capture the original goal of Rothko's work by encouraging engagement with the artwork. The complexity of the visual effects involves subtle and diffuse changes in the painting light, color, and shape. These effects encourage each viewer to create their own personal dialog with "Encounter (Resonances)".

2. REBUILDING ROTHKO

The installation has three levels of granularity, corresponding to a progressive discovery of the piece. Each level offers a different conceptual and sensorial approach which echoes Rothko's mixed media painting technique where thin layers of very diluted paint were progressively added to the canvas.

The first and general level is a global view of the painting that changes color gradually. This was achieved by firstly resizing each painting layer taken from Internet without interpolation to the same dimensions, resulting in images with different resolutions. The overall effect offers the viewer a constantly changing representation of the painting by varying continuously and independently the levels of transparency of each of the layers. Each painting layer is also combined with a set of black and white masks that hide or reveal parts of the image when blending them (Figure 2). Each mask is derived from the actual structure of Rothko's

layered painting technique using an image of the work taken under Ultra-Violet light, obtained from the Tate Modern in London.

The second level concerns the macro-structure of the artwork that can be highlighted through specular (reflective) lighting. It corresponds to the low relief imprints due to brush strokes and canvas structure. For a fixed light source (such as the lighting in an art gallery), specular lighting depends on the position of the onlooker with respect to the painting. It is revealed by moving around the painting and engages the viewer to adopt different angles of view to perceive it more extensively. The visual rendering of the specular reflections is controlled by a normal map that describes the inclination of each surface point when compared with a flat surface (Figure 3 (a)). Different renderings of the specular lighting, depending on the position of the viewer are shown in Figure 3 (b) and (c).

The third and finest level of detail or micro-structure of the work, is at pixel level. The purpose of the rendering at this granularity is to allow viewers to perceive moiré effects due to the relative positions of pixel-wide holes in the dotted masks on each layer (Figure 4). Such a technique evokes the kinetic artwork of Frank Malina [2] using electric light that was shone through painted transparent and opaque plates moved by electric motors [2]. To produce these effects, we use a non-interpolated mode for texture rendering that is nowadays completely outdated and replaced by interpolation and smoothing. This rendering mode was however the only available one in the early ages of computer graphics in the 70s.

The moiré effects should evoke further the perception of the subtle transparencies of Rothko's paintings. They are produced by independently rotating each layer by very small amounts, resulting in visible variation of pixel colors seen through a holes in the mask. Through this rendering, complex patterns emerge that can stimulate the imagination [3].

The graphic rendering of this installation relies on the interactive composition of a pile of layers and attached masks (Figure 5). It can be regarded as an interactive Photoshop

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[2]Malina was a contemporary of Rothko and his work laid a bases for early computer art.

