


# Automated Content Generation

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# Agenda

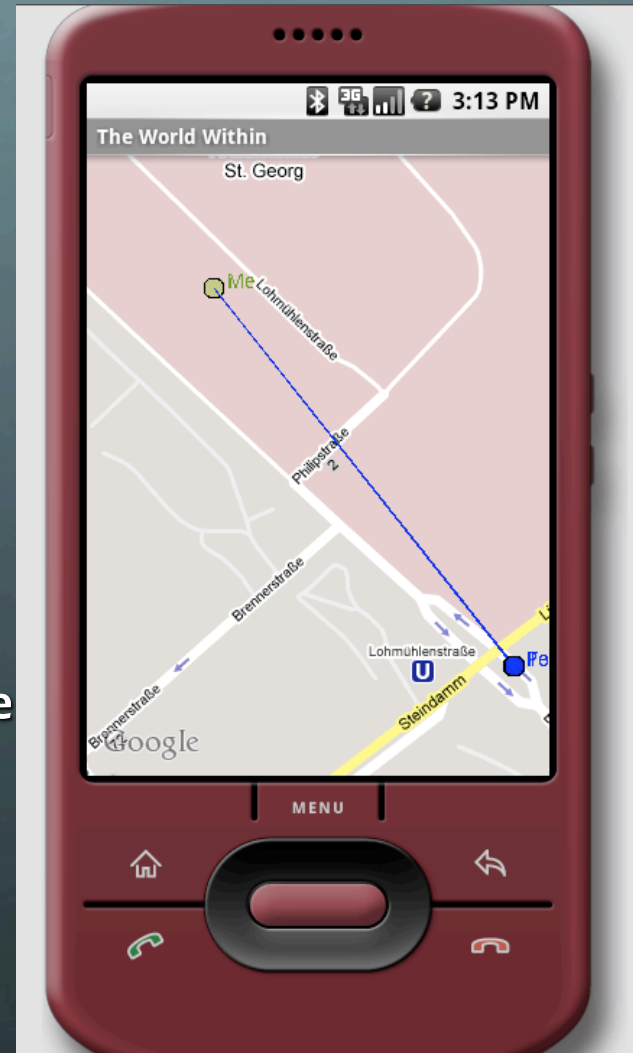
- **Introduction**
  - Pervasive Role Play Game
  - Motivation
  - What kind of content?
  - Technologies
- **Master thesis**
  - Vision / Ideas
  - TODO's
  - Risks
  - Chances

# Pervasive Gaming

-  **Pervasive Gaming definition:**  
Pervasive gaming implies the construction and enacting of augmented and/or embedded game worlds that reside on the threshold between tangible and immaterial space, which may further include adaptronics, embedded software and information systems in order to facilitate a 'natural' environment for gameplay that ensures the explicitness of computational procedures in a postscreen setting.  
[Walt05]

# Pervasive Gaming

- 🌐 'The world Within'  
Aspects of PG from [Walt05]
- 🌐 Mobile
  - 🌐 Play everywhere
- 🌐 Distributed
  - 🌐 Player versus Player
- 🌐 Persistence
  - 🌐 The world is always available
- 🌐 Transmediality

















# Motivation

- 🌐 Pervasive Gaming Project
- 🌐 Pervasive Role-Play-Game 'The World Within'
  - 🌐 Avatars live in an 'empty' virtual reality
  - 🌐 No time to populate the virtual reality
  - 🌐 No motivation to populate it manually
- 🌐 But motivation to populate it automated
- 🌐 AW 1 continued... 'Game Engineering'
  - 🌐 Authoring tools

# What kind of content?




-  **Buildings**
  -  Hotels, ruins, supermarkets, tool shops, bars ...
-  **Breed centres**
  -  Lakes, rivers, caves ...
-  **Opponents (NPC)**
-  **Stories**
  -  Paths through the world annotated with narrative content
-  **Quests / Player-Tasks**
  -  Generation of puzzles

# Technologies for Content Generation




-  Content generated by Artists
-  User Generated Content
-  Procedural Content Generation

# Content generated by Artists

## Contra

-  High effort
-  Lots of things are done over and over again
-  High costs

## Pro

-  Uniqueness
-  Creativity
-  Professionalism



Hammer - [dm\_carousel.vmf - Textured Shaded]

File Edit Map View Tools Window Help

camera

Texture group:  
All Textures

Current texture:  
nature/rockwall015a  
512x512  
Browse...  
Replace...

