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[Faculty of Science
Information and Computing Science]

3D Reconstruction of historic landscapes

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Seminar Mapping Cultural-Historic Landscapes of Europe
Wageningen UR, The Netherlands

Honselaarsdijck around 1650



Honselaarsdijck around 2010



Virtual Honselaarsdijck



Presentation outline

- Introduction
- Research challenges
- Landscape modeling
- User experience
- Conclusion





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Problem definition and research questions

RESEARCH CHALLENGES

Limited information

Lots of sources

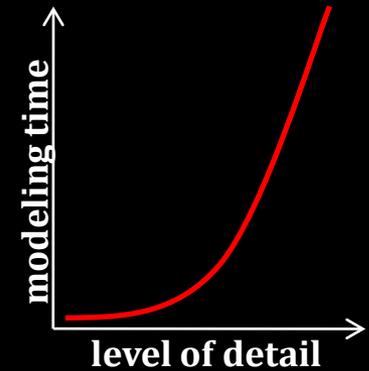
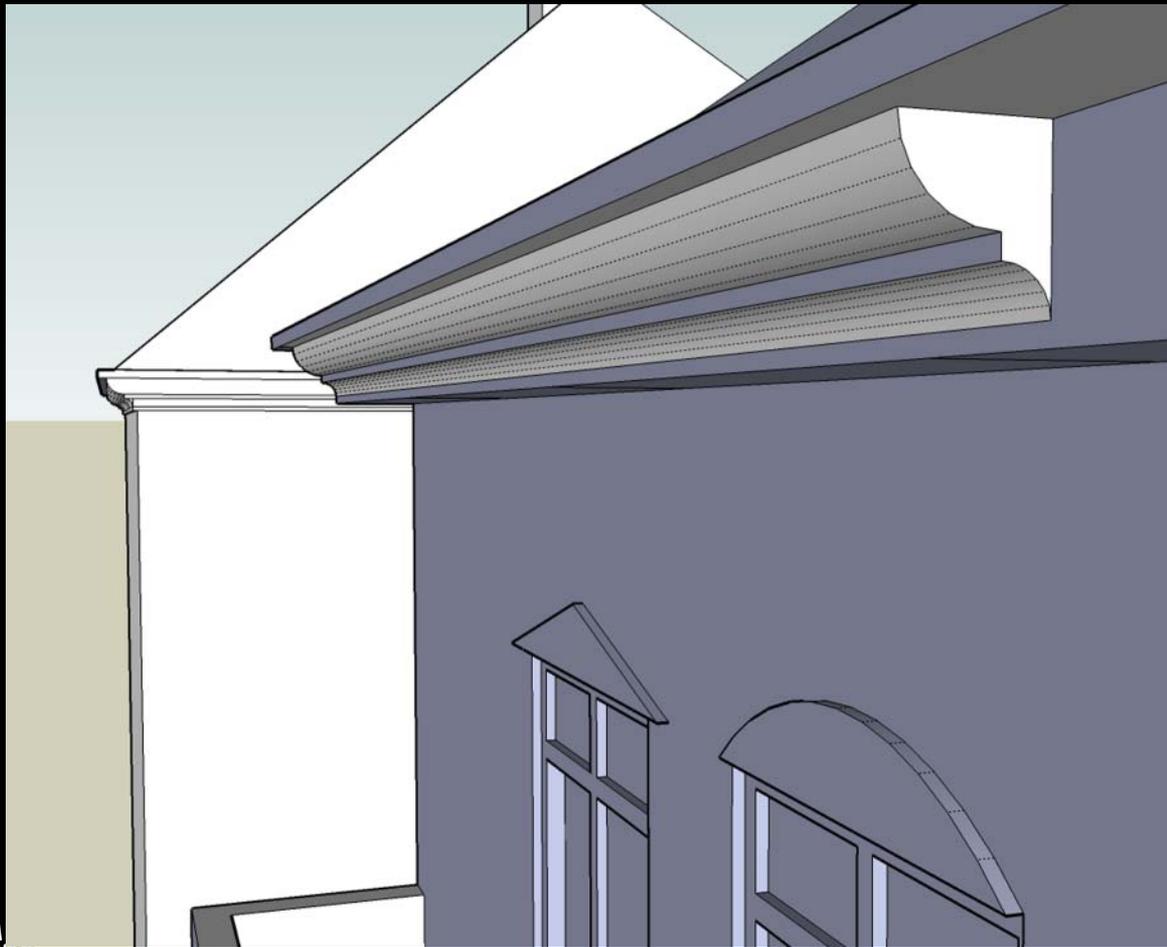
Limited information