(a) (b) (c)
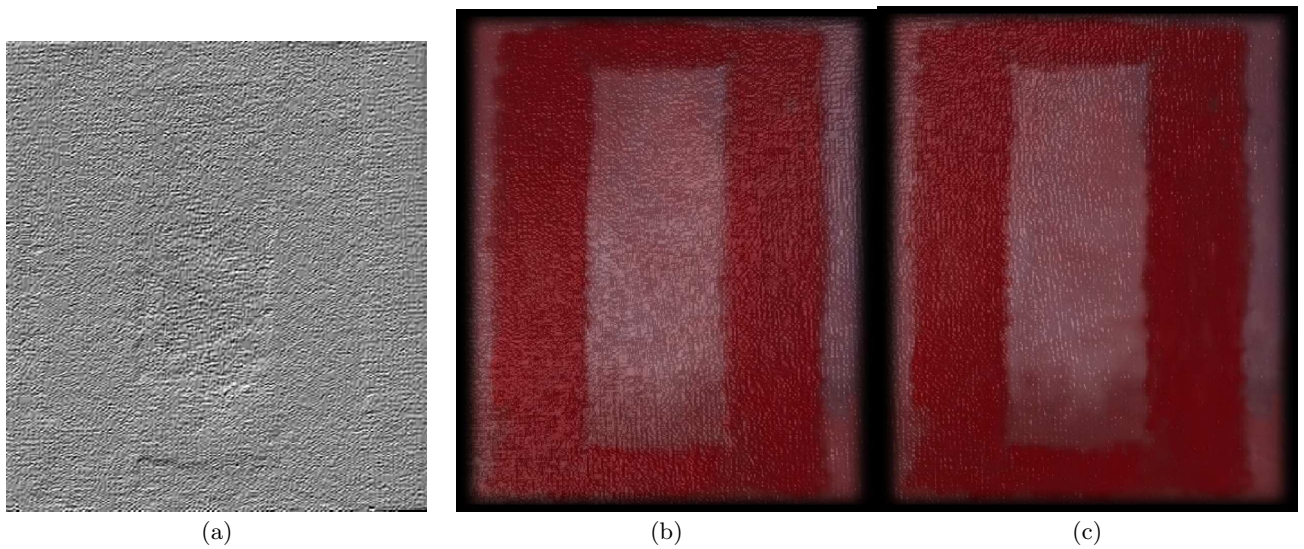
Figure 3: The specular lighting effect. (a) shows the normal map used for the specular lighting effects. (b) and (c) show different renderings of the specular light depending on the position of the person in front of the painting. Note also that the different positions cause also parallax effects to be observed in the different layers of the painting so that the layers that are furthest away from the observer appear to move less than those that are closer.
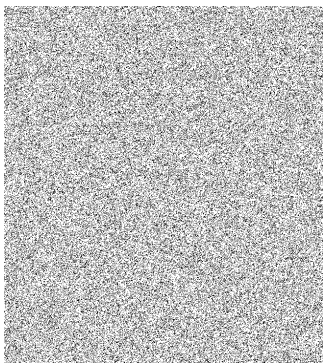

Figure 4: The dotted masks for moiré effects at a microscopic level.

application, and is well-suited for combining and blending several images through the superimposition of semi-transparent layers. Each layer has two masks: a partial mask for non-uniform transparency blending, and a dotted mask for moiré effects which are generated through layer rotations. The top layer also has a normal map for specular lighting. The graphical rendering is implemented in the 3D engine *Virtual Choreographer*[3], through a single quad with as many textures as layers, shape and dotted masks, and a normal map. Fragment shaders are used to compute the mask-based transparency, pixel holes, and the specular lighting of the top layer. Vertex shaders are used for the GPU computation of texture rotations.
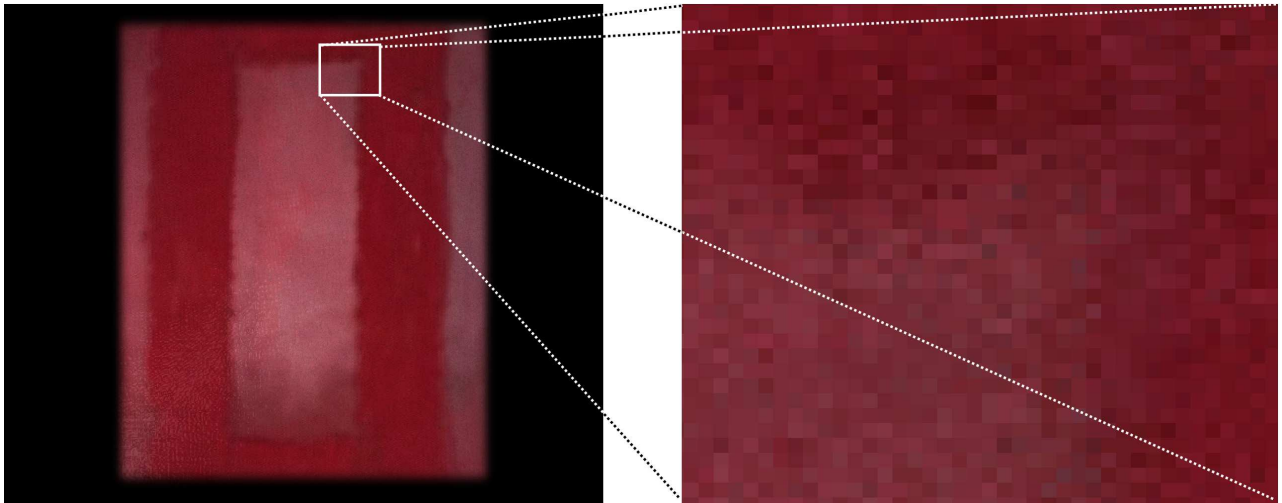
3. INTERACTION

