Wholetoning: Black-and-White Image Synthesis

Jie Xu • Craig S. Kaplan

Computer Graphics Lab

David R. Cheriton School of Computer Science, University of Waterloo

We consider the problem of depicting continuous-tone images using only black and white. Traditional solutions to this problem include halftoning, which approximates tones, and line drawing, which approximates edges. We introduce "wholetoning" as a technique that attempts to depict forms in an image. We apply segmentation to a source image and construct a planar subdivision that captures segment connectivity. Our algorithm is a combinatorial optimization over this graph. The optimization is controlled by parameters that can be tuned to achieve different artistic styles.

Source Image
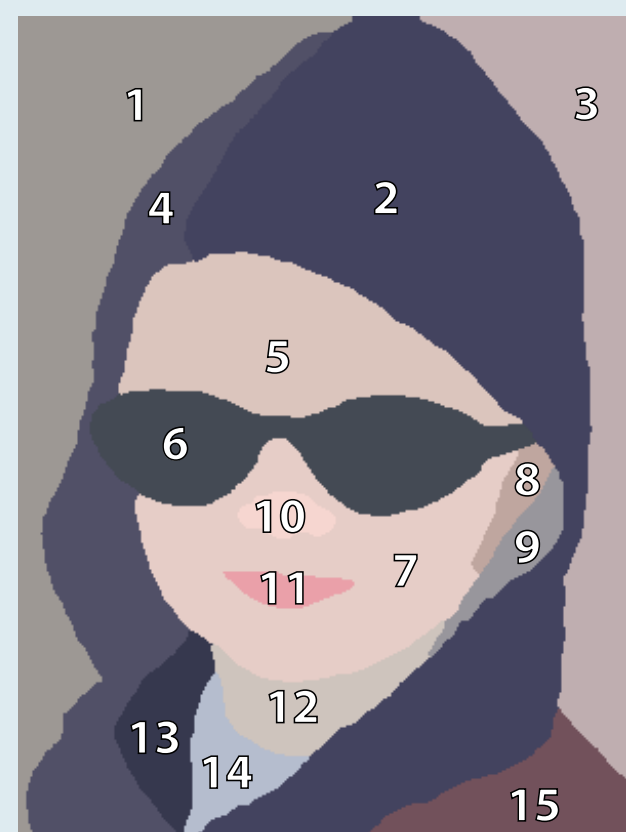
Segmentation
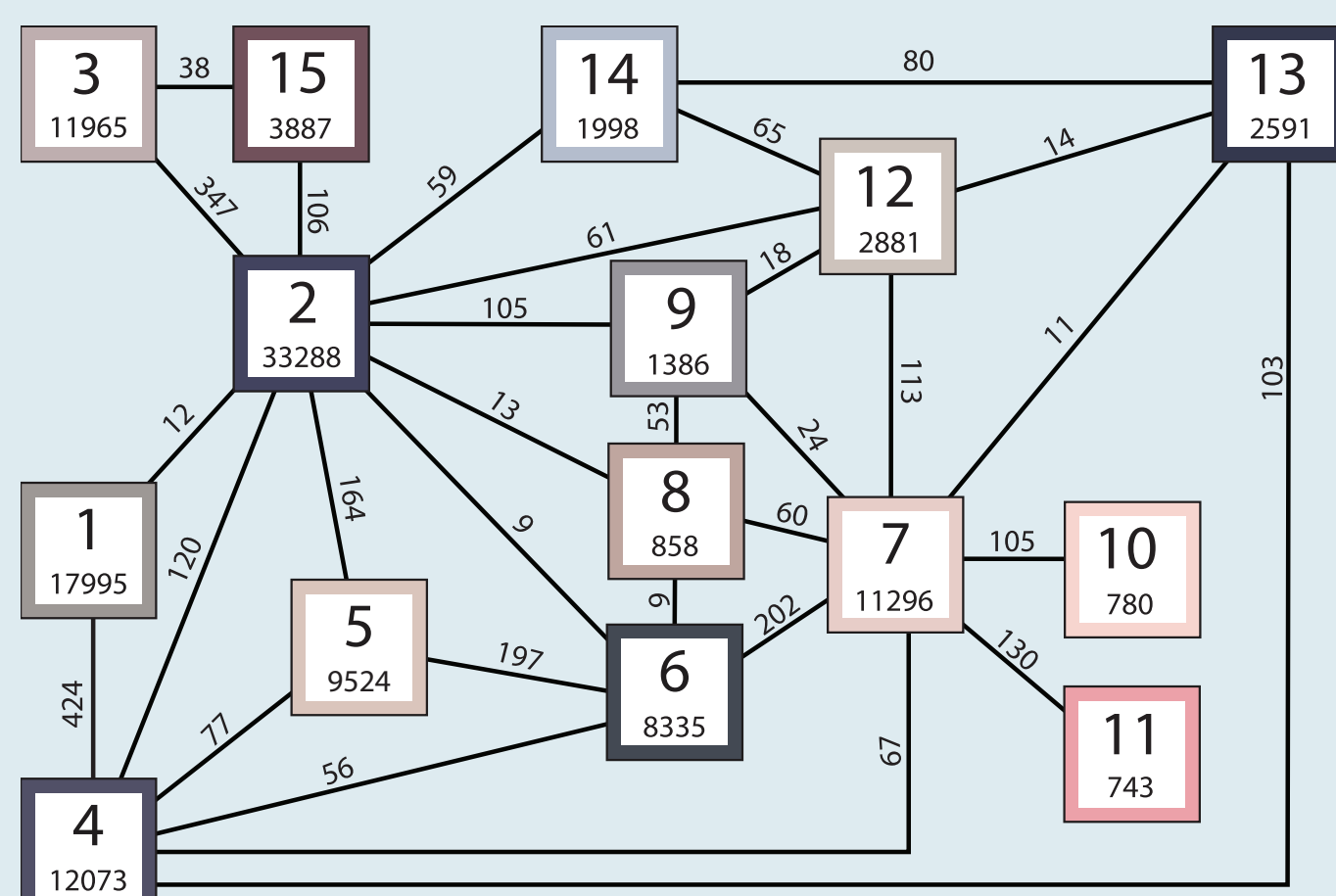
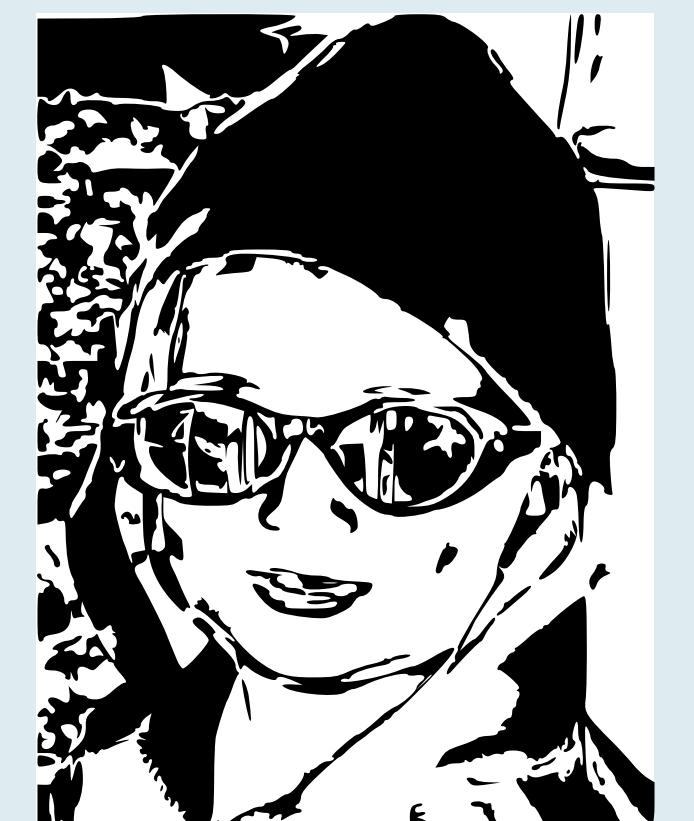Region Adjacency Graph