Uncertainty in
historical situation

No input data

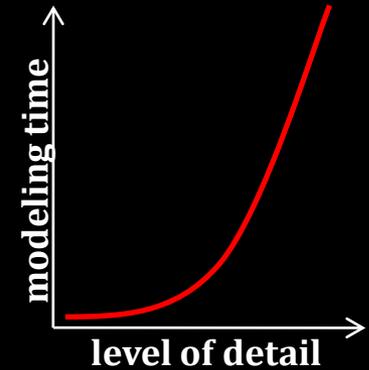
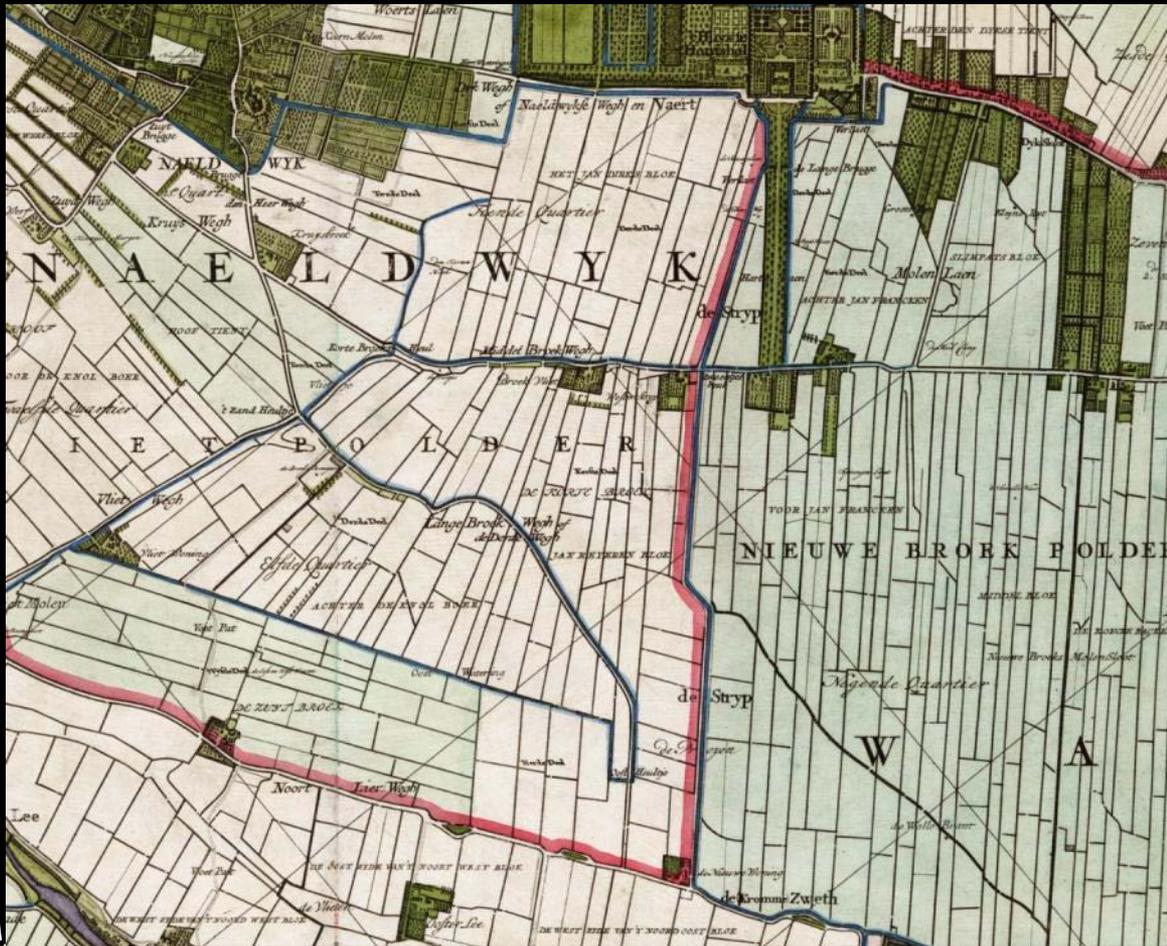


No computerization tools



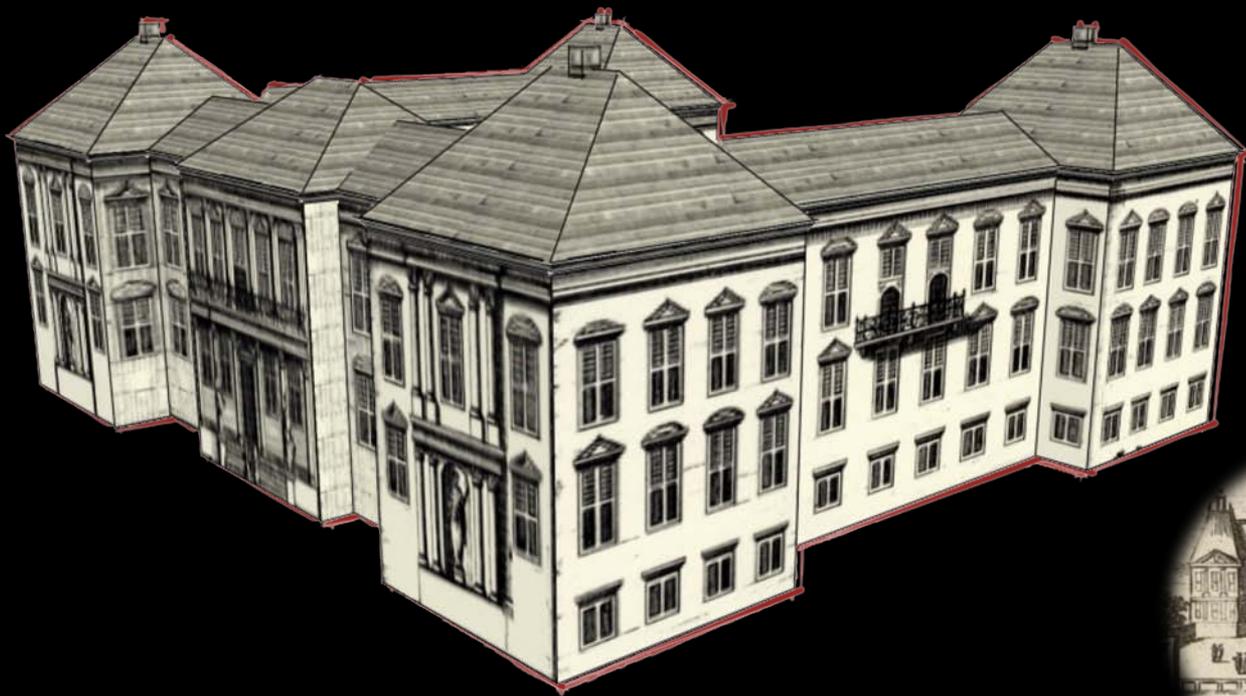
more details
=
more time

No computerization tools



more details
=
more time

'How good is good enough?'



Research question

How to efficiently process historic sources
to create a virtual landscape reconstruction

to effectively communicate
historic landscape information?