VisGroups:  
User | Auto |  
☒ water  
☒ caps  
☒ skybox  
☐ clips  
☐ widget  
☐ 3d\_skybox  
☒ projector

Show Edit Mark

Move selected: toWorld toEntity

Categories:

Objects:

Faces: 0  
Create Prefab

func\_detail

env\_cubemap env\_cubemap env\_cubemap

For Help, press F1

solid with 10 faces




288w 256l 92h @(-592 864 242)

Snap: On Grid: 32



<->

# User Generated Content

## Contra

-  Content generation requires often high skills
-  Without content, no users - and vice versa
-  Low motivation of users

## Pro

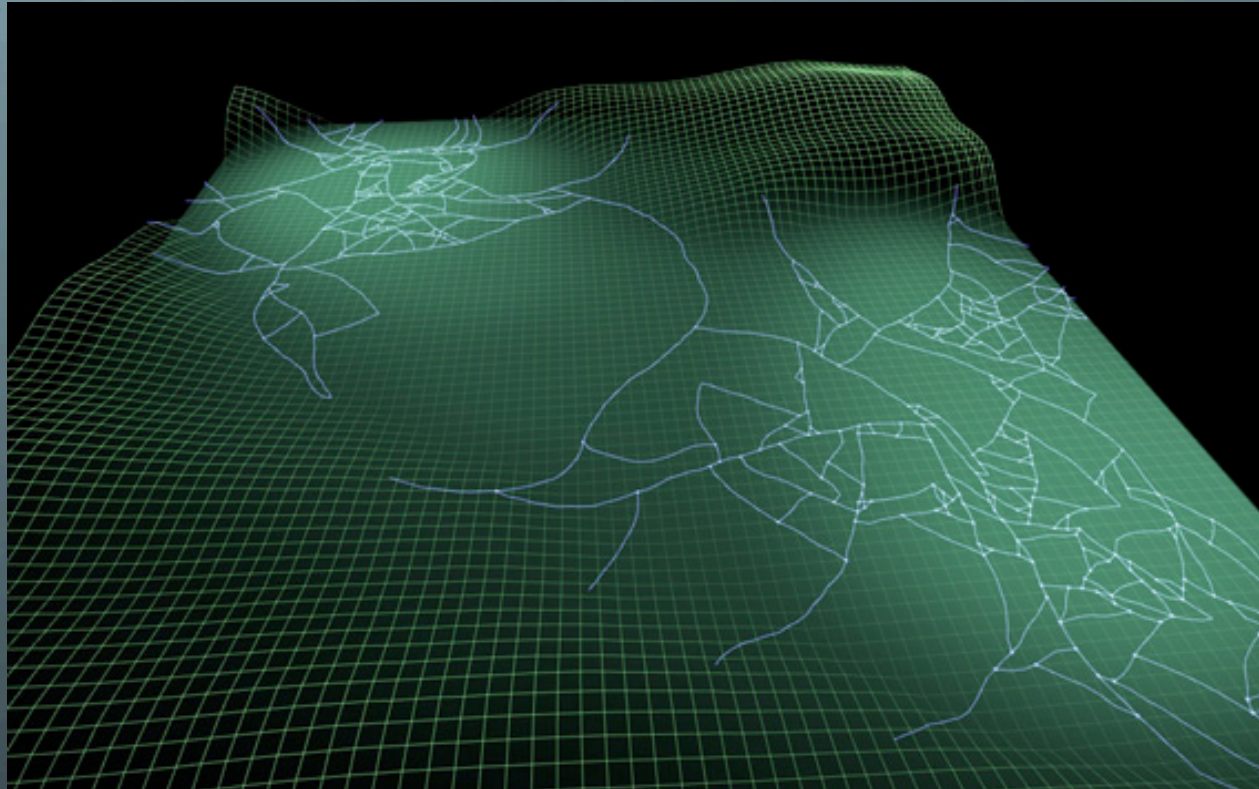
-  Real routes can be recorded
-  Real tasks can be recorded

# Procedural Content Generation

- Runtime random level generation
  - e.g. Hellgate London, Dwarf Fortress, Civilization 4, Diablo
- Design of level content
  - e.g. SpeedTree, Dryad
- Dynamic world generation
  - e.g. Elite
- Instancing of in-game entities
- User mediated content
- Dynamic systems
- Procedural puzzles

