Image Construction with 2D Ellipses by Genetic Algorithms Optimization

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Bitmap Images

- **Simplification**
  - Represent an image in a simpler way
- **Vectorization**
  - Conversion of pixels into instructions of simple drawing primitives
- **Colors reduction**
  - Transformation of full-colors image into limited set of colors
  - In our case 24-bit colors to 16 indexed colors
Genetic Algorithm

- Search heuristic
- Mimics natural selection
- In the class of evolutionary algorithms
- Uses inheritance, mutation, selection and crossover
Our Implementation of GA

- Individuals are ordered set (variable size) of simple ellipses
- Single cut point crossover
- Mutation is a small correction of x-y position and orientation angle of a single ellipse
- Selection is based on Euclidean distance between the source image and the generated image

http://github.com/TodorBalabanov/EllipsesImageApproximator
Usage
Conclusions

- Genetic algorithms based bitmap images simplification by vectorization and colors reduction is very effective
- The optimization process is very time consuming
Questions & Answers