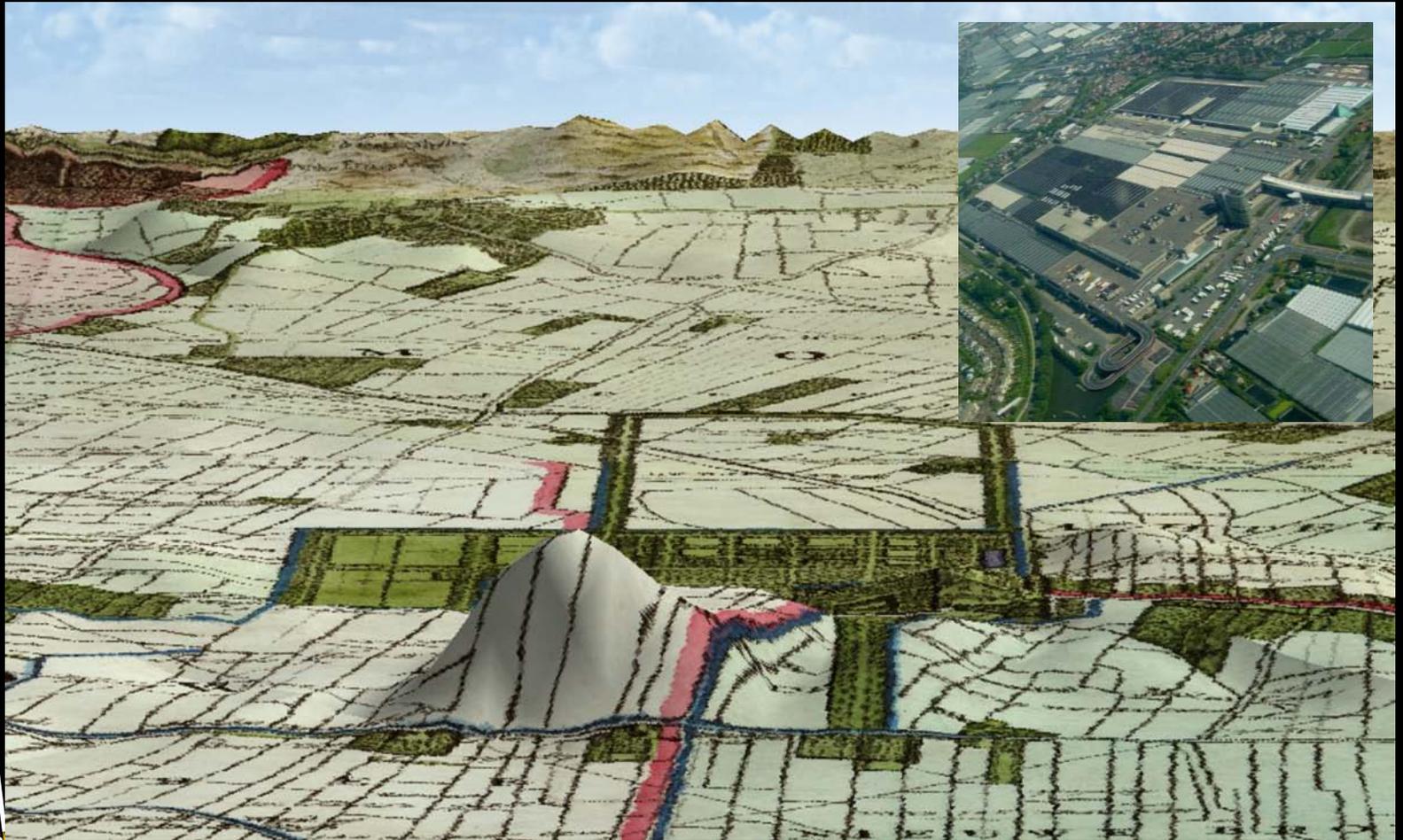
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Digital terrain and 3D object modeling
LANDSCAPE MODELING

