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Towards a Model for Computational Aesthetics

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Aesthetics is a subject area that everyone likes as it is inbuilt to human beings throughout their lifetime. People appreciate a variety of aesthetics including music, drama and visual arts that comprise of various products such as songs, visuals, paintings, etc. Depending on the level of aesthetic appreciation, people tend to prefer creative products with higher aesthetic values rather than traditional products as there are technologies available today to improve their quality. When an advertisement or a painting is created, its creators always ensure to include the maximum aesthetic value. With technological advancement, the computer is used as a tool to perform different types of tasks efficiently. Therefore, if any approach can be found using Information Technology (IT) to compute the aesthetic value of an artwork like a painting, that will be of great use for efficient and effective evaluation and enhancement of the aesthetic characteristics of such products.

Aesthetic characteristics are the most important concerns in several areas where human judgment is involved in producing a quality output. The theory of aesthetics introduced by Birkhoff in his book *Aesthetic Measure* involves computational methods. It has built a foundation for other researchers to come up with different frameworks and models for computational aesthetics. Attempts have been made in the area of landscape planning and management, computer aided conceptual design, garment and fashion industry, and the entertainment industry. However, very little research has been done on assessing and enhancing the aesthetic value of artworks using IT as it involves three basic concepts: subjectivity, cultural influence and qualitative evaluation.

In this paper, inventions for assessing and computing aesthetics are discussed and a new approach using Analytic Hierarchy Process (AHP) is proposed. AHP is a multi-criteria decision making method which was originally developed by Saaty. It derives ratio scales from paired comparisons. The input is obtained from actual measurements such as price, weight, etc., or from subjective opinions such as satisfaction feelings (preference). When dealing with aesthetics in artworks, the evaluator has to give satisfaction feelings using a scale of measurements depending on physical attributes such as color, intensity (light), texture and material used for the artwork. When AHP is formulated, one should first yield the judgment matrices based on pair wise comparison for all elements in each hierarchy with respect to the higher hierarchy according to certain criteria of comparison within the scales. Ultimately, it will compute overall composite weight of each alternative choice based on the weights at different levels. Therefore, the AHP model can be customized to compute the overall composite weight of each physical attribute for the aesthetic value of an artwork (painting). The issues of models and frameworks used in the above mentioned application areas are further discussed and adapted to a model for computing aesthetics in an artwork (painting). This will be a milestone in the development of a tool to assess and enhance the aesthetic values of an artwork.