

The Study of Quantitative Evaluation Method of Beauty, Using Basic Figures and Motif Compositions as the Aesthetic Measure

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There exist pictures that people have recognized as great, beyond the borders of cultural differences over the last 100 years. This suggests that such paintings would have certain aesthetic elements in common, and if people are able to recognize them through a shared sense of beauty, it would be possible to study what kinds of properties influence people's evaluation of paintings.

Based on the tentative theory that "beauty should be easy-to-understand, super-rational, implicit knowledge". First, focusing on Katsushika Hokusai's paintings, we study the quantitative evaluation method of the level of impressions of beauty, with the hypothesis that "the number of the patterns of beauty in the picture at the initial viewing should be equal to the aesthetic level of beauty". In this study, we defined that "beauty" is caused by positive awareness and pleasantness.

We considered that beauty (pleasantness and positive awareness) would be indicated by physical (line, figure) and psychological (symmetry, complexity, order) factors caused by patterns of beauty existing in the picture.

Currently we are trying to automatically calculate the level of beauty by using image processing, based on the ideas that (1) the similarity ratio of the motif's shape and basic figures, (2) the matching ratio of composition rules and motif allocations, both of which can be the patterns of beauty. We adapted some polygons as basic figures which have high aesthetic ratio defined by Birkooff, such as a square, triangle and circle. In our previous experiment the participants were asked to subjectively apply these basic figures to the motif of paintings. Based on that result, we calculated (1) the similarity ratio of applied figure and original basic shapes, and (2) the matching rate of composition rules and motif allocations using center gravity of fitted figures and Hokusai's composition rules.

Presently, in 2 cases, the levels of beauty of original pictures are higher than the altered pictures. There are some issues I would like to raise, how to add appropriate weights for each motif, how people can fit the basic figures to the picture's motifs with proper sizes and positions. To implement these processes into the program, we are now trying to construct the algorithms for a quantitative evaluation method of beauty.