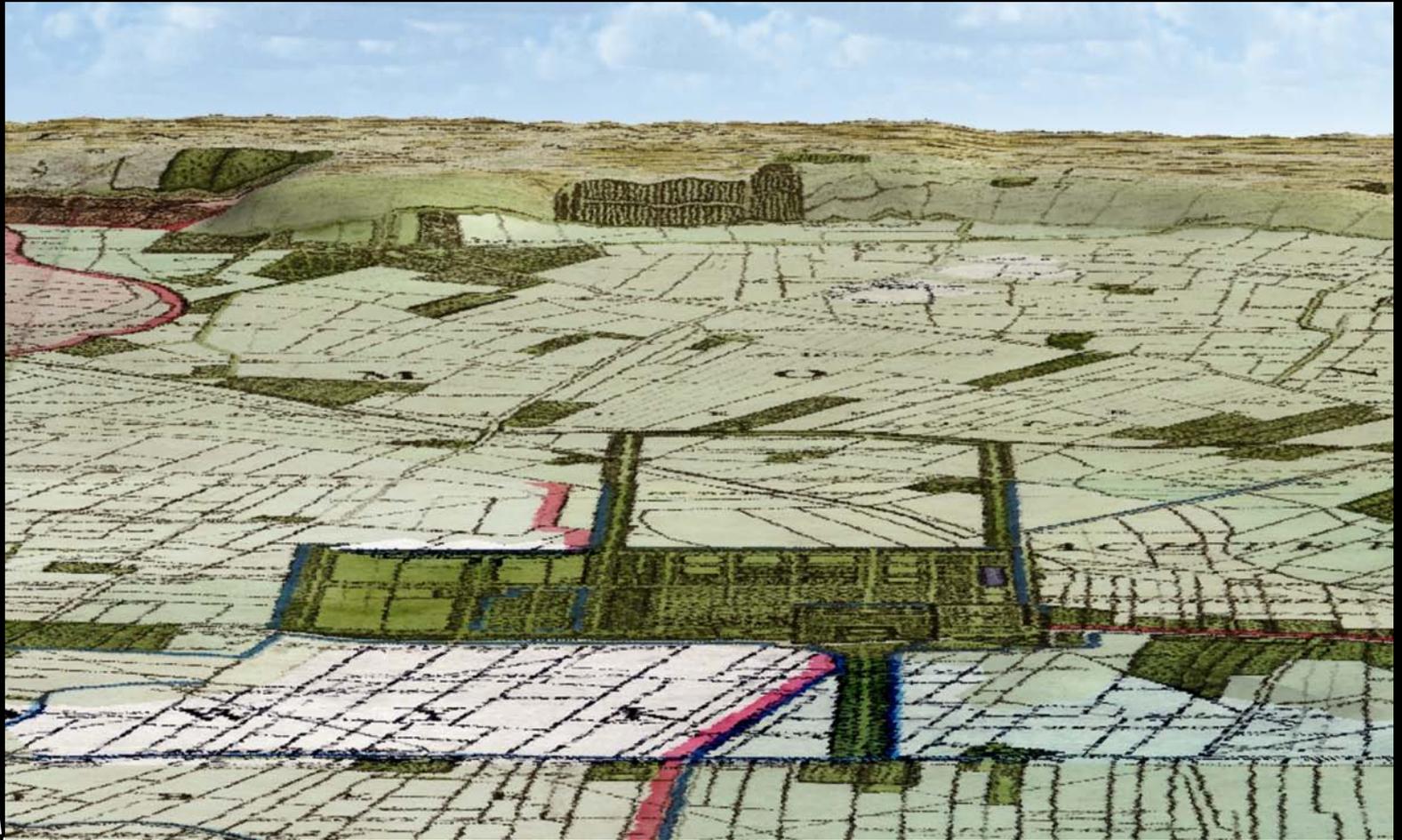
Virtual landscape

- Terrain → terrain modeling
- Structures → 3D object modeling
- Vegetation → plants library
- Water → materials library
- Atmosphere → atmospheres library

