CONTEMPORARY ART AND TECHNOLOGICAL OBSELOTOENCE

Film digitization and color rendering in avant-garde and experimental cinema

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SINCE 2006, THE CONTEMPORARY ART GROUP IN THE RESEARCH DEPARTMENT OF THE C2RMF HAS BEEN WORKING ON THE IMPACT OF TECHNOLOGICAL OBSOLESCENCE ON CONTEMPORARY ART PRESERVATION. THE FIRST AND MAIN RESEARCH PROJECT THAT HAS BEEN INITIATED DEALS WITH TIME-BASED MEDIA AND, MORE PRECISELY, FILM DIGITIZATION.

THE PURPOSE IS TO EVALUATE THE VISUAL MODIFICATIONS THAT NECESSARILY OCCUR DUE TO THE CHANGE IN TECHNOLOGY AND THEN ELABORATE AN EXPERTISE AND DEONTOLOGICAL FRAMEWORK CONCERNING ARTISTIC FILMS’ DIGITIZATION.

BECAUSE ART WORKS ARE UNIQUE AND NON-STANDARD OBJECTS, THE METHODS OF MASS DIGITIZATION USED IN OTHER DOMAINS (E.G., TELEVISION AND LIBRARY ARCHIVES) CANNOT BE DIRECTLY IMPORTED INTO THE FIELD OF ART.

References


INTERNATIONAL SYMPOSIUM CONTEMPORARY ART: WHO CARES?

Research and Practices in Contemporary Art Conservation

Context. With the technological obsolescence of film it becomes increasingly difficult to show and exhibit certain art films. As a result, heads of collections have to deal with digitization.

Problematic. Our first study on film digitization focused on color rendering. In avant-garde and experimental films, color – far from being a photorealistic parameter – often constitutes the main subject. Color must therefore be reproduced as true as possible to the original.

Experience. Three films selected in Light Cone’s collection* have been digitized by three different colorists from the same film – each of them was asked to respect the colors of their usual working methods. [Fig. 1]

Protocol. Contrary to graphic art and design (e.g. photography, press), the image treatment chain in cinema does not incorporate any standardized procedure for color calibration. With the prospect of digital projection, cinema industries are currently working on it. Given this lack of standardized procedures, our study requires a preliminary step of color measures and device characterizations. In order to compare colors on film and the colors validated by the colorists, we characterized the telecine and the screen.

The three colorists used different methods. Two of them used a color reference: the first looked at the color on the films (delayed mode), the second used the LAD charts (color reference chart). The third colorist did not use any color reference.

Among the data generated by digitization, we selected 30 images from each film, representing the range of color and developed an algorithm for statistical analysis.

Results. The original colors were then compared with the colors obtained after digitization: we observed many differences in color reproduction. Some colors were close to the original, some were really different. We used Delta E measures, for which 1 represents no difference and ca. 100 an important difference. The average difference observed between the film and the digital version was approximately 25. Moreover, not all colors reproduced the same differences within a single frame. Color differences depended on the film itself and on the colorists.

All the reproducible colors (gamut) by a device depend on its technology. Therefore, color reproduction differs among devices. In our case, there is an inevitable difference between colors on a film and colors on a screen. [Fig. 2-3] A few colors on film are thus modified by digitization independent of the colorist.

Interpretation. After studying the digitizations, we observed a common behavior in the color transformations generated by the colorists: they mainly modified colors by increasing lightness and saturation and by deviating towards pure colors. The hue did not change significantly, but brightness and chroma did. Research about color reproduction in the field of photography could help us to understand the phenomenon: it concludes that without memory colors, exaggeration phenomena (increase of chroma and saturation toward pure colors) occur. Memory colors are colors associated with well known objects like the sky, grass or skin. We have a precise representation of these colors in our memory, based on experience. Many avant-garde and experimental films are non-figurative, which is the most difficult case for digitization: without object representations there are no memory colors. Indeed, without tools of color management, colorists are used to modifying colors by comparing digitized color with an internal reference they have in their memory. Without memory colors on the film, colorists behave as in the case studied in the photographic field.

The experiment demonstrates a non-negligible disjuncture between original and reproduced colors.

Part of the disjuncture comes from the lack of parameter in the cinema chain. Indeed, the faithful reproduction of color constitutes a limit case in the work of postproduction firms for commercial cinema. Their work concerns primarily the interpretation of color and not colors’ reproduction. Up until now digital color management in cinema has been used for printing from digital to film.

Consequently colorist s do not yet have the complete set of tools to make the most faithful color reproduction.

A much more developed system that takes into account the differences in technology, projection parameters, gamut mapping and data about color appearance is necessary. Color traceability should also be integrated: recording and conserving digitization parameters would permit the description of digitization characteristics to be included in a work’s file.

The study on color management constitutes a primarily step. Another project about flicker is in progress.

The goal of these studies is to find a way to minimize the gap between the original film and its digital version without denying the structural differences between those images and their respective supports. In the end, the precise formulation of the differences in image perception is central to our approach.

* VMF, Vitrin Vierdas, 2002, color, 35 mm, 10’
Francois Fabel, Cécile Fontaine vs. Dany Brillant, 2004, 35mm, 7’
Carl E. Brown, Quiet chaos of desire, 2007, color, 35 mm, 3/20