

# A Hybrid Approach for Image Vectorization for Semi-Geometric Images

by

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## Problem statement

- ▶ Converting a raster (pixel-based) image to vector (shape-based) image
- ▶ Develop hybrid method that combines benefits of previous methods

# Edge tracing

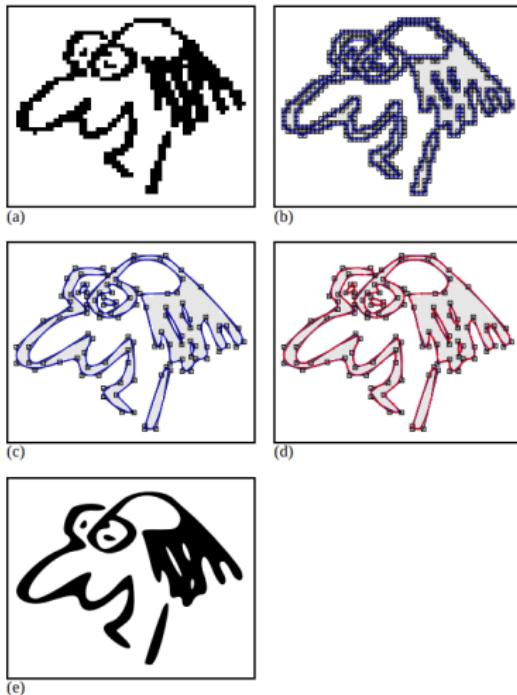


Figure: Illustration of the Potrace [1] vectorization process

# Blue-noise sampling

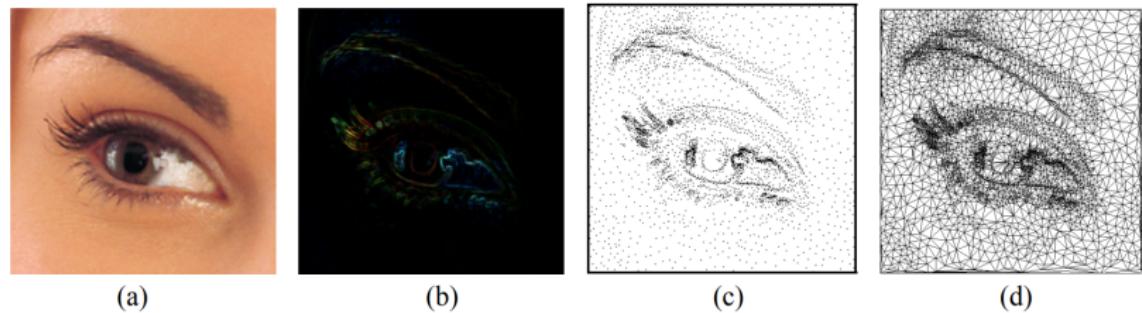


Figure: Illustration of the BNS vectorization process [2]

# Hybrid approach

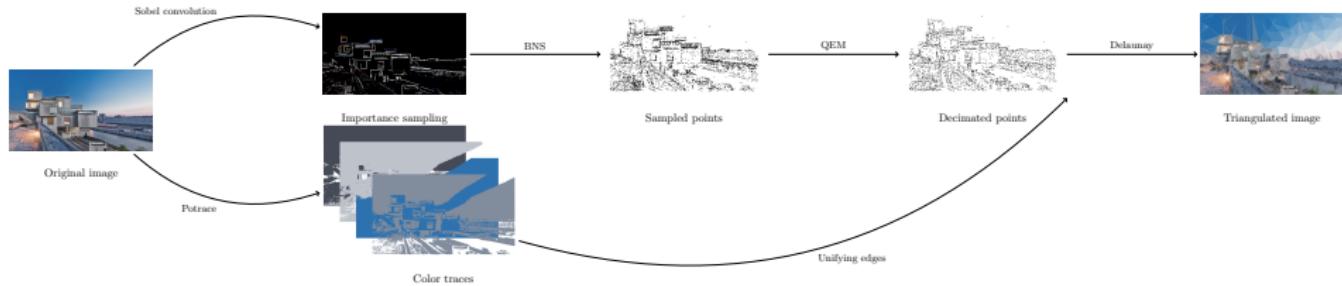


Figure: Architecture diagram

# Results



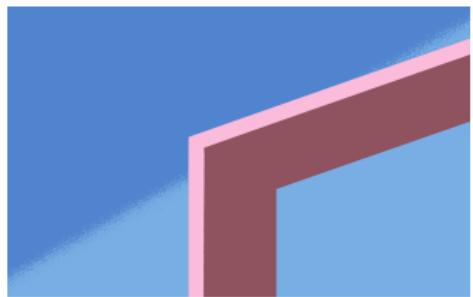
(a) Original image



(b) BNS image



(c) Hybrid image



(d) Potrace image

Figure: Set of images for experiment 3

# Results



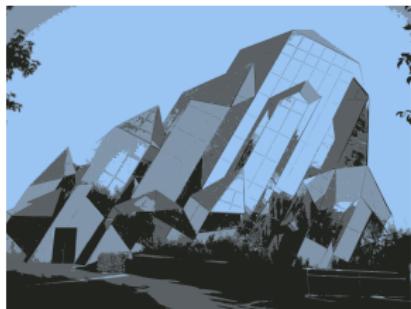
(a) Original image



(b) BNS image



(c) Hybrid image



(d) Potrace image

Figure: Set of images for experiment 4

# Results



(a) Original image



(b) BNS image



(c) Hybrid image



(d) Potrace image

Figure: Set of images for experiment 5

# Results



(a) Original image



(b) BNS image



(c) Hybrid image



(d) Potrace image

Figure: Set of images for experiment 8

# Conclusions

- ▶ Implemented framework for vectorizing images
- ▶ Based on blue-noise sampling and Potrace
- ▶ Larger file size in exchange for better performance on accuracy (MSE)

## Future work

- ▶ Alternative methods to strengthen edges
- ▶ Curve simplification
- ▶ Machine learning preprocessing
- ▶ Mathematical model of pipeline
- ▶ Improved evaluation metrics

## References

- [1] Peter Selinger. “Potrace: a polygon-based tracing algorithm”. In: *Potrace (online)*, <http://potrace.sourceforge.net/potrace.pdf> (2009-07-01) 2 (2003).
- [2] Jiaojiao Zhao, Jie Feng, and Bingfeng Zhou. “Image vectorization using blue-noise sampling”. In: *Imaging and Printing in a Web 2.0 World IV*. Vol. 8664. International Society for Optics and Photonics. 2013, 86640H.