TERRATINKER

Crafting Playful Visualizations from Geospatial Data

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Motivation

Using video games for interactive data visualizations combines the benefits of interactive visualizations with the engagement brought by video games. The goal of the thesis was to create **TerraTinker — a tool for generating visualizations of real world objects and phenomena inside a virtual environment of a Minecraft world**. Such visualizations can be nearly impossible to create manually. TerraTinker aims to automate the process of designing and expanding such visualizations while maintaining the freedom of customization.

The maps generated by TerraTinker can be used directly for the exploration of the used geospatial datasets and engagement of public with a specific problem, such as climate change or urban planning. Example of a generated map can be seen in *Figure 1*.
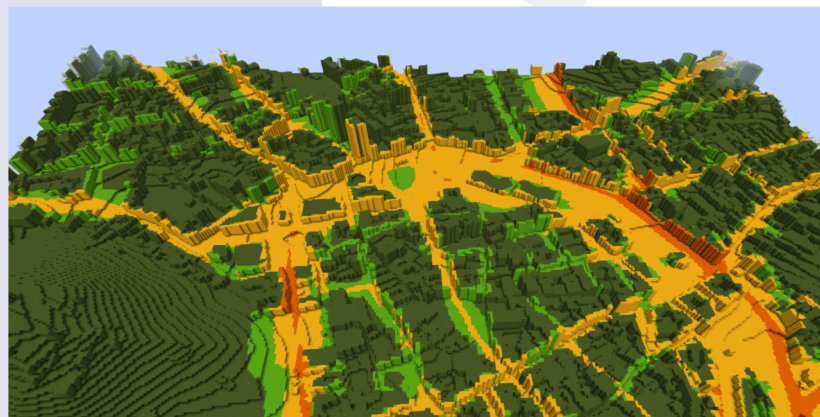

Figure 1: A generated Minecraft map visualizing the noise levels in Brno city center

Implementation

The interface offers a guided, wizard-like experience that walks the user through each step, from the initial region setup through the layer design to previewing and exporting the final map.

The layer design shown in *Figure 2* is the core step of the whole process. It empowers a creator to define multiple independent transformers (layers) using a **node graph**. The node graph represents a series of operations applied to input data. Each layer represents an individual geospatial feature (such as buildings or roads) and independently transforms input geospatial data into a Minecraft map.
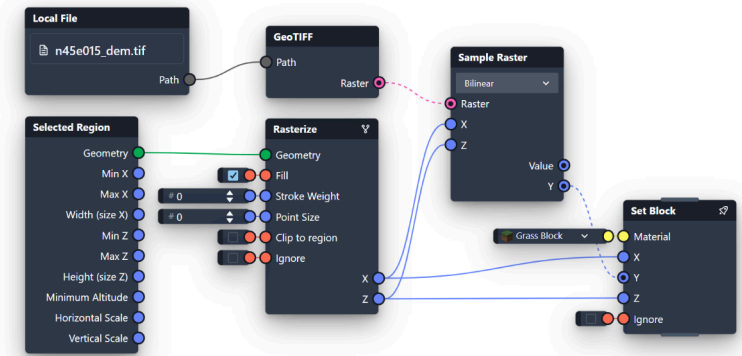

Figure 2: Example of a layer for generating terrain in TerraTinker

Contribution

TerraTinker has been successfully **used in real-world applications**, as demonstrated by the Craft-my-Street project at the University College Dublin. The tool was used to generate a virtual version of the Dublin Docklands area in a scenario showcasing the potential impact of rising water levels.

The application of TerraTinker extends beyond just geospatial data visualization. It **can also be utilized in other educational fields**, such as plotting functions and visualizing mathematical definitions of geometric bodies.