TESTING THE IMPACT OF 2D GENERALISATION ON 3D MODELS – EXPLORING ANALYSIS OPTIONS WITH AN OFF-THE-SHELF SOFTWARE PACKAGE

3D GeoInfo 2018

Delft, Netherlands

Session 4+ EuroSDR/Volta session

3D Geoinformation for National and Cadastral Mapping Agencies II

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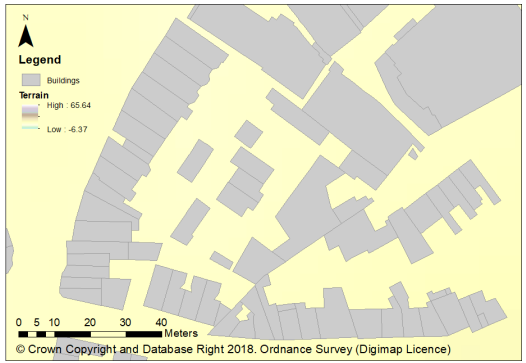
3D GENERALISATION

- Transition (detail > coarse) automatically?
- Different detail levels <> different applications?
- 3D model: efficient and reusable.
- 3D generalisation **commercial** algorithms?

What is the impact of 2D generalisation on the results of 3D line-of-sight and shadow-casting algorithms?

1) Original

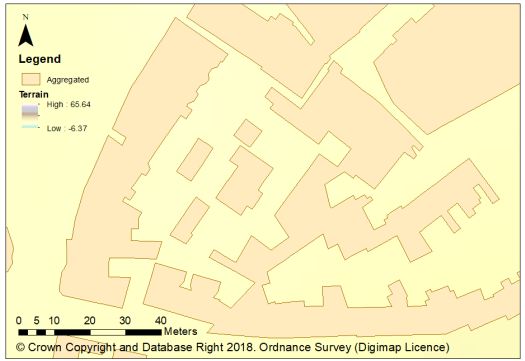


ArcGIS
Aggregate Polygons

FME

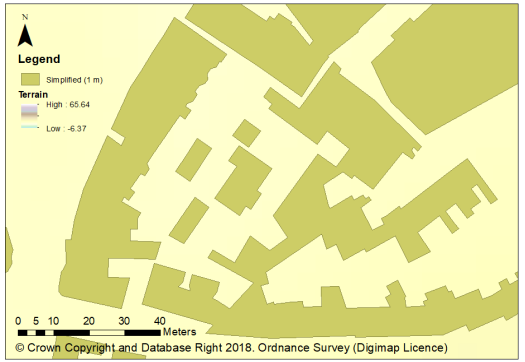
PostgreSQL

2) Aggregated (1 m)

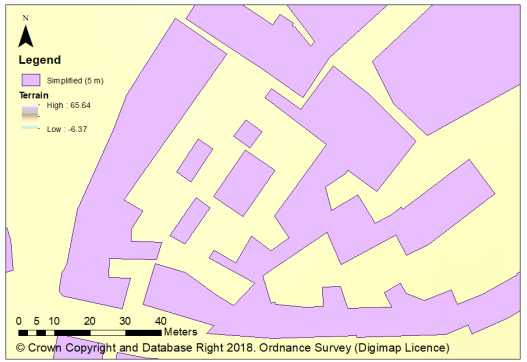


ArcGIS
Simplify Building

3) Simplified (1 m)



4) Simplified (5 m)