A person standing in front of the projected artwork is captured by a video camera above the projection. The video
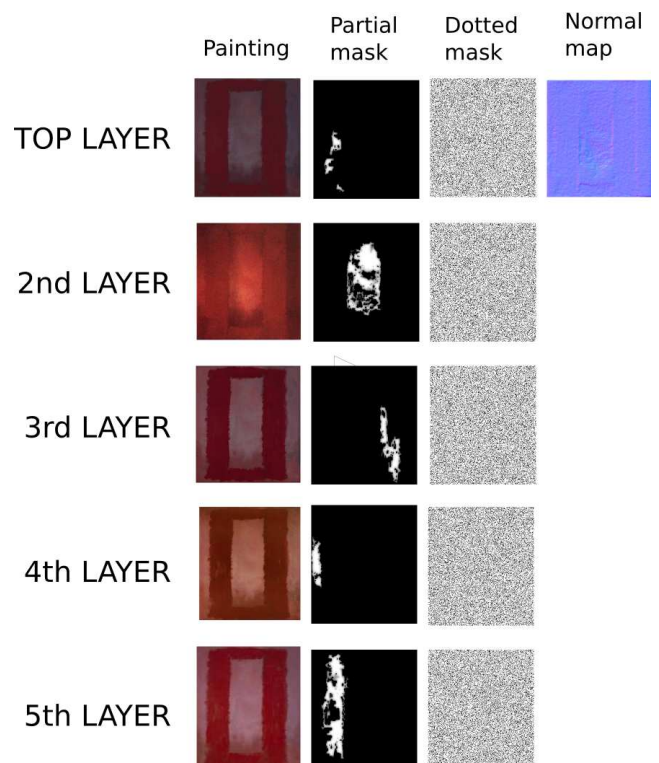
Figure 5: The pile of masks and layers used for rendering "Encounter (Resonances)".

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[3]http://virchor.sf.net

Figure 6: The composited layers. The left image shows the full composition and the right image shows a zoomed detail in the part of the painting shown on the left.

capture and the associated video analysis software are used to estimate where she is in relation to the painting, and how long she has been standing in front of it. Both these aspects of the observer's behavior are obtained with background subtraction and standard tracking techniques. The output of the video analysis is used to control the graphical synthesis of the artwork.

The position of the viewer relative to the art work is used to translate the layers according to their depth. It generates small parallax effects to give her a sense of depth to the virtual painting. And it is also used to modify the specular light seen on the painting (the reflection of the virtual light source on the painting surface layers, which is shown in Figure 3 (b) and (c)). Finally, the absence of strong motion triggers due to more careful contemplation of the work causes subtle rotations of the layers which generate shimmering moiré effects at the pixel level. Regions of the layers below are also revealed, slowly, using the shape masks that are shown in Figure 2, which were generated from the physical structure of the original painting. Different shape masks are shown depending on where the person is standing in front of the painting. These effects are more subtle than the specular lighting and parallax effects that were used in the first level of engagement. To see these effects, the observer must look at the pixels to see the changes.

Contrary to many digital artworks in which strong changes in the work are designed to encourage an immediate engagement with the onlookers, our soft and subtle approach to interaction could be called environmental. By observing how the user enters the installation environment, she is progressively immersed into the fine variations of the visual rendering (Figure 6). The two modes of interaction mean that those who are quick to judge or pre-judge the art work in terms of its shallow initial interactive experience will find their preconceptions to be vindicated. However, observers who do not have some initial pre-conceptions, and who can demonstrate a willingness to engage beyond the immediate gratification that the painting offers, can reach a level of 'trust' with the painting so that further aspects of the work can be revealed.

4. CONCLUSION

"Encounter (Resonances)" offers an interactive experience of discovery where the value of a copy of an artwork is questioned. Using graphical rendering and computer vision techniques to realize this installation, the work tries to emulate and augment an authentic experience with one of Rothko's paintings where enjoyment of the painting can be deepened only with prolonged engagement and with a willingness to perceive beyond the initial impression of the work.

5. ACKNOWLEDGMENTS

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