

Artificial Terrain Generation

Paper by Génevaux *et al.* [1]

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Paper Overview

Research Summary

To generate large and geomorphically consistent terrain in an efficient manner with high user controllability.

Key Points

Take concepts from hydrology:

Hydrology is the study of the movement of water over land. Hydrology is what happens in the real world, so if the goal is to create terrain that is consistent with what we see on Earth, it must be considered.

Use rivers as a starting point:

Rivers are a key feature in many landscapes across the globe. Land is often carved by rivers so it makes rivers a natural starting point for any method aiming to be realistic.

Instead of simulation use primitives:

Simulation of water can create visually plausible terrain but it takes a high level of computational power. It is therefore best to avoid simulation in order to generate terrain in an efficient manner. To keep the landscape visually plausible a set of river primitives taken from real world data must be utilised.

Keywords

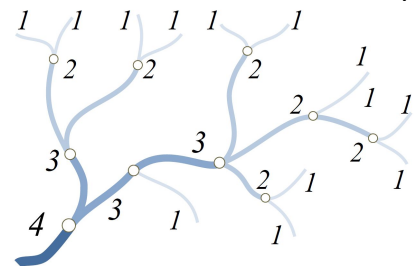
Drainage River Network - A graph representing the path of a river from source to mouth

Heightfield - A function that takes x, y coordinates and outputs the height at that point.

Rosgen Classification - Classifies a river into one of 9 types based on physical features.

Horton-Strahler Number - A way to measure the complexity of a branching tree. A node is equal to the number of its children or if the children are equal, children plus one.

Horton-Strahler Number example from [1].



Related Work

The work done by [1] in 2013 was improved upon by Zhang *et al.* [2] in 2017.

They added more hydrology concepts to create more accurate terrain.

[3] also added to the field by creating animated water surfaces that are accurate to the flow of water observed on earth.

Questions

Why generate the rivers first instead of the terrain?

Is creating geologically consistent terrain that important?

Can the issues with other generation methods be fixed to bring them up to the standard presented here?