WPVS for Content Analysis of Spatially Enhanced Multimedia

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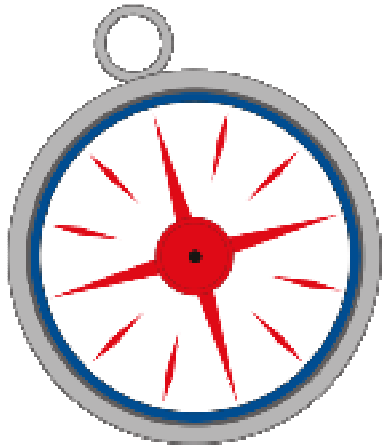
Road map

- Introduction
- Data preparation
- WPVS in action
- Inaccuracies and limitations
- Conclusions



Introduction

- Increasing availability of all-in-one capture devices and online multimedia
- *Geotagging:* adding location metadata to multimedia
- Photo annotation = captioning + labeling
- Content-based: classification; not identification
- Location metadata = contextual information

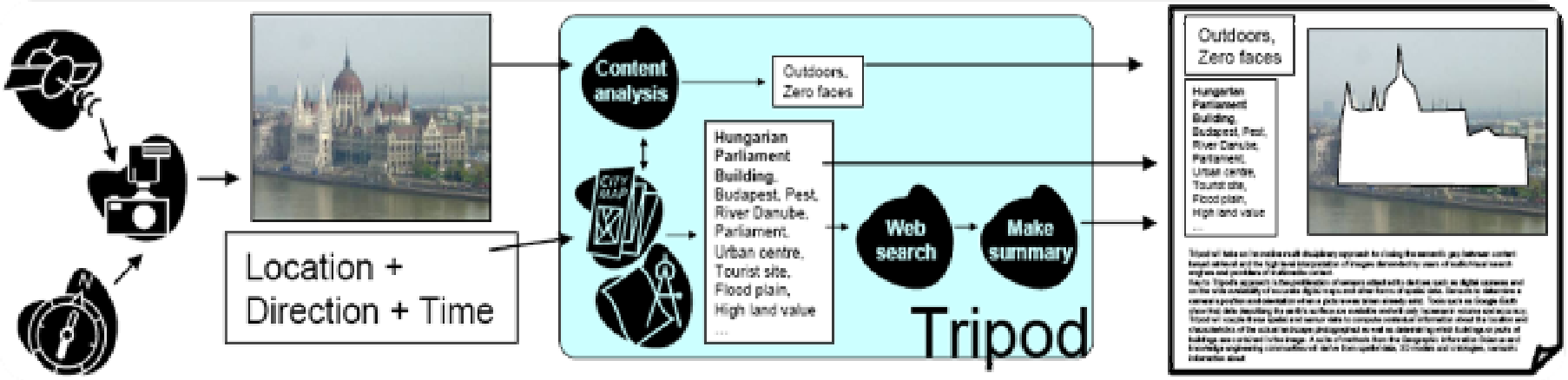

Populares (829)
Todas
Tus fotos
Popular photos in Google Earth
« Anterior
Siguiente »


Busca
Haz zoom con la rueda del ratón | Arrastra el mapa
Map
Satellite
Hybrid
Google
29º 58' 42.75" N 31º 8' 4.44" E
Terms of Use