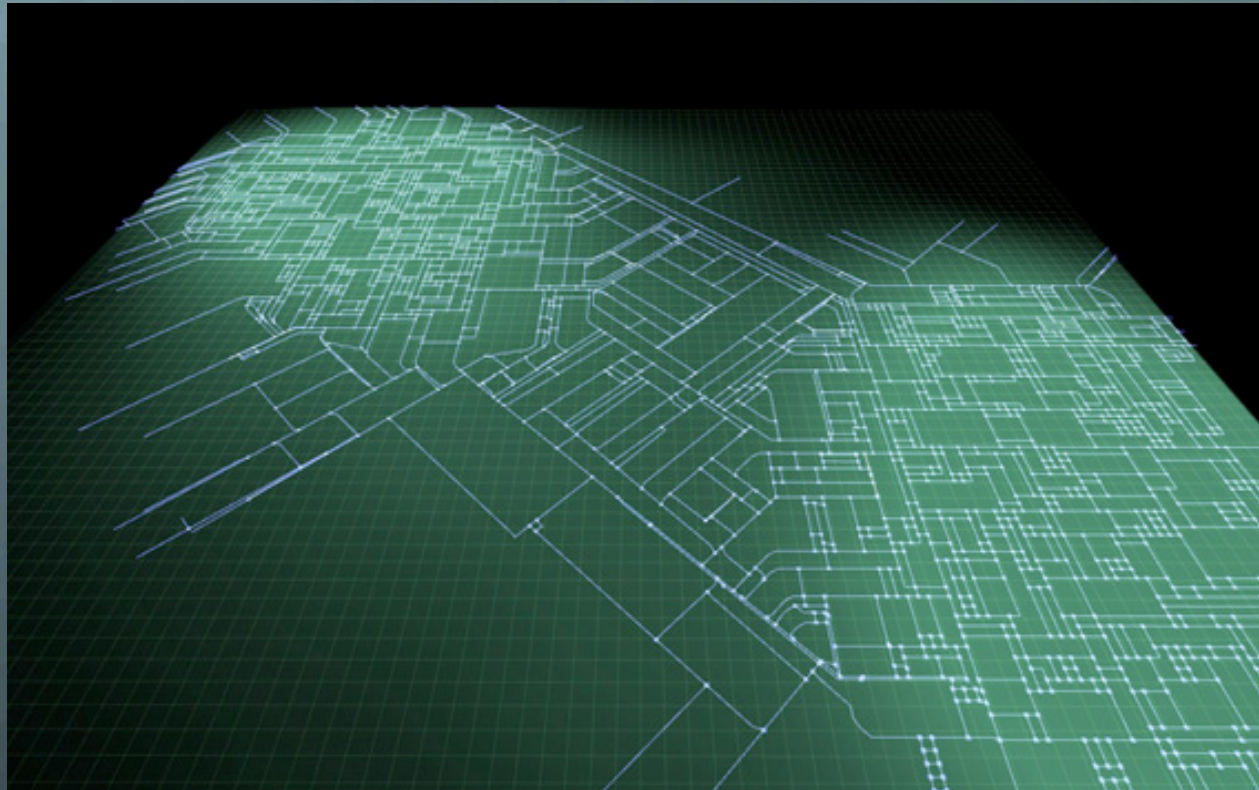


# PCG – Road generation

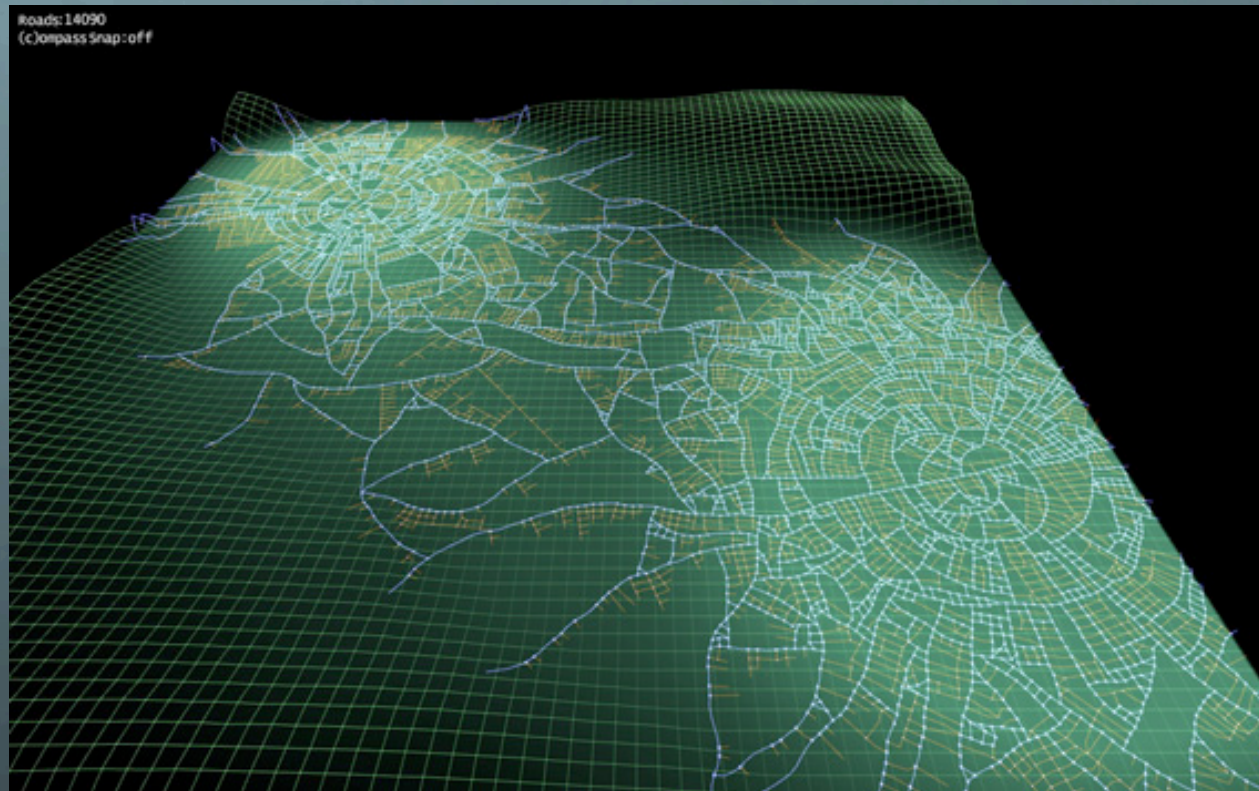




# PCG – Road generation



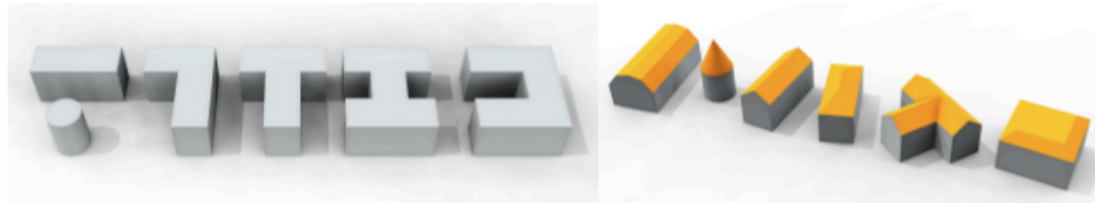
# PCG – Road generation



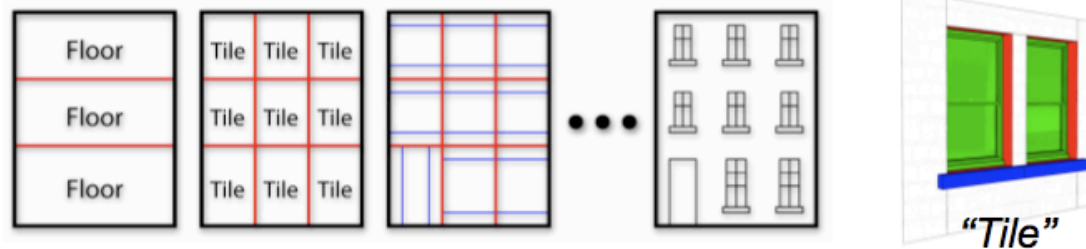
# PCG - City generation

## Encoding of Buildings

- *Mass*: rule-driven assembling of primitives



- *Surface*: usual subdivision scheme



URBAN DESIGN AND PROCEDURAL MODELING  
PASCAL MUELLER: APPLIED PROCEDURAL MODELING

SIGGRAPH2007 



# PCG – City generation

Procedural Reconstruction of Archaeological Sites

## Procedural Pompeii: Renderings






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PASCAL MUELLER: APPLIED PROCEDURAL MODELING







# Procedural Content Generation

## Contra


-  ,There's two kinds of hard - I'll call them depth and complexity.' [Rogu08]
-  Often an over-blown solution that overshoots the mark
-  Artistic directability not guaranteed anymore ... really?