Terrain modeling



Terrain modeling



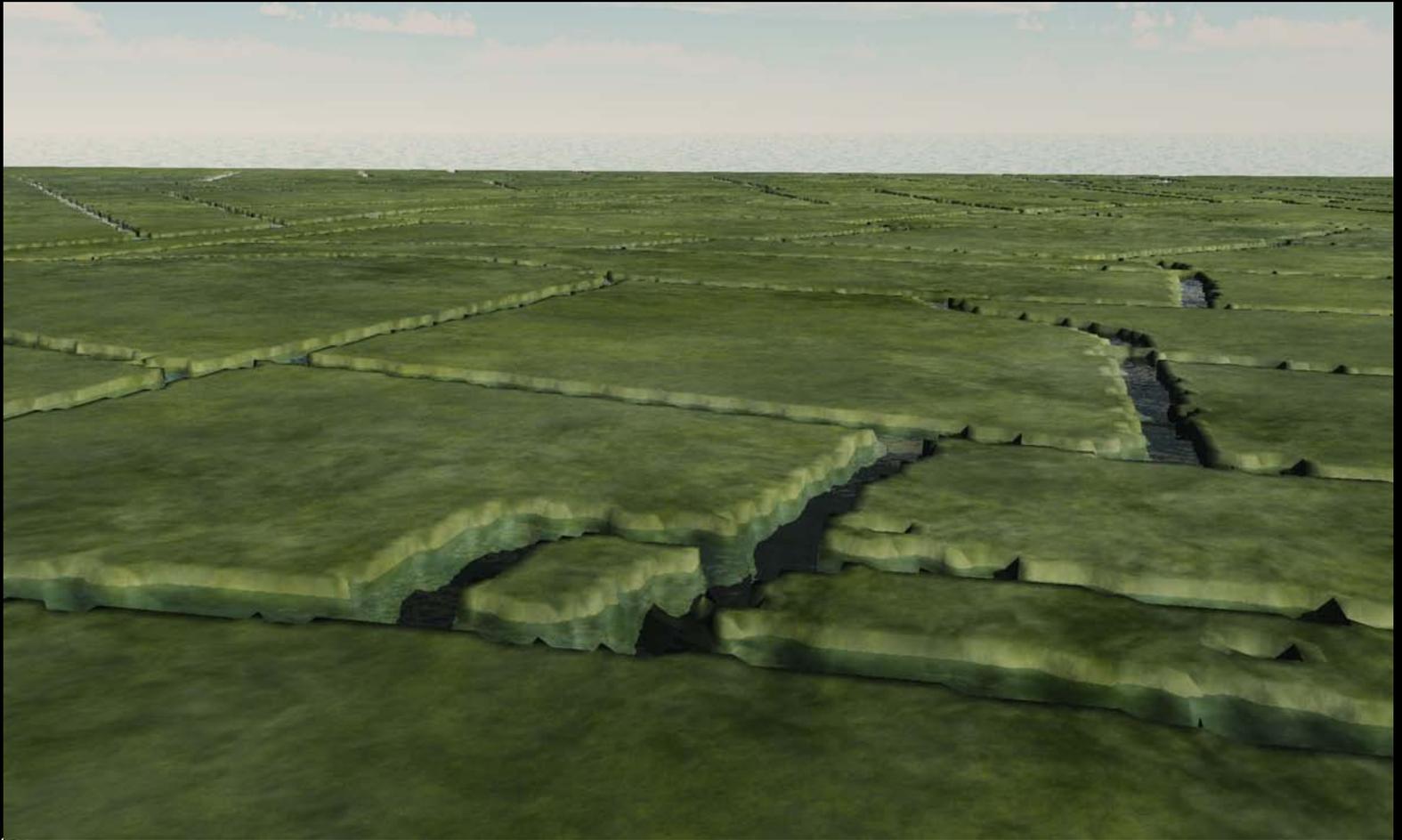
Large-scale terrain features



Large-scale terrain features



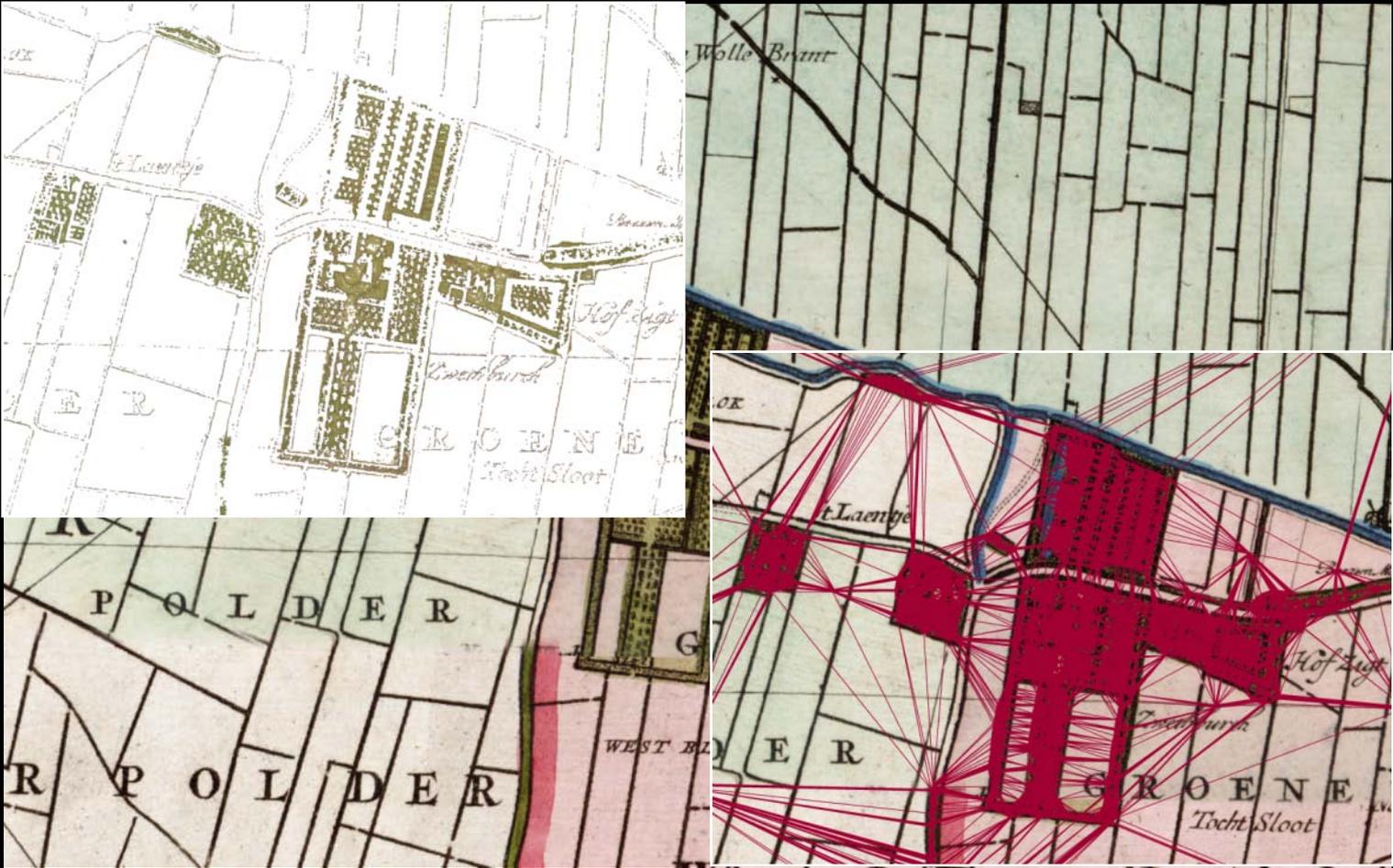
Large-scale terrain features



Area delineation



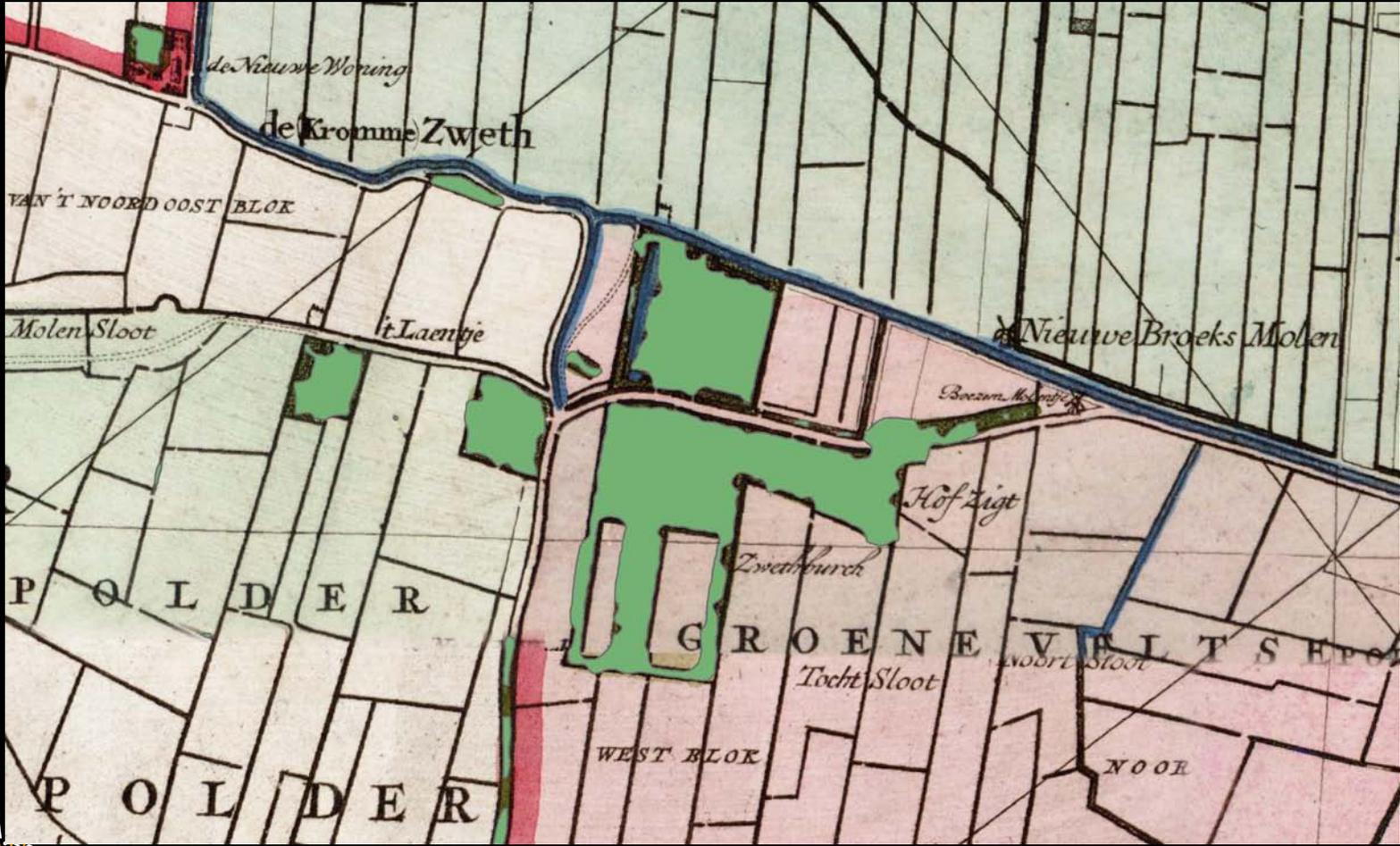
Area delineation



Area delineation



Area delineation



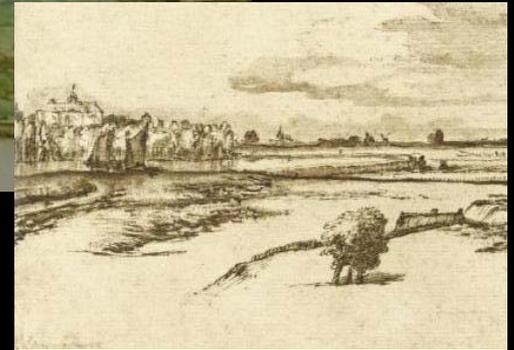
