Automated Site Plan Extraction from TLS Point Clouds

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Outline

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Motivation

- Increased use of laser scanning in archaeology for
  - Documentation
  - Analysis
  - ...

- Challenge of data handling
  - Data size versus relevant information
  - Automation is needed

How to get a georeferenced site plan in no time?

Approach

Real Object

Point Cloud

Horizontal Histogram

Extraction of Site Plan Elements

Shapefile

(3D-) GIS
### Approach

- Generation of horizontal histogram
- Thresholding \( \rightarrow \) binary image
- Extraction of site plan elements
  - Multiple thresholds
  - Segmentation
- Morphological operations
  - Erosion
  - Dilation
- Boundary tracing for vectorization
- Storage in shapefile

### Results

St. Maria, Laramate, Perú

- Automated extraction
- Manual interpretation
Domus Aurea, Rome, Italy

Results

Conclusions

- Chosen approach works well for vertical walls
- Other vertical objects connected to the walls cannot be removed automatically (e.g. plants)
- Only areas containing parts of a wall remain in the site plan

- Estimated accuracy
  - historical, well defined walls $\rightarrow$ 1 - 10 cm
  - other, less well defined walls $\rightarrow$ 10 - 20 cm

$\Rightarrow$ Site plans can be automatically generated based on laser scanner data
Outlook

– Improvement of extraction algorithm
– 2D GIS analysis
– 3D Reconstruction

Thank you for your attention!