# EvoGraph – Optimizing Graph Readability using Stochastic Techniques

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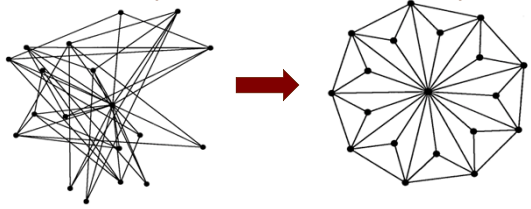
## Problem

**Given a particular graph, what is the best way to visually represent it visually?**

Initial Graph → Final Graph

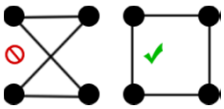


## Key Features

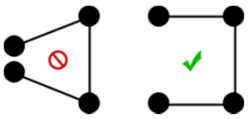
- Four different stochastic algorithms:
  - Simple Genetic Algorithm
  - Simulated Annealing
  - Hill Climber
  - ALPS
- Human-in-the-loop
- Algorithms have no knowledge of graph topography
- Adjustable fitness weights
- Convergence Detection
- Metaheuristic for Complete Graphs

## How we measure Graph Fitness?

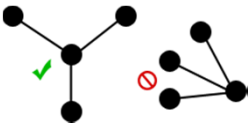
1. Minimizing Edge Crossings



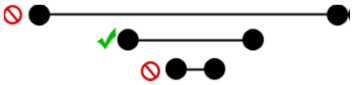
2. Optimize Node Separation



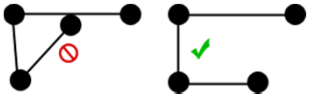
3. Optimize Angular Resolution



4. Optimize Edge Length

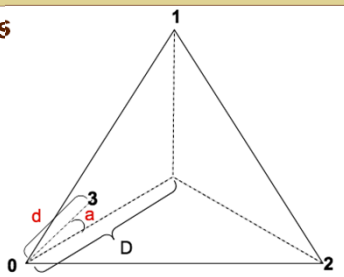


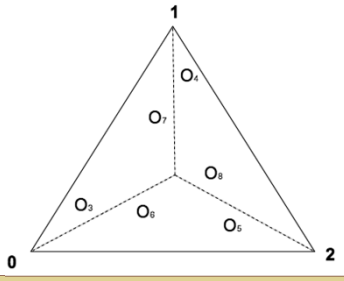
5. Reduce Edge Tunneling

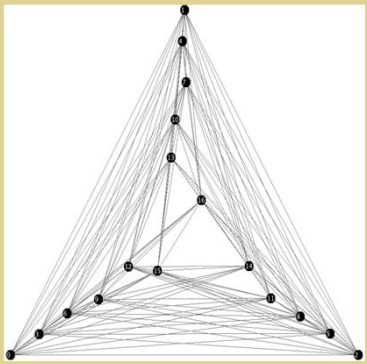


## Metaheuristic for Complete Graphs

- Place the first three nodes on the edges of the canvas as corners of an equilateral triangle. These are called the *Anchor Points*
- Every subsequent node is placed somewhere near the bisector of each *Anchor Point* with an angular deviation of *α (*a random Gaussian *Variable)* and a distance *d*
- The variable *d* is initialized as the ratio of the point's current layer divided by the total number of layers multiplied by *D*, the distance from the *Anchor Point* to the center of the triangle



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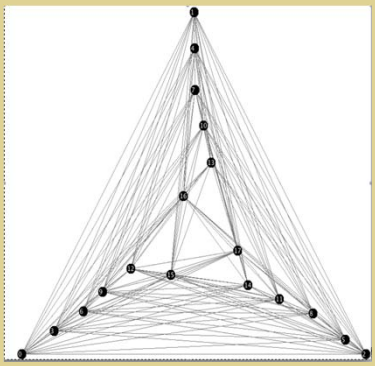

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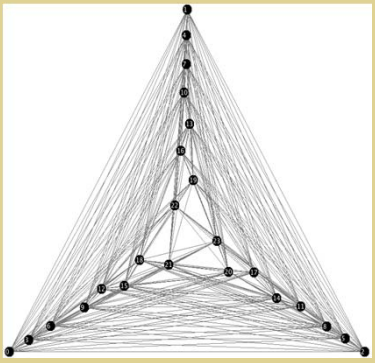

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