Zdenek Mikovec

http://www.cgg.cvut.cz

Context Sensitive Streaming & Progressive LOD

Czech Technical University
Prague, Czech Republic
xmikovec@fel.cvut.cz

Content

- Motivation
- Problem definition
- Solution

Motivation

- Why context sensitive information presentation?
  - to present only interesting information
  - to decrease HW/SW requirements
  - to enable information presentation at all

Problem definition

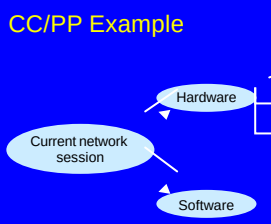
- Context
  - what is important and how to describe it
  - where to get the context information
- Presentation methods
  - how to make presentation methods context sensitive

Context

- What it is
  - user preferences, end-device profile, network, situation/location
- How to describe it
  - generally RDF (XML based)
  - existing standards
    - CC/PP (RDF based) - what the user agent is capable of doing

Context

CC/PP Example




```
<?xml version="1.0"?>
<rdf:Description about="HardwarePlatform">
 <prf:Defaults
   CPU="PPC"
   ScreenSize="800x600x8"
   Memory="32mB"/>
<prf:Modifications
   Memory="64mB"
   Bluetooth="YES"/>
</rdf:Description>
```

Context

- Where to get context information
  - sensors (GPS, IrD, GSM, NetWatch)
  - application
  - context profiles (e.g. CC/PP)
  - semantic description of document(s) (MPEG-7, SMIL)

Presentation methods

- Context sensitive presentation means:
  - to be sensitive to Region of Interest (ROI)
  - to enable Level of Detail (LOD) definition
  - to keep given degree Quality of Presentation (QoP)
  - to take into account Quality of Service (QoS)

Presentation methods

Semantic based adaptation

- semantic ROI
  - based on semantic relations of objects
  - calculation is context sensitive
- LOD
  - choosing item representation based on object category
  - calculation is context and ROI sensitive

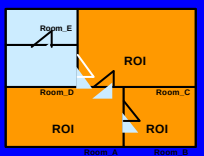


Fig.1 Semantic definition of ROI

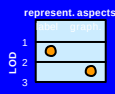


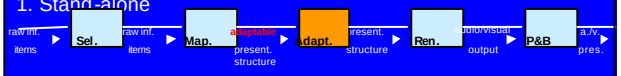
Fig. 2: Representation matrix for object category "picture"

Presentation methods

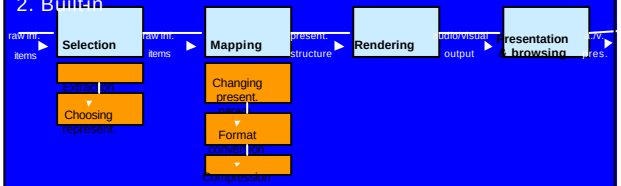
Semantic based adaptation

Adaptation in context of information visualization

1. Stand-alone



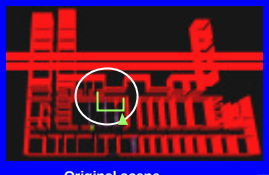
2. Built-in



Presentation methods

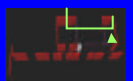
Semantic based adaptation

Searching path in the scene

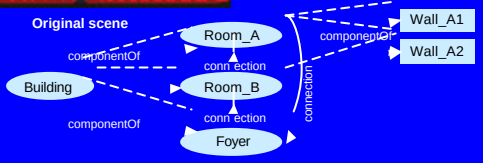


Original scene

Adaptation



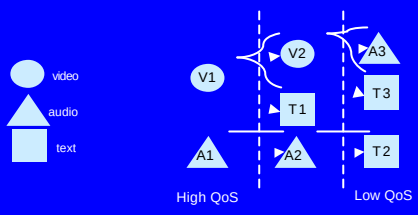
Adapted scene



Presentation methods

QoP based streaming

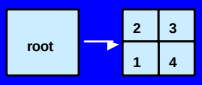
- preserving QoP even when the QoS changes dramatically



Presentation description preserving QoP (SMIL)

Presentation methods
GeoVRML

- Extension of VRML for Terrain visualization
- GeoInline
  - on demand inlining (control over when to load and unload the data)
- GeoLOD
  - streaming of multi-resolution tiles
  - based on quad-tree approach

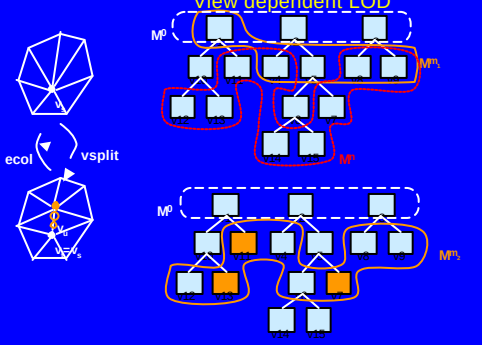


Quad-tree approach

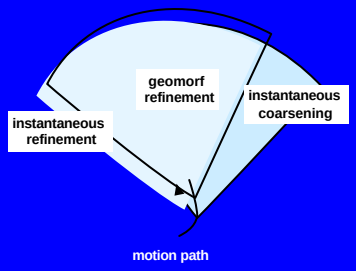
Presentation methods
View dependent LOD

- output-sensitive data structures (VDPM)
  - store only active mesh (M^m) that is much smaller then full detailed mesh M^n
- geomorph refinement
  - eliminates "poping" by smoothly interpolating geometry

Presentation methods
View dependent LOD



Presentation methods
View dependent LOD



Presentation methods
View dependent LOD

Links

- **Context**
  - http://www.w3.org/Mobile/CCPP/
  - http://mpeg.telecomitalialab.com/
  - http://www.w3.org/RDF/
- **GeoVRML**
  - http://www.geovrml.org/
  - http://www.tvgeo.com/vrml_sets/set2.shtml
- View-dependent LOD
  - http://research.microsoft.com/~hoppe/#svdlod
  - http://research.microsoft.com/~hoppe/#vdrpm