Procedural Modelling of Cities implemented as a Blender Plug-In

Supervisors: Kevin Glass and Shaun Bangay

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1 Previous Short Term Objectives

1.1 Road Generation Methods

The previous objective in terms of road generation methods was to further my understanding of the underlying concepts used in these methods and in so doing come to gaina better understanding of the methods as a whole. Specifically the decision was made last week to no longer focus primarily upon methods which implements L-Systems, but rather to review various other methods and then compare those methods to the L Systems in terms of their ability to generate the various types of urban roads as discussed in Procedural Modeling of Cities[**?**]

1.2 Blender Scripting

A further short term objective for this week was to expand my experience with the Blender scripting API and specifically to begin to implement project relevant elements in Blender using python scripts. The aim of this objective is to provide a sufficiently competent environment for the implementation of the various algorithms associated with both road network generation and procedural modeling of buildings.

1.3 L_YX

The priamry objective for this week in terms of document creation and layout was the implementation of this document (The weekly progress report) in a L_YX editor. The aim of this objective was to force myself early on in the year to become familiar with the documentation tool which will be used for the generation of the final thesis of this project. This is in the hope that it will relieveto some degree the time pressure at final write up.

2 Progress

2.1 Road Generation Methods

In line with the decision made at the VRSIG meeting last week, the majority of my efforts this week in terms of the road generation methods was focused on understanding the various different methodologies. This involved finding and reading various papers on various different topics, not necessarily related to city modeling but which implement a method of graph creation or mesh subdivision. Specifically two aims for the road generation methods could be isolated, the first is to begin at some point with the intended surface plan for the network and from there to generate lines in various pseudo random directions. From each of the end points of these line segments the process of line creaiton is repeated. This creates a complex branching system which results in a tree like layout for the road network. This systme however ahs the major drawback of being unable to automatically link road ends to other road and thus create circular road circuits. This function must thus be implemented by a further function or program which is called after the network has been created. The second option for network generation is to begin with a simple mesh or polygon representing the surface which the city will have to be implemented upon. This mesh is then subdivided using different subdivision algorithms in order to create a closed network of splines which can be used to represent the road network. At this point it appears that possibly the best metohd for road generation is to combine both of the two options. Specifically to beign with a mesh or polygon representiong the footprint of the city and then to subdivide that once or twice in order to create highways or major artery roads. The spaces between these road can then be taken as new footprints to which either subdivision methods can be applied to created urban highly populated and structured areas or branching systems can be applied to create more natural rural or outskirt type roads.

2.2 Blender Scripting

In terms of Blender scripting there has not been much progrress made in the week, some time was spent implementing basic splines and linear objects into a blender script, however these as of yet do not follow any particular path or network. The process of object creation and insertion has been fully understood and thus this leaves me free to concentrate on the implementation of some form of algorithm to control the placement of planes or splines.

2.3 Lyx

This document has been produced in LyX and as a result I can only assume that significant progress has been made in terms of use of LyX as a document generation tool. There are still however a few issues with the latex commands which neeed to be ironed out.

3 Objectives for Next Week

3.1 Road Generation Algorithms

This objective for next week combines both the road generation algorithms and the blender scripting. It appears that no certain decision can be made on the correct road network generation method without being able to effectively see the results. This is particularly true when combining both subdivision and and branching techniques. Thus the objective for this week is to properly develop a platform in Blender where the various algorithms can be implemented and combined allowing for a decision to be made on which method is best suited to the task.