Color Matching
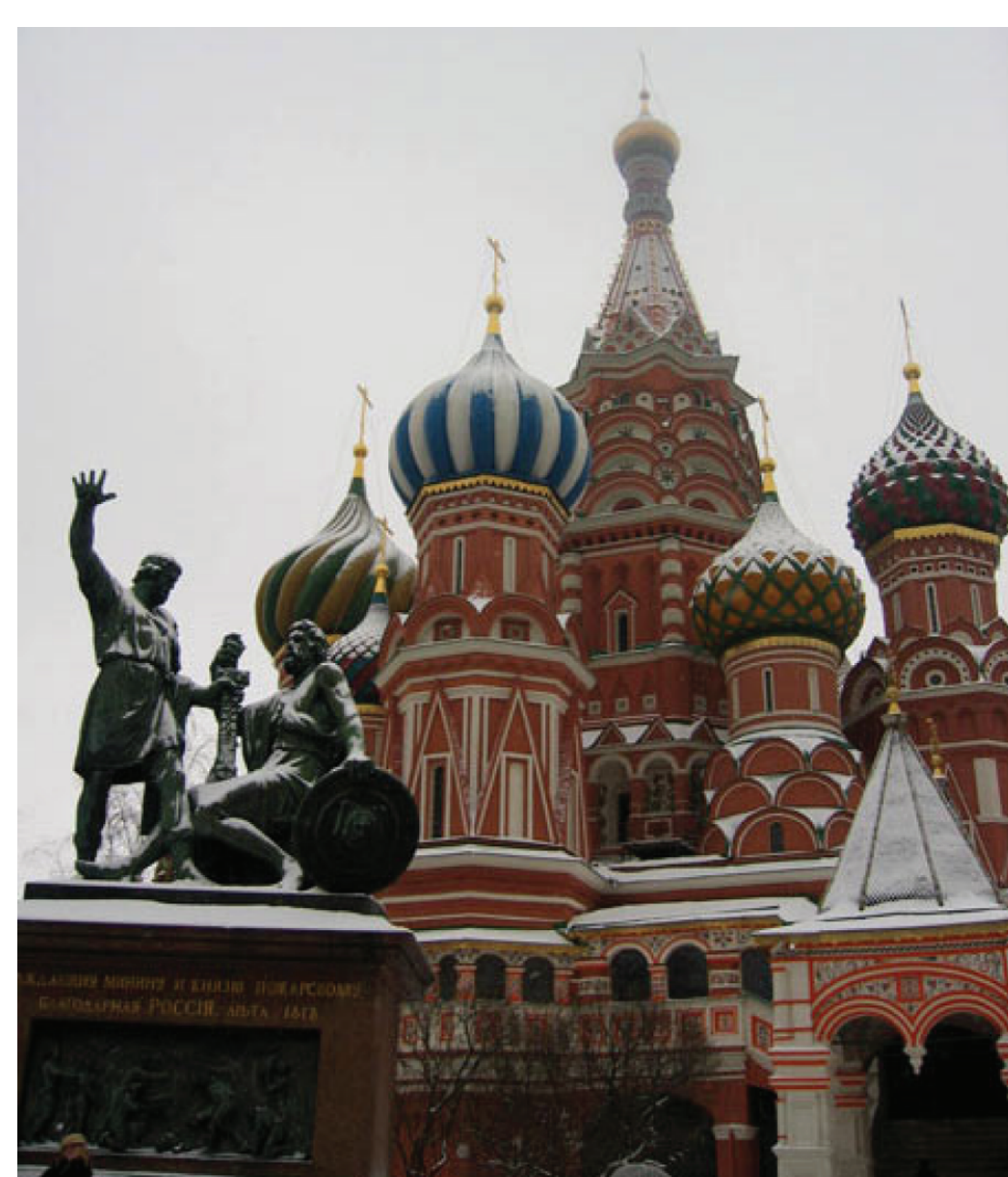

Area Matching=10%

Boundary Contrast

Feature Homogeneity

Examples

Results

We have experimented with other illustrative styles

Papercutting

Calligraphic Packing

Representational Mazes