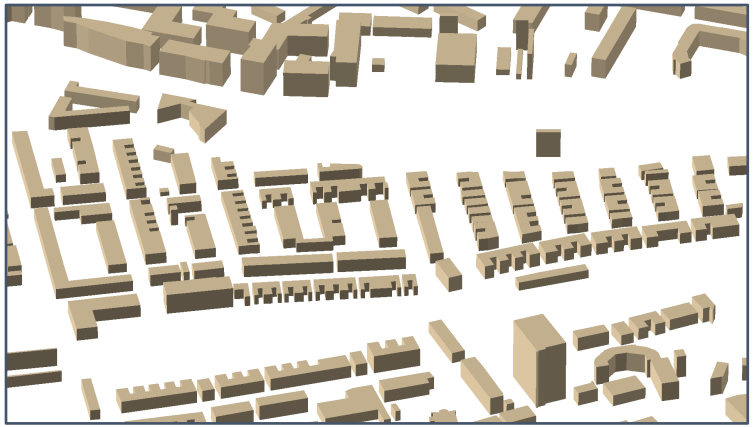


UCL

1) Original

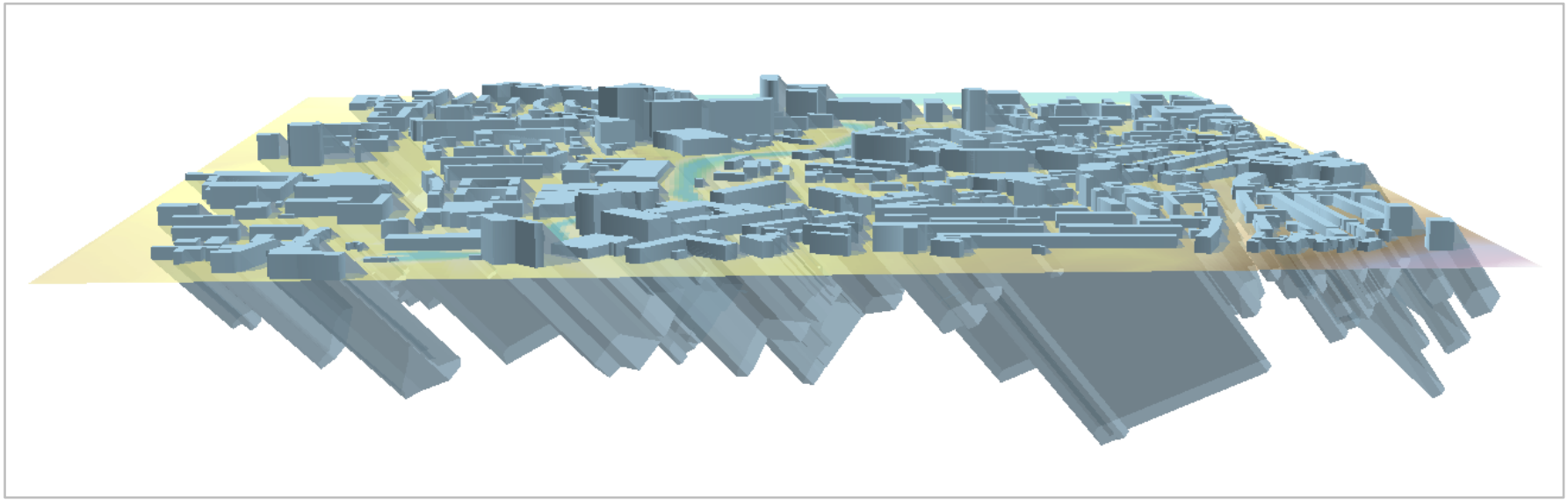
3D by extrusion

4) Simplified (5 m)

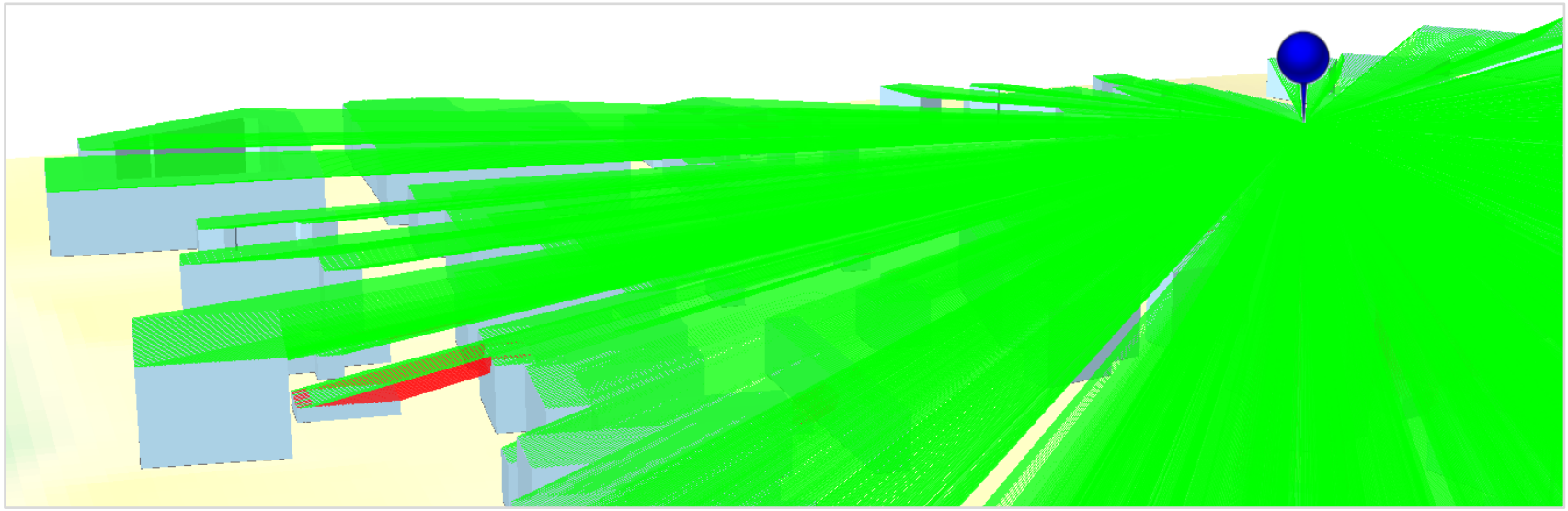


Data reduction		
No. Polygons reduced by 81.82 %	No. Nodes reduced by 83.12 %	3D Volume reduced by 7.91 %

3D Volume reduced by 11.58 %	6.32x faster processing



Visible area increased by 19.81 %	7.82x faster processing



What is the impact of 2D generalisation on the results of 3D line-of-sight and shadow-casting algorithms?

- 2D generalisation and extrusion: loss of detail [~8% vol.]
- Performance improvement in the spatial analyses [~6-8x].
- Decreased shadow volume [~11%]. → Solar panels
- Increased visible area for line of sight [~20%]. → 5G antennas
- Potential of displaying larger 3D datasets.
- Lack of commercially available 3D generalisation tools.

Use case scenario + Detailed requirements = ONE size does NOT fit all

- Importance of 3D generalisation algorithms.
- Impact of detail – vs – generalised:
- Room for further improvement.
- Limitations of the software.
- Generation of robust tools.
- ArcGIS Pro.

Performance

Analysis

ArcGIS Pro

Thank you!

Comments, questions, suggestions

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