

# Preface by Supervisor

Good design plays an important role in every aspect of our daily lives. Traditionally, design is taught as a set of concepts, rules, and practices that capture continuously evolving trends, with a basis in 100-year-old traditions. As an important area of human endeavor, design is naturally attractive for study by scientists and engineers. In this thesis, the author makes several fundamental contributions to the study of design of graphical materials. The thesis begins with an insightful review of the relationship between design and aesthetics and the use of mathematical models to capture this relationship. Then, a novel method for linking words to colors using the Latent Dirichlet Allocation Dual Topic Model is proposed. This work is informed by a dataset of over 2,654 magazine covers and a crowd-sourced experiment with 859 participants. Next, the thesis considers what comprises an aesthetically pleasing spatial layout. By application of principles of saliency, and Gaussian mixture models to a dataset of about 120,000 professional photographs, the author provides a remarkable confirmation of Arnheim's conjecture regarding spatial layout. The thesis concludes with the description of tools to support automatically generating personalized design of pleasing magazine covers by individuals who lack design training and experience.

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