

Infinite Procedural Infrastructured World Generation

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Introduction

- Complex infinite world generation is a relatively new field of research with little coverage.
- Creating virtual worlds manually is arduous.
- Generating deterministic interconnected features is complicated.

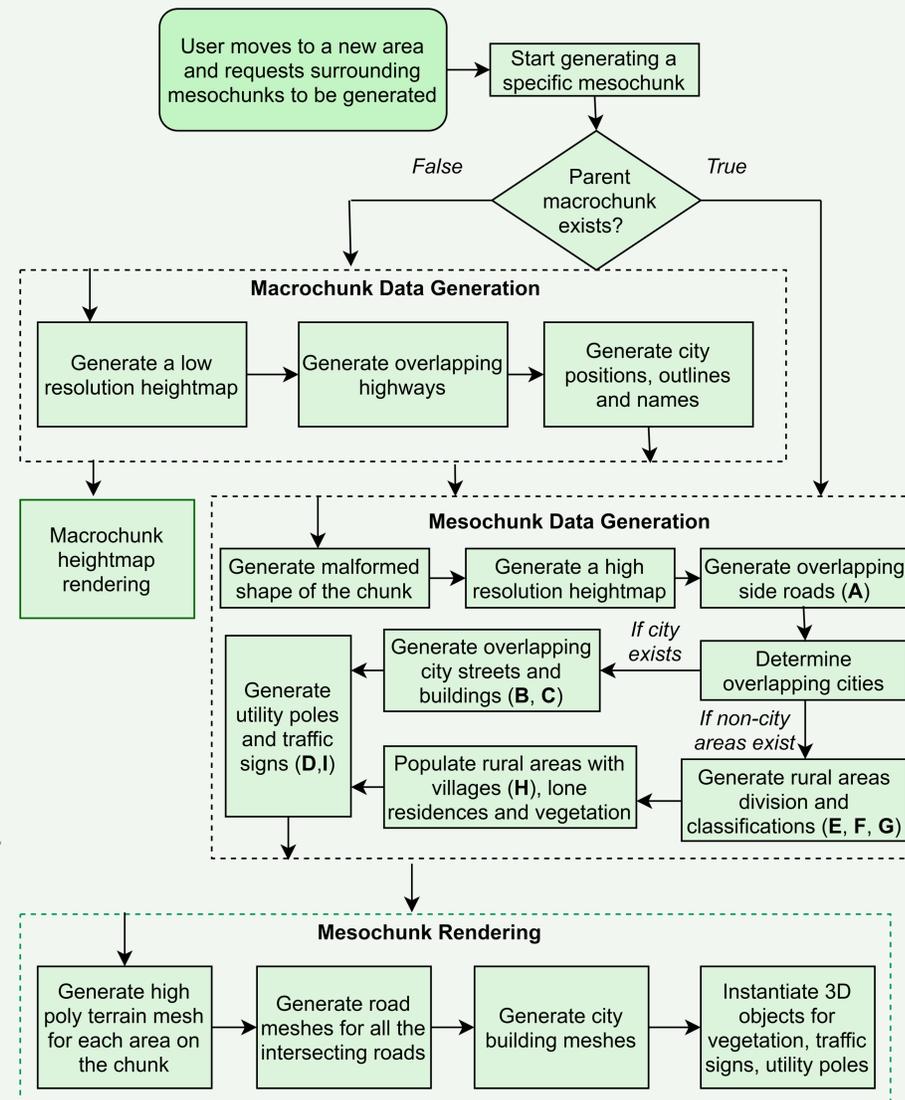
Solution

As part of a master's thesis, a novel algorithm capable of generating deterministic infinite worlds with many different features was developed. The goal of the project was to generate a world similar to real life temperate climate zone areas near civilized areas. In addition to pictured features, a variety of potential future features are discussed in the thesis.

Exponential Generation

- A novel way developed for generating different features.
- The world is divided into nested chunks.
- Differently sized chunks generate features most fitting to their size.
- Smaller chunks require larger parent chunks to exist.
- Currently 2 different chunks are implemented:
 - **Macrochunks** ($8 \times 8 \text{ km}^2$)
 - **Mesochunks** ($512 \times 512 \text{ m}^2$)
- A third, megachunk ($128 \times 128 \text{ km}^2$), is discussed for generating rivers and railways.

Generation Pipeline



Applications

- A computer game's background world;
- A simulation environment for algorithms;
- A driving simulator;
- A game with a small file size;
- Initial input for map generation tools for user-controlled refining.

Project's author is a second year Master's student of the Computer Science curriculum at the Institute of Computer Science, Faculty of Science and Tehnology, University of Tartu. The project was supervised by Raimond-Hendrik Tunnel. The thesis and the build are available from https://comserv.cs.ut.ee/ati_thesis/ The source code is available from <https://bitbucket.org/AndreasGP/mastersthesis>

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E: A Corn Farm



F: A Forest



G: A Nature Reserve



H: A Village



I: A side road junction with utility poles



A: Rural side roads junction



B: City streets and buildings



C: A highway through a city



D: Various traffic signs