Evolving images

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Introduction

Optimization algorithms have been proven to be useful for many applications. In given project differential evolution and hill-climbing algorithms were used to evolve images from random polygons and Voronoi points. Meaning that with each iteration the algorithm tries to get closer to the original image, however its possibilities are limited with the number of polygons or with the number of Voronoi points.

Styles

Figure: Polygons: each polygon had separate color, alpha and coordinate values.

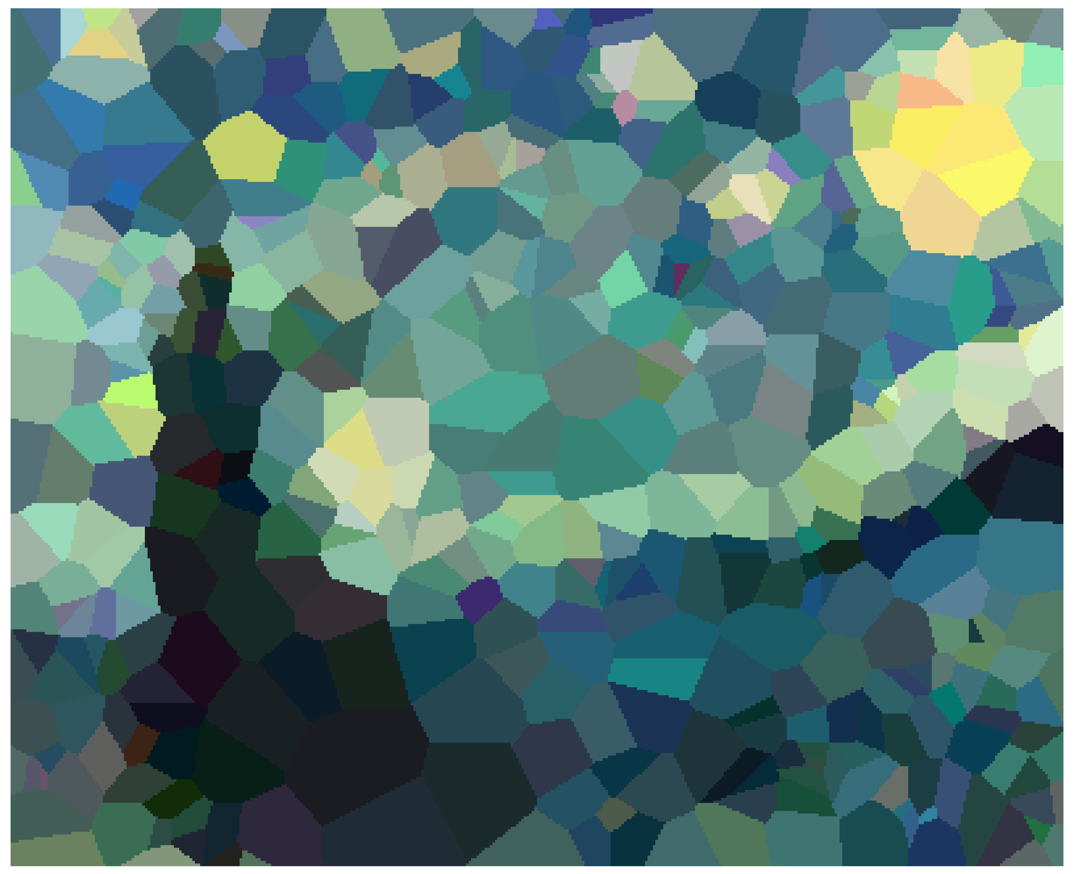


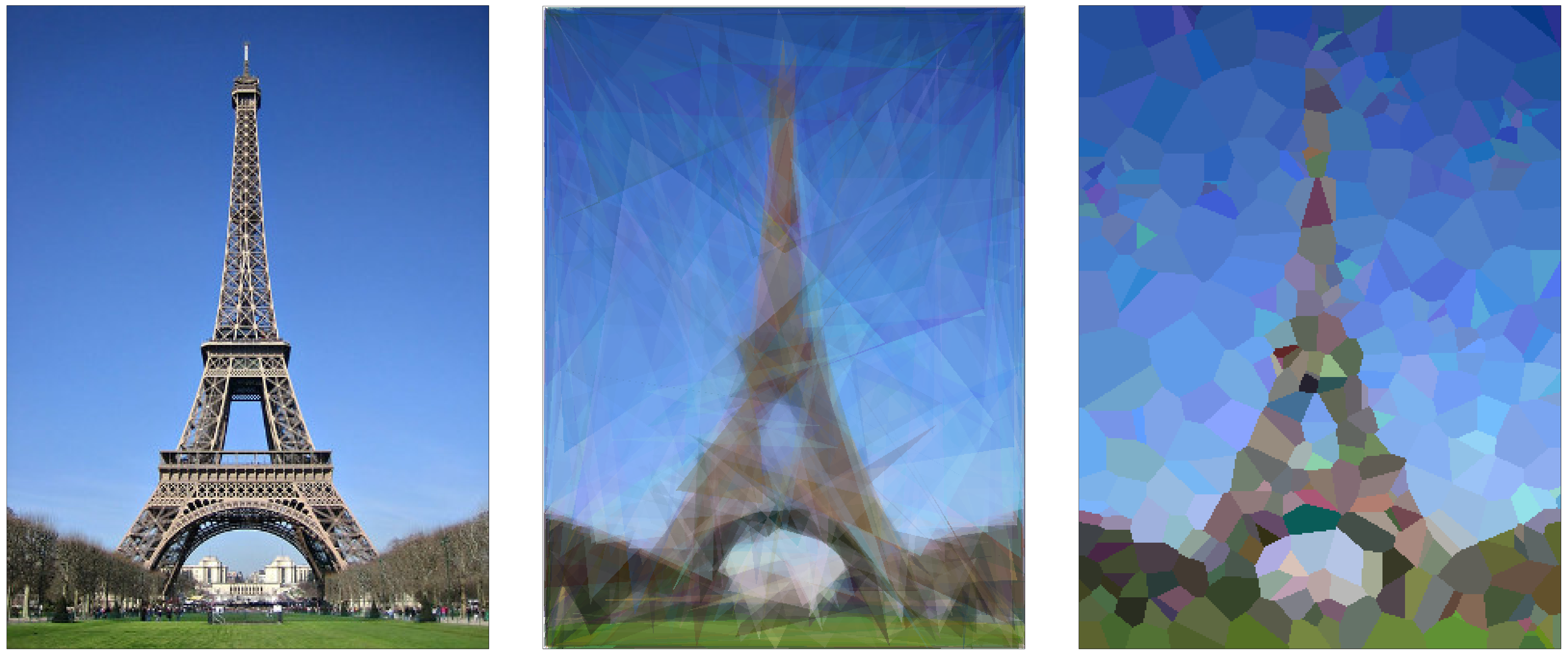
Figure: Voronoi diagram: these diagrams were built using points that had color values.

