

# **Evaluation of the Color Image and Video Processing Chain and Visual Quality Management for Consumer Systems**

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CHESTER F. CARLSON CENTER FOR IMAGING SCIENCE  
COLLEGE OF SCIENCE  
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**CERTIFICATE OF APPROVAL**

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**M.S. DEGREE THESIS**

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The M.S. Degree Thesis of Abhijit Sarkar has been examined and approved by two members of the Color Science faculty as satisfactory for the thesis requirement for the Master of Science degree

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## **ABSTRACT**

With the advent of novel digital display technologies, color processing is increasingly becoming a key aspect in consumer video applications. Today's state-of-the-art displays require sophisticated color and image reproduction techniques in order to achieve larger screen size, higher luminance and higher resolution than ever before. However, from color science perspective, there are clearly opportunities for improvement in the color reproduction capabilities of various emerging and conventional display technologies. This research seeks to identify potential areas for improvement in color processing in a video processing chain. As part of this research, various processes involved in a typical video processing chain in consumer video applications were reviewed. Several published color and contrast enhancement algorithms were evaluated, and a novel algorithm was developed to enhance color and contrast in images and videos in an effective and coordinated manner. Further, a psychophysical technique was developed and implemented for performing visual evaluation of color image and consumer video quality. Based on the performance analysis and visual experiments involving various algorithms, guidelines were proposed for the development of an effective color and contrast enhancement method for images and video applications. It is hoped that the knowledge gained from this research will help build a better understanding of color processing and color quality management methods in consumer video.

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