## Pro





-  Faster, better, cheaper, reusable, etc...
-  Custom-designed implementation strategies possible (code, grammar, scripting, visual programming, etc... )

# Agenda

## Introduction

-  Motivation
-  What kind of content?
-  Technologies

## Master thesis

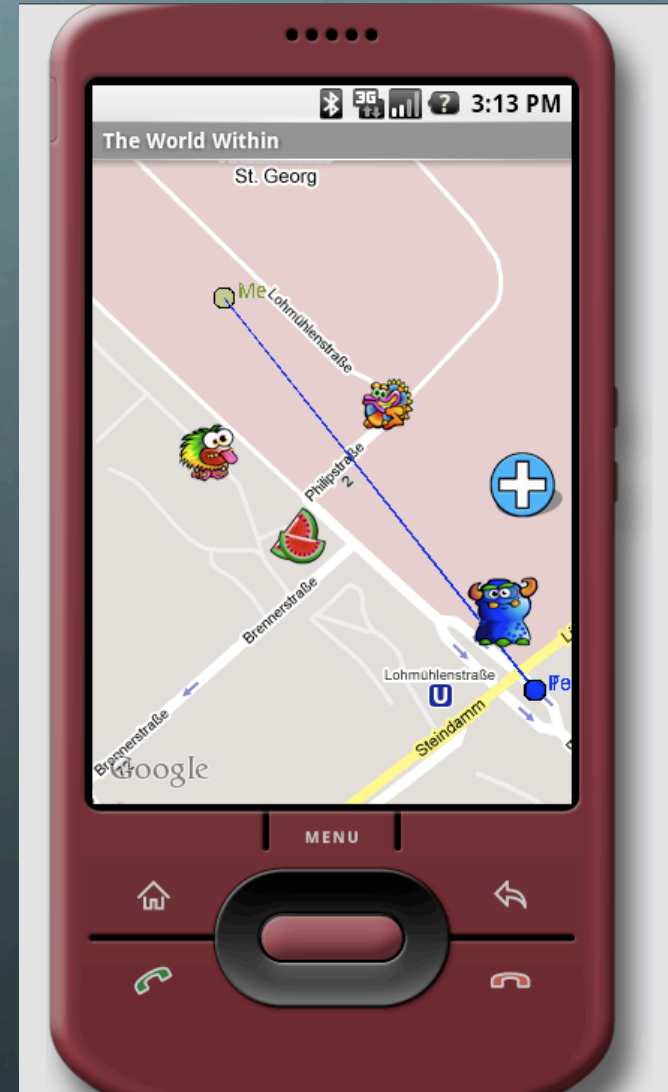
-  Vision / Ideas
-  TODO's
-  Risks
-  Chances

# Vision / Ideas

- Cellular Automata
  - Instancing opponents
  - More dimensions
  - $O(n)$ -complexity
- Agents
  - Instancing buildings
  - Looks for hotels and other real world entities
- User mediated content
  - Stories
  - Paths
- Instantiation depends on amount of users at specific places

# Vision / Ideas

- Dynamic PCG on mobile node
- Multiplayer content PCG on server









# TODO's

- Preparatory work
  - Concretise idea
  - Define concrete subtopic
- Investigation
  - Similar work
  - Research in Procedural Content Generation (AW2)
  - Contact Specialists
- Master thesis
  - Concept
  - Prototype
  - Analysis

# Risks

-  Too complex to realize everything
-  Is a good boundary possible?
-  What has been done already?
-  Are there research topics?

# Chances

- 🌐 As mentioned in 'The creation of content is a huge industry!' [Dedj08]
  - 🌐 Automation is very welcome
  - 🌐 Saves a lot of money
- 🌐 Groups of interest
  - 🌐 Mobile game industry
  - 🌐 Exit games??

# Bibliography

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**Vielen Dank für die  
Aufmerksamkeit!**