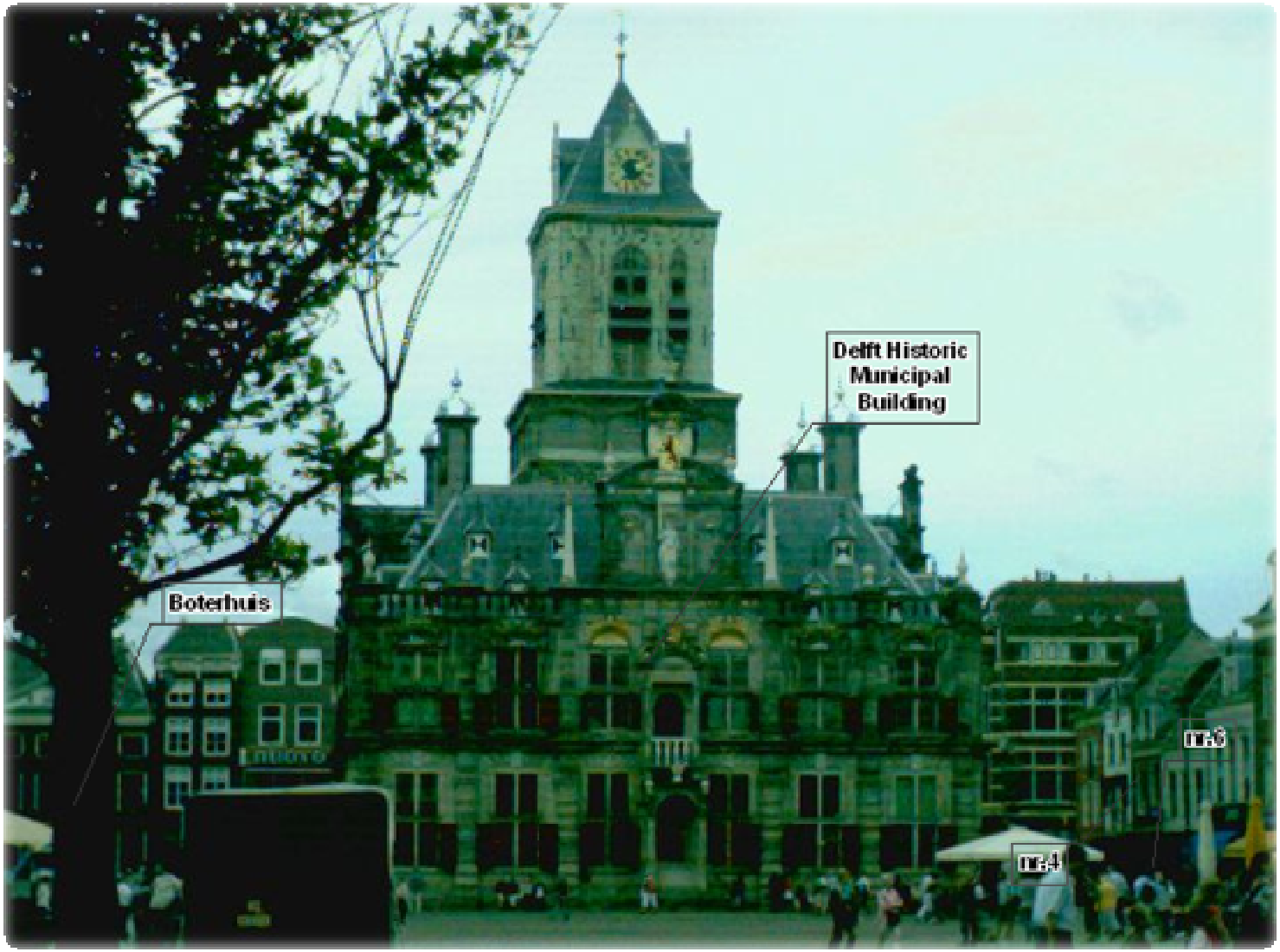
“Improve access to enormous body of visual media”