Area delineation



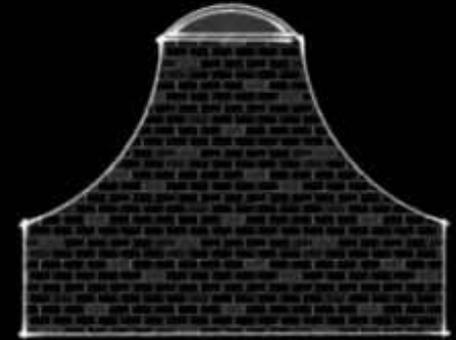
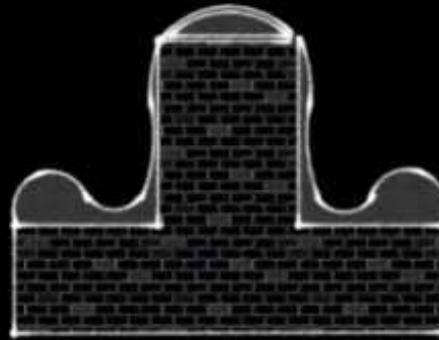
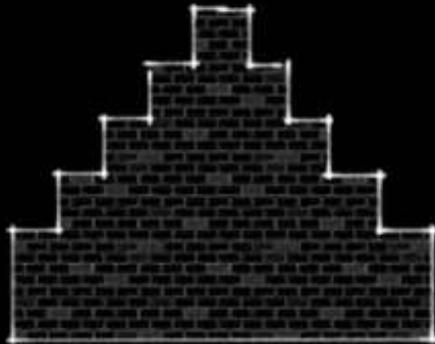
Area delineation



3D object modeling



3D object modeling



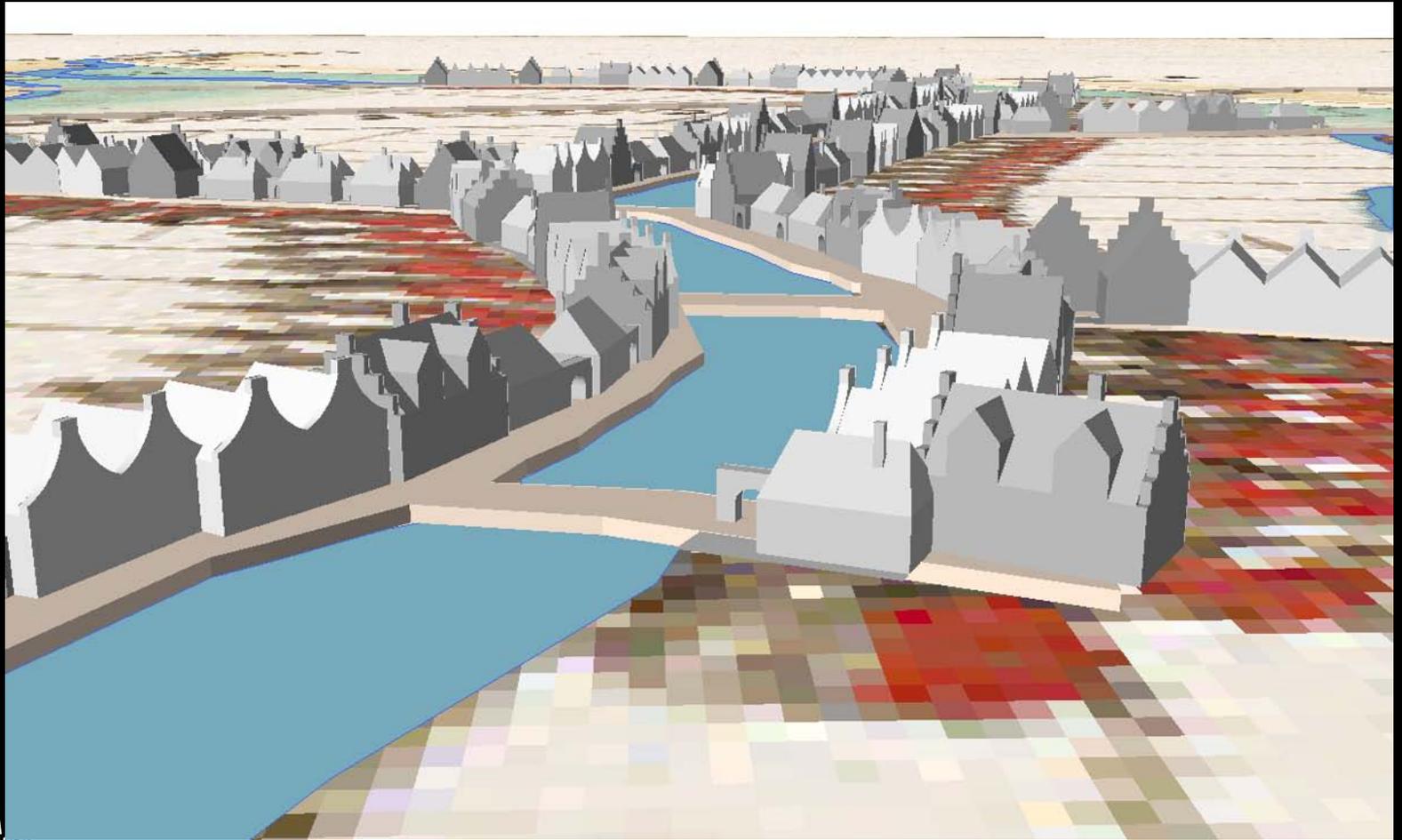
Object placement



Validation



Validation





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Perceived realism and user tests

