

Faculty of Informatics

Diplomarbeitspräsentation



Procedural Generation of 3d Buildings and Interiors

Masterstudium:

Visual Computing

Franz Richard Spitaler

Technische Universität Wien Institut für Computergraphik und Algorithmen Arbeitsbereich Computergraphik Betreuer: Ao.Univ.Prof. DI DI Dr. techn. Michael Wimmer Mitwirkung: Dipl.Mediensys.wiss. Dr. techn. Przemyslaw Musialski

ROOM LAYOUT GENERATION

The room layout generation needs to be as realistic and believable as possible. A grid-based algorithm subdivides the available spaces into individual rooms. The most important steps of the algorithm are displayed in the visualization.

VISUAL RULE-EDITOR

In this work a visual rule-editor was developed to facilitate the creation process of the procedural system. The visual rule-editor is used to define and to connect the production-rules of the procedural system without the need to write a single line of code.

 Asis
 X
 V

 Part
 1
 Relative
 V

 Part
 2
 ElementsWidth
 V

 Part
 1
 Relative
 V

Axis Z Part 1 Relative Part 1 Absolute +

Axis X ~ Part .05 Absolute ~ Part .05 Ab





HIERARCHICAL BUILDING MODEL

By defining the rooms hierarchically it is possible to create complex room layouts. An example is a floor containing six apartments. Each apartment consists again of five individual rooms.



PROCEDURAL GENERATION (OF BUILDINGS)

The procedural generation of content and especially the generation of buildings is a very powerful way to create content in a fast and easy way. The generation of the content is achieved by using production rules instead of creating the content "by hand". The rules work with any input and can produce a wide variety of different results by using randomized values in the generation steps.



VERTICAL CONNECTIONS & ROOFS

Apart from the implemented basic production rules, two new rules are introduced in this work. The vertical-connection - rule is used to create floor-connecting elements like stairs and is treated in a special manner in the generation process. The roof-rule makes the creation of roofs easy and also leads to complex geometries without the need for a complex set of rules. Both rules create shapes, which can be modified by using attached rules.



RESULTS

The application combines a visual rule-editor with a procedural geometry-generator and displays the results of the creation interactively in a 3-dimensional view. The buildings can be saved and loaded into a professional tool e.g. to create realistic renderings or even use the results in games. The screenshots show some of the created buildings.





Kontakt: spitefr@gmail.com