Photo annotation & image retrieval tools

Camera with GPS **and** compass captures full spatial metadata



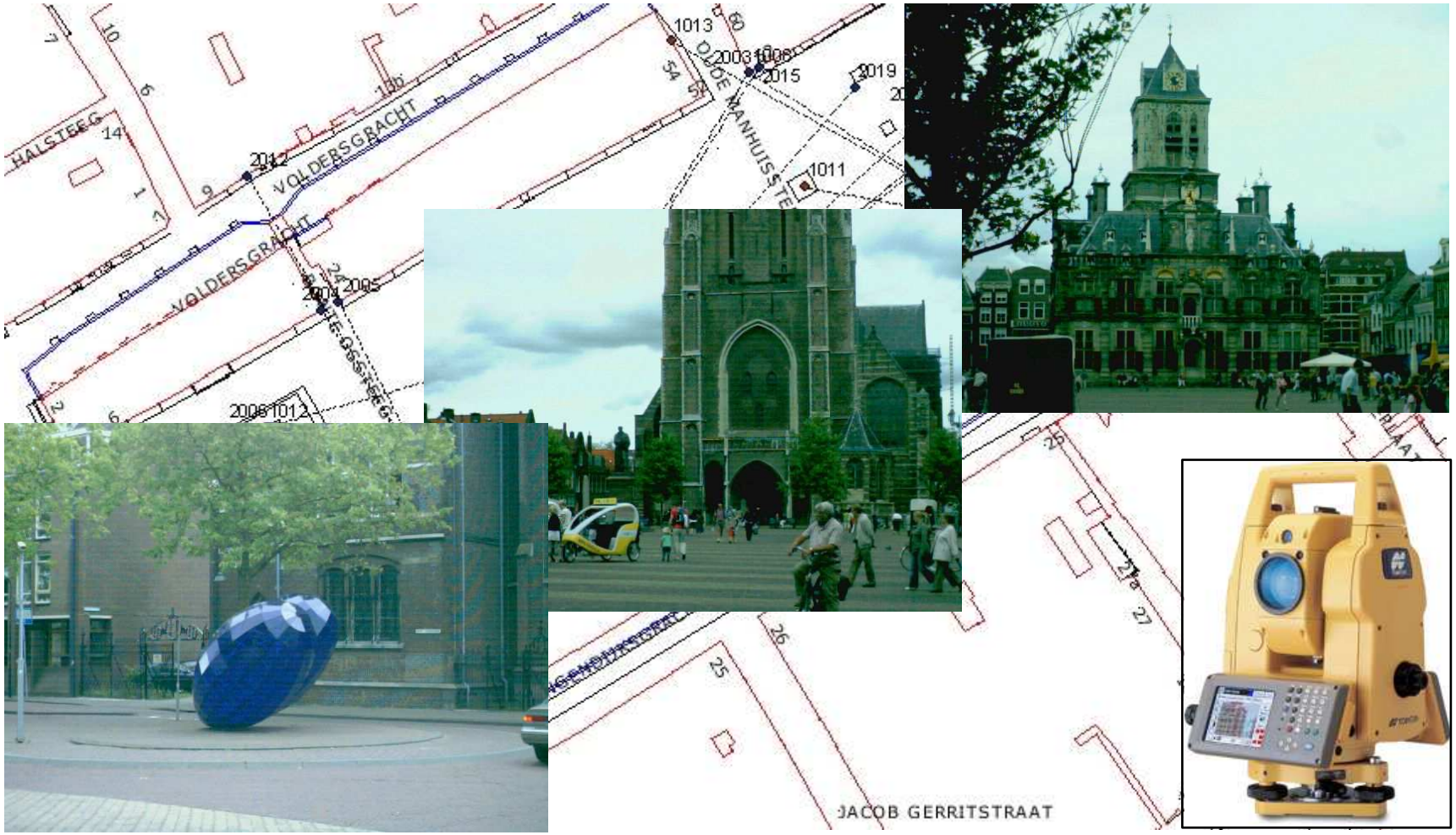
Dias E, de Boer A, Fruijtier S, Oddoye JP, Harding J, Matyas C, Minelli S (2007) Requirements and business case study. Project deliverable D1.2. TRIPOD: TRI-Partite multimedia Object Description. EC-IST Project 045335 (www.projecttripod.org).