USER EXPERIENCE

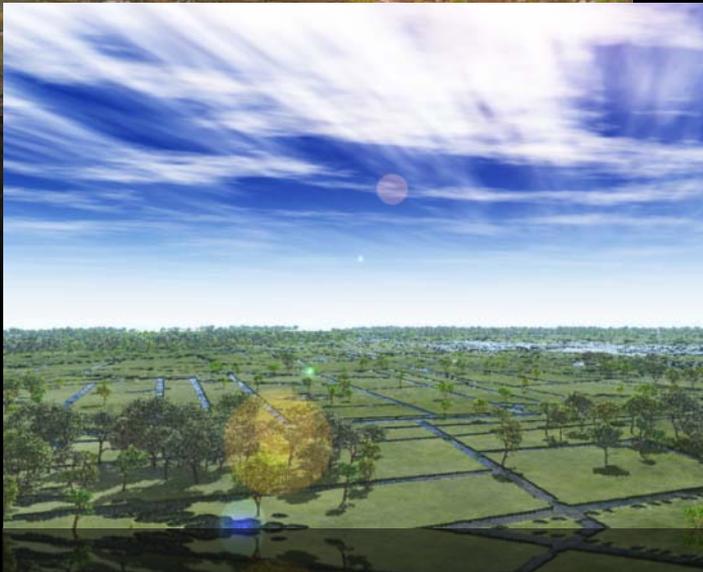
Realism

‘How good is good enough?’

or

‘What is the required **image quality**
for **perceived realism?**’

Realistic image \neq realistic experience



Cartoons



Non photorealism

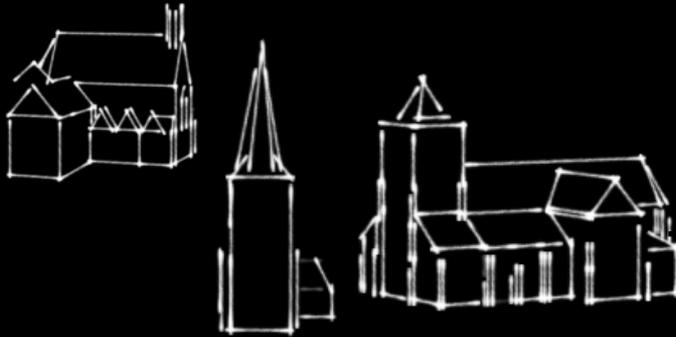
Efficient modeling

Reducing *information-overload*

Uncertainty visualization

Perceived realism

Real world



Mental image

Virtual object

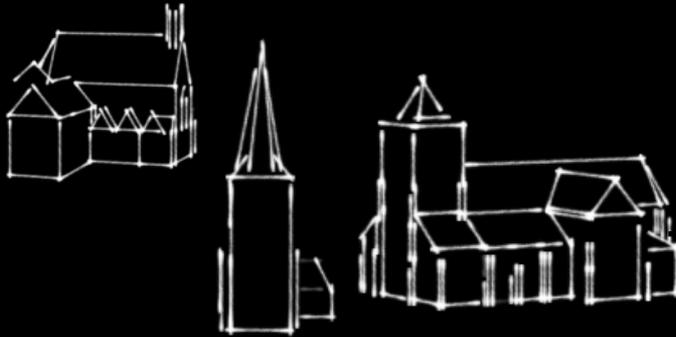


NO realistic experience



Mdt.

Perceived realism



Mental image



YES realistic experience

Mdt.

