

GENETIC GENERATION OF 3D MODEL

Within the context of a video game development, we wanted to generate a world which has some original decorative elements.

We decided to create a generator of natural objects based on genetic algorithms with random alterations.

In this poster, we will present the work we made on Blender software and Python programming language.

OUR APPROACH

Approach

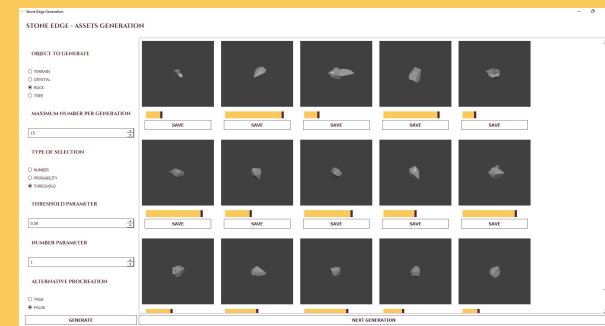
Our first approach for making these assets is to define some properties we can randomly set for the purpose of getting some original objects.

Problem

It is to find ways to control the random aspect in such a way the user can lead the generation.

Then

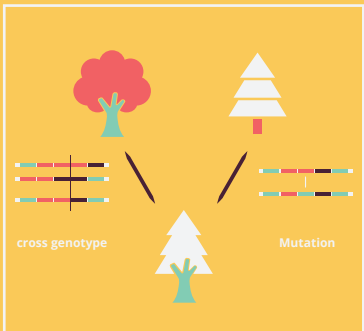
We decided in a second time to use the principle of genetic algorithm to combine the generated objects. It consists of making some individuals evolving through several steps. As the biological genetic evolution the goal is to modify some characteristics for getting better individuals.



PRINCIPLE

It consists of making some individuals evolving through several steps. As the biological genetic evolution the goal is to modify some characteristics for getting better and better individuals until the user find satisfying objects. These characteristics are defined as the genotype and the resulting 3D objects are defined as the phenotype. In our case, we can't assess this phenotype objectively. So we let the user evaluate his preferred individuals. biology.

And we go so on until the user gets the good one. Basing on best individuals we generate some new objects by combining their characteristics like in biology. And we go so on until the user gets the good one.



GENERATION CODE

We decide to make a system which can generate any object leaded by the genetic evolution. Here is the pipeline which generate a specific object:

- Generate first individuals randomly
- For each phenotype :
 - remove it according to the selection condition
 - or change some characteristics if not removed
 - pick best individuals and make new individuals from it
 - repeat the process as long as we want

REFERENCES

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Andrew HALE (TrumanBlending). Blender Plugin Sapling Tree.

RELATED WORK

Terrain generation using genetic algorithms

<https://dl.acm.org/citation.cfm?id=1068241>

The generation use two stages : thefirst is the silhouette and the second the heightmap. It generates 2D polygonal map by using random paths generation and the fitness computation is done automatically.

RESULTS

