Introduction to Artificial Intelligence
Assignment 2
Report

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9 April 2021

1 Description of algorithm's parameters

1.1 Chromosome representation

The chromosome is represented as the sequence of 1024 16×16 images' numbers by which the target picture is approximated. So, in my implementation, the gene is the 16×16 image's number.

1.2 Population size and selection technique

The population size has been chosen to be 50.
The top 10% of the population by fitness value are taken to the next generation without any changes. Then, top 20% of the population (including the previous 10%) are crossed with each other, and the crossed offsprings with the best fitness values compose the next 20% of the population for the next generation. After that, mutations are performed on all offsprings except those who are taken without changes. For the next and all future generations, the described process is repeated, and the population size remains constant.

1.3 Fitness function

The chosen fitness function is the Mean Square Error between the image produced by the chromosome of the offspring and the target picture. An offspring with the lowest Mean Square Error value is the fittest one.

1.4 Crossover

As it has been mentioned, the chromosome is the sequence of 1024 numbers. The crossover type used in this algorithm is the Uniform Order Crossover. Each gene of the new chromosome (child's chromosome) is taken randomly either from the first offspring participating in a crossover or from the second one.

1.5 Mutation

Firstly, the number of changes in the chromosome is selected randomly from the range $[0, 5]$. At each change, the number of a 16×16 image corresponding to the randomly selected gene is replaced by the random number corresponding to some other 16×16 image.

*A detailed description of an algorithm's code can be found in comments in **.py** files submitted.*

2 Examples of input test images and corresponding output images

GIF animations of the generation's process of images presented below can be found in my GitHub repository.

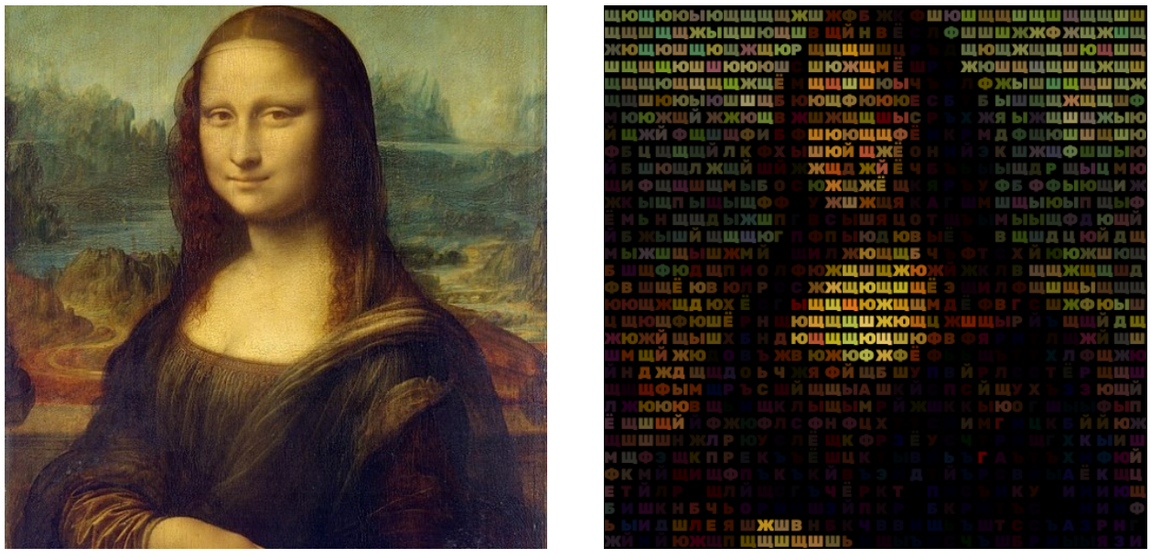

Figure 1: Mona Lisa (25000 generations)

