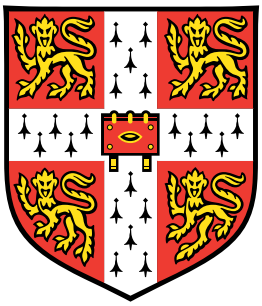
Color, Style and Composition in Image Processing



A thesis for the degree of
Doctor of Philosophy

Mark Grundland
Peterhouse College
Computer Laboratory
University of Cambridge
2007

Abstract

Ph.D. Thesis of Mark Grundland:
Color, Style and Composition in Image Processing

My work presents image processing techniques for facilitating artistic visual expression. Inspired by both visual art and visual perception, the aim of my research is to enhance the possibilities of visual communication by extending the repertoire of creative techniques available to digital artists. My work offers new ways to transform style, color, and composition in digital imaging. To improve control over stylized rendering, I propose a concise, multiresolution image representation that can simultaneously support both photorealistic reconstruction and non-photorealistic rendering. To improve control over color and contrast enhancement, I propose recoloring techniques to remap colors, find and replace colors, and convert colors to grayscale. To improve control over image compositing, I propose image blending operators designed to produce composites that preserve key visual characteristics of their components, including contrast, color, detail, and salience. Seeking mathematical models to express aesthetic and perceptual goals, I develop algorithmic image transformations that are shown to have a variety of practical applications across automated image rendering and interactive image editing.

Table of Contents

Table of Figures