Enhancing and Characterizing Paintings:

A Computational Aesthetic Approach

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W.A.P. Wickramasinghe
University of Colombo School of Computing
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048694

Abstract

The recent developments of the emerging digital media technology have significantly influenced all spheres of life. Some of these technologies have enabled modern computer systems to act, or more precisely to respond as humans especially in the areas where human intelligence is essential, for example aesthetic appreciation of art, music or any other form of fine arts. In the area of Visual Arts, integration of digital images with creative works is one of the key processes. In order to improve their efficiency and achieve high quality in their creative works, designers usually embed digital images of digital paintings adapted by using digital image processing techniques. One of the major requirements that we need to satisfy in this type of applications is balancing the aesthetic quality while maintaining the other aspects such as interpretation, creativity of those creations. Information digitization has resulted in high availability of digital images of painting that belong to diverse categories in the Internet without any intellectual property restrictions. Therefore, it is very important and useful to have image processing applications to capture and to model the aesthetic quality of images, so that the human designer is aware of how the aesthetic quality is affected by different image processing techniques. As the work reported in the literature is significantly little, it is expected to explore this area further in this research with a motivation of developing a computational aesthetic model to deal with visual aesthetic quality of digital images of paintings.

In this research, many existing models and frameworks in the area of computational aesthetics were studied with the aim of identifying a possible approach for characterizing and enhancing a painting. The three main approaches identified were the models associated with AHP, Machine Learning and Extended AHP. Ultimately, it was justified that Extended AHP method produces the most suitable solution for the current research problem.

Based on the literature survey, Analytic Hierarchy Process (AHP) was selected as the most successful methodology to solve our problem. AHP considers both qualitative and quantitative approaches and combine them into a single empirical inquiry. When dealing with aesthetics in artworks, user or the evaluator has to give satisfaction feelings using a scale of measurements depending on the physical attributes such as color, intensity (light), texture and material used for the artwork. Further, a new tool was developed to prove the concept for the extended AHP method for ranking and enhancing the digital images of paintings. There are different types of applications of the developed tool.

The major outcome of the research is the suggested framework to characterize a painting in the area of computational aesthetics.