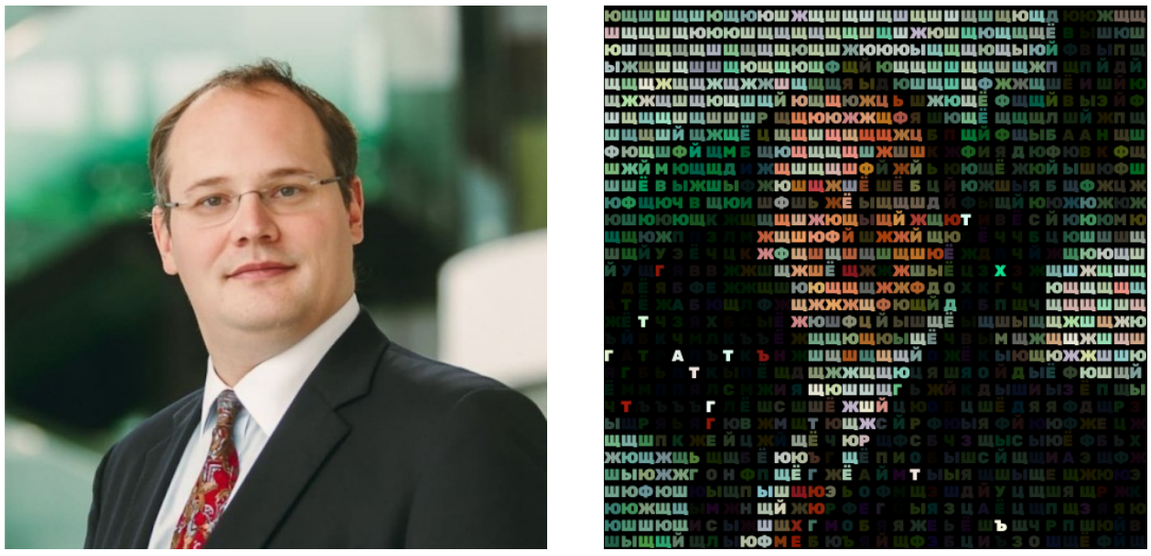

Figure 2: Doctor Brown (25000 generations)

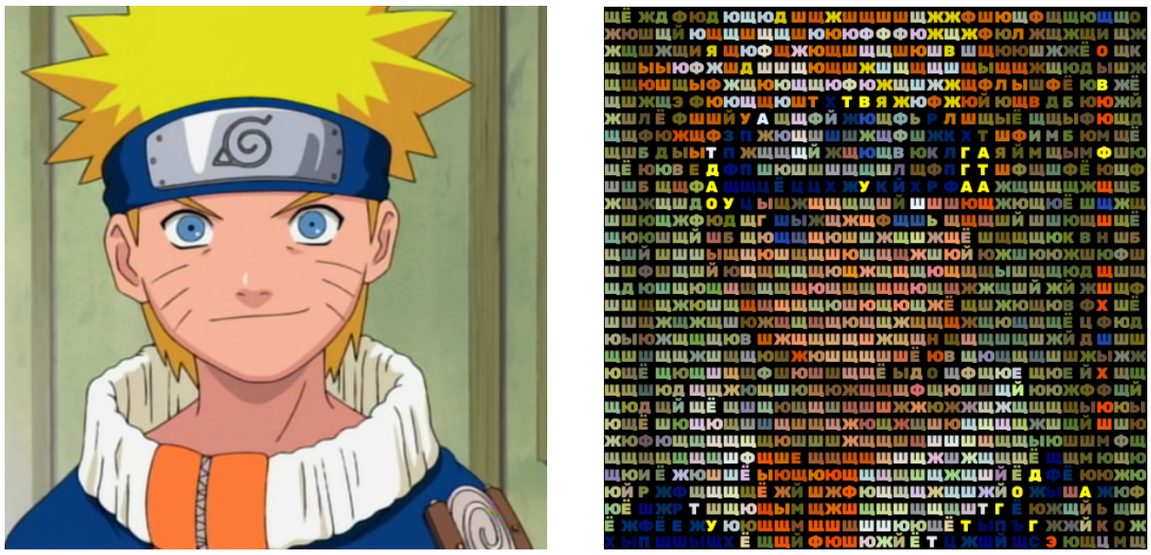

Figure 3: Naruto (25000 generations)

Figure 4: Head (25000 generations)

Figure 5: Head (25000 generations)

3 What is art

For me, art is a creation that satisfies someone's love for beauty. It is something that causes an emotional response and an aesthetic pleasure in people. I love how the generated by my algorithm pictures are represented/approximated with the use of other images. I consider created pictures beautiful and they deliver me aesthetic satisfaction. Furthermore, I have asked a lot of people from the Innopolis University for feedback on created images, and they also have had similar emotional responses. Of course, I agree that the produced images are just an approximation of original pictures. However, generated by my algorithm images have their own distinctive style. Therefore, I believe that my work (by work I mean the pictures generated by my algorithm) is art.