Scene Contour Junctions Influence Visual Aesthetics

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Rationale

Aristists have used contour junctions and other perceptual properties of images to evoke aesthetic appreciation in works of art (Cavanagh, 2005).

Can we predict aesthetic appreciation of ordinary visual experiences using structural properties of contours?

Aesthetic Ratings Experiment

Participants (n = 60) rated 475 artist-generated line drawings of real-world scenes based on how much they enjoyed viewing them on a 5-point likert scale. Average normalized liking scores for each image were calculated.

Extracting Contour Properties

Using the MLVToolbox, low-level visual properties; histograms of contour orientation, curvature and length, as well as, the number of T, X, Y and Arrow junctions for each image were extracted. A statistical model of aesthetic value as a function of these properties was built using a random forest analysis. The number of T junctions was identified as the most important feature contributing to aesthetic ratings predictions.

Random Forest Analysis

A regression random forest analysis was used to predict aesthetic ratings based on a cascade of contour properties. A bootstrap-aggregated ensemble of 100 regression trees was used. The number of T, X, Y and Arrow junctions for each image were extracted. A statistical model of aesthetic value as a function of these properties was built using a random forest analysis. The number of T junctions was identified as the most important feature contributing to aesthetic ratings predictions.

How do feature manipulations impact ratings?

In a follow-up experiment, participants (n = 100) were presented with the modified line drawings.

Does the effect persist across scene categories?

Participants preferred the modified line drawings which contained the top-ranked contour properties based on our statistical model. The pearson correlation between observed and predicted pleasure for modified versions was 0.62, p < .01.

Conclusion

We empirically modified subjective ratings of aesthetic pleasure when viewing line drawings of naturalistic scenes by manipulating contour properties in targeted ways while preserving their content.

References