Historic town hall, Delft, The Netherlands

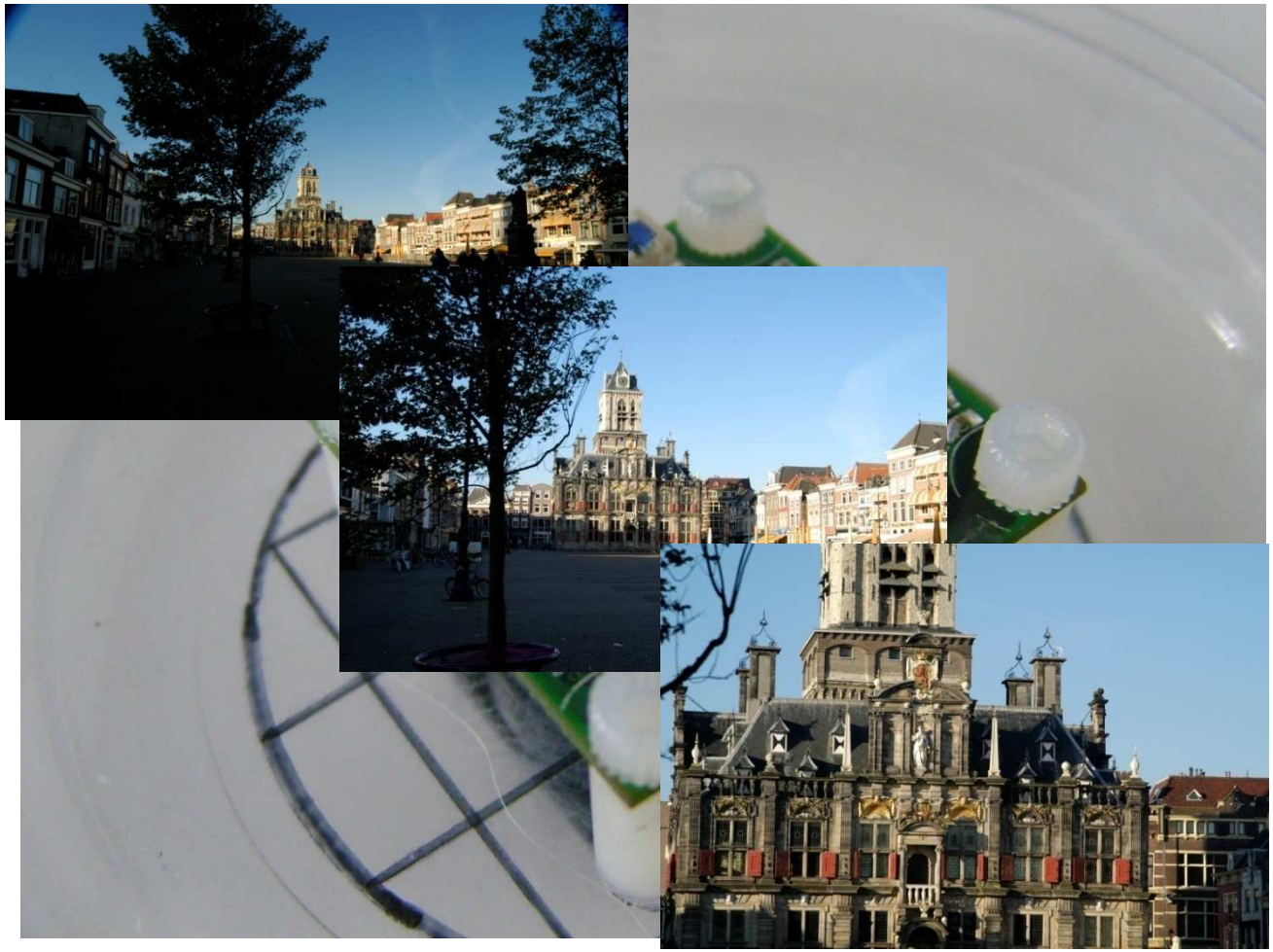
Low-resolution and high spatial accuracy photos

Topcon GPT-7003i © imaging TS



High-resolution and low spatial accuracy photos

Nikon D-100 © SLR camera with different lenses



Oceanserver 3-axis digital compass

- Specifications:
  - 3-axis compass: heading, pitch, roll
  - 0.1 resolution / 1º accuracy
  - tilt-compensated / calibrated
  - 0.1-20Ghz update rate
  - 1.4” x 1.8” ~ 35 x 40 mm
  - USB en RS232 connectivity