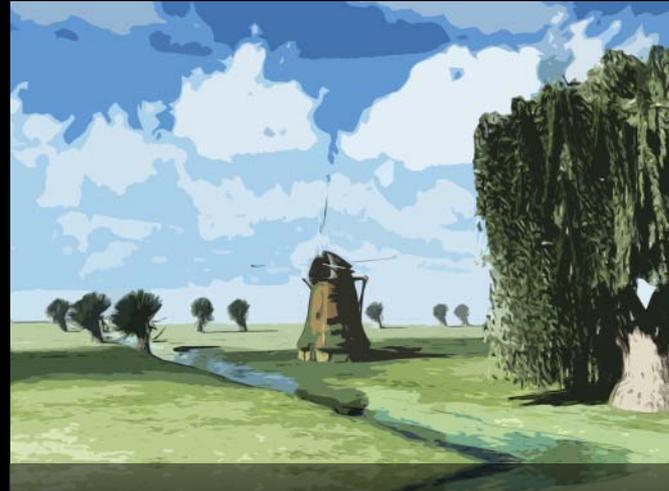


Recognition & acceptance

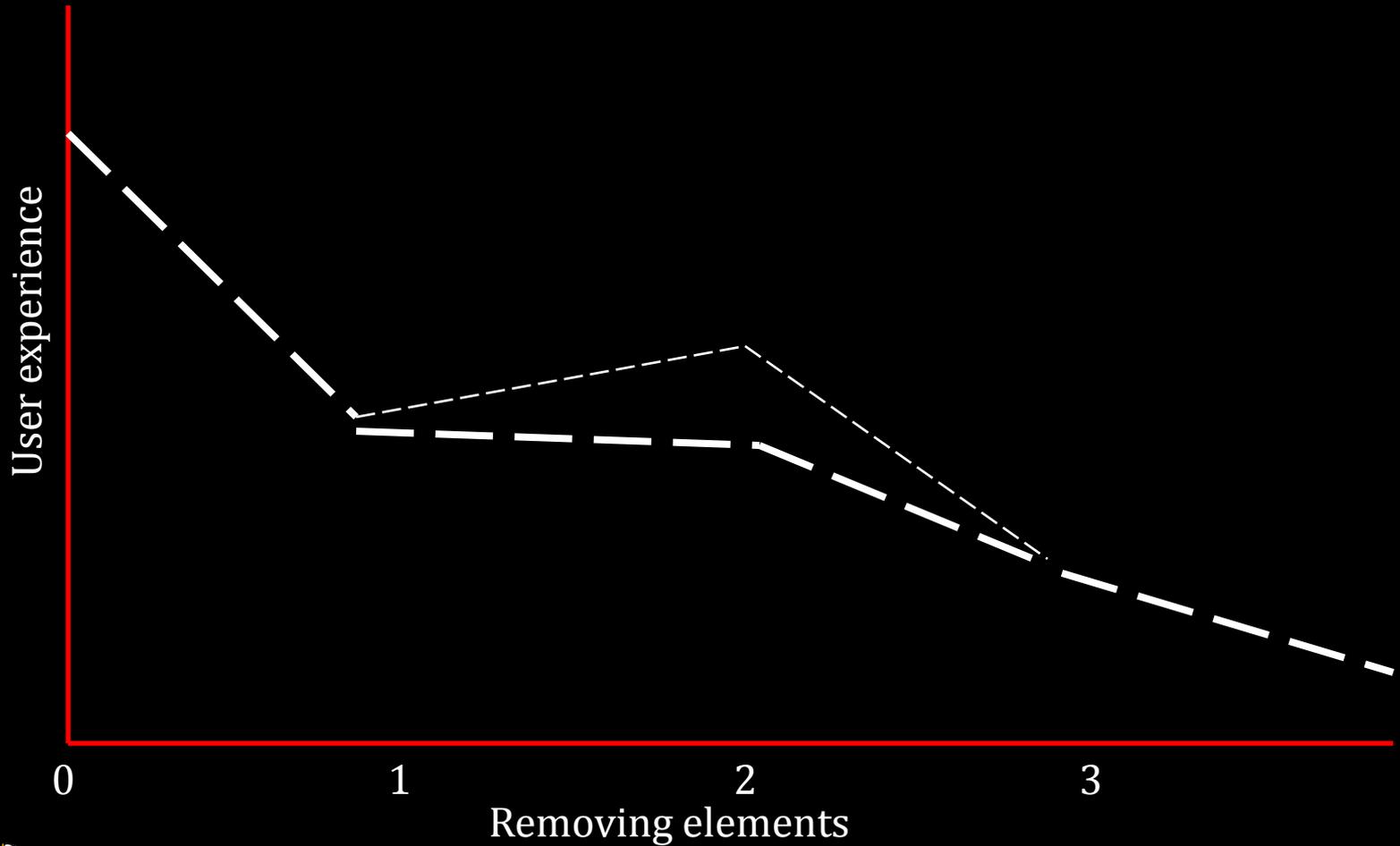
Jan van Goyen, View on Leiden from the Northeast (1650) – Leiden, Stedelijk Museum De Laken Hal



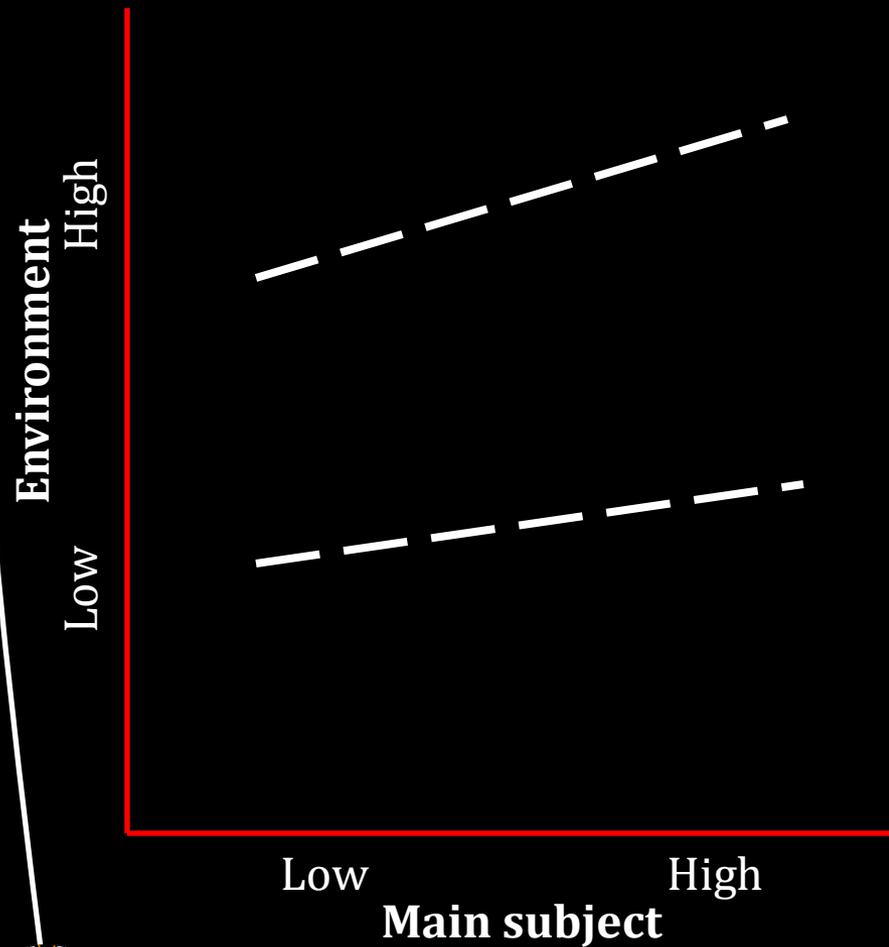
Pre-test



Landscape elements



Object vs. Environment: rich vs. poor





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Final remarks and future work

CONCLUSION

Conclusion

- Efficient modeling
& effective communication
- Present cultural heritage for broad public
- Requires CH geodata & sources

Historic sources



CH geodata

- Online access: scanning + metadata
- Standards: quality + data formats
- Retrieval: space + time + theme
- 2D maps and sources & 3D models

Future work

- Cases: Honselaarsdijck vs. Montfort (LB)
 - Landscape: polderscape vs. hilly landscape
 - Data availability
 - Processing sources: methodology
- Identifying features for user experience
- Uncertainty visualization using NPR



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