Hill climbing

Hill climbing is local search algorithm. In this project one parameter was changed to random value at a time. After changing the value, the newly generated image was compared to original. If it was better than previous, it was kept, otherwise discarded.

Original | 400 polygons, 125000 iterations | 500 points, 75000 iterations

Figure: Statue of Liberty



Original | 300 polygons, 100000 iterations | 400 points, 25000 iterations

Figure: Eiffel tower

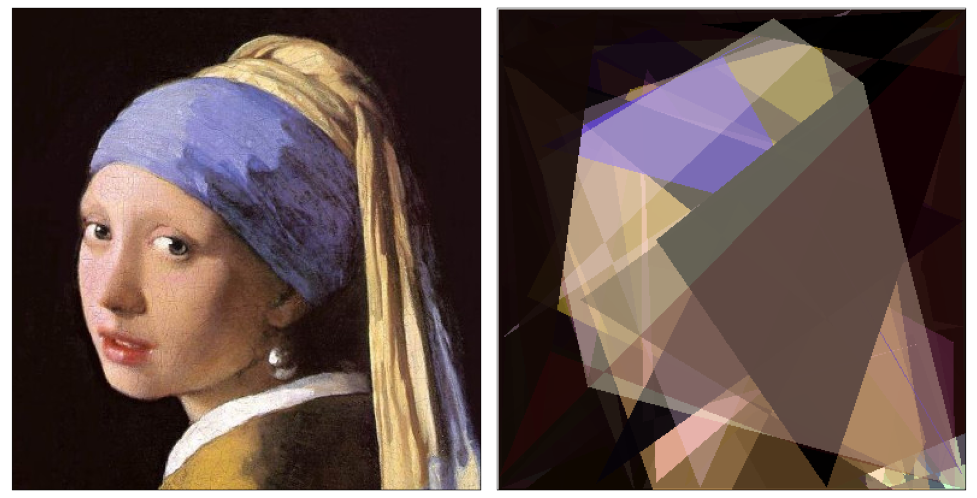
Repository: `github.com/LauraRuusmann/AA-evolving-images`

Differential evolution

In evolutionary computation, differential evolution is a method that optimizes a problem by iteratively trying to improve a candidate solution with regard to a given measure of quality.

Original | 150 polygons, iter 10000

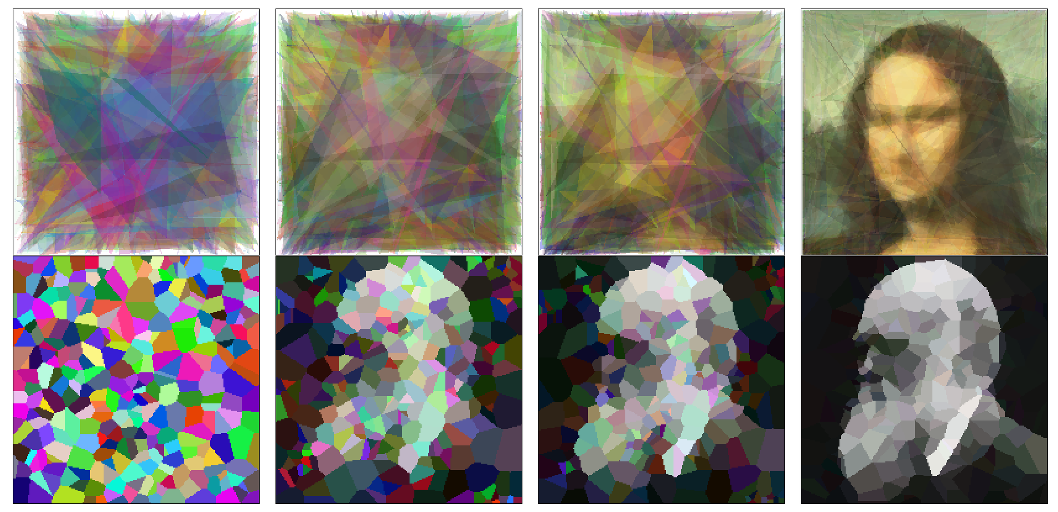
Figure: "The Starry Night" by V. van Gogh evolved using differential evolution and polygons



Original | 150 polygons, iter 10000

Figure: "Girl with a Pearl Earring" by J. Vemeer evolved using differential evolution and polygons

Time lapse



Iter: 0 | Iter: 5000 | Iter: 10000 | Iter: 75000

Figure: Hill climbing with polygons and Voronoi.

To see more time-lapse GIFs visit **bit.ly/evolving1** or scan the QR code.