

Artificial Intelligence Assignment 2

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Introduction

In this task we are asked to generate image 512×512 pixels using some input 512×512 images via evolutionary algorithm.

Description of algorithm

Pseudocode for my implementation:

```
1: Generate population_size(10 by default) blank images
2: for each image do
3:   Perform mutation (add '*' character in random place with random colour)
4:   Calculate fitness value for each image
5:   Sort images by fitness value
6: end for
7: for number of generations do
8:   Keep the best half of population
9:   for each member of saved population do
10:    Perform mutation
11:    Calculate fitness value
12:   end for
13:   Sort by fitness value
14:   # After each iteration population size is 10 again:
15:   # 5 saved parents + 5 mutated kids
16: end for
17: Save the best member of population
```

- Chromosome representation:
 - Chromosome is pixel on each image and genes of this chromosome are
 - * Coordinates of this pixel
 - * RGB colour of '*' character
- Population:
 - Population is 10 images
 - Selection technique saves the best half of the population, while other half 'dies'. Saved half of population are 'parents' and each parent generate new mutated 'child'.
- Fitness function:
 - Fitness values is calculated using difference between original and current image, calculating statistics for resulted difference and finding mean value of resulted statistics.
- Mutation:
 - Mutation is changing random pixel of black image to '*' character with random colour.

Examples

Let us consider examples of generated images.
On the left side original image, in the center generated image after 200000 generations and on the right side generated image after 500000 generations.



Figure 1: Smeshariki

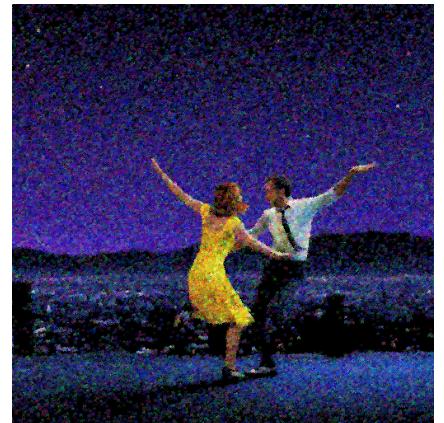
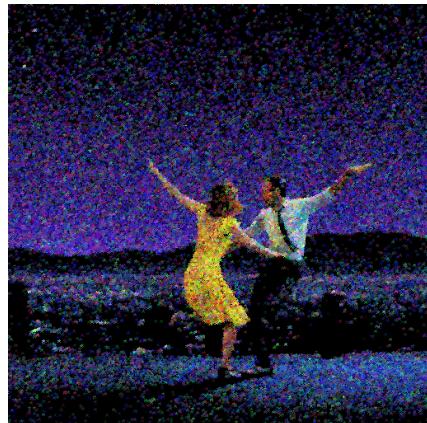


Figure 2: La La Land

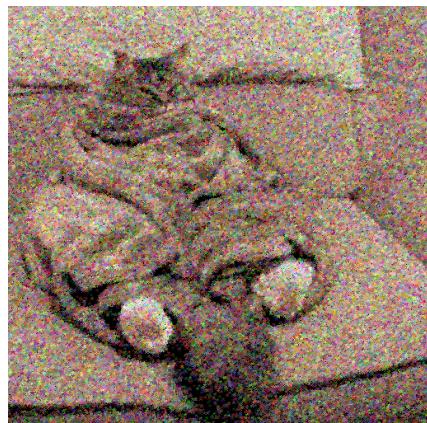


Figure 3: Lazy cat

As we can see, with higher number of generations image becomes more and more similar to the original image, but consequently, it takes much more time

Conclusion

In my opinion, art is some human creation that person creates in order to express feelings or thoughts. It can be painting, music, book, sculpture etc. For instance, when painter sees beautiful landscape he/she wants to capture that view. Or if writer has thoughts about some problem he/she writes a book. And there are more and more examples.

Therefore, I do not think that generated image is art because program just copies already existing image and does not try to express its feelings and thoughts through it. If my program generated something by itself, then I might think that it generates art, but now I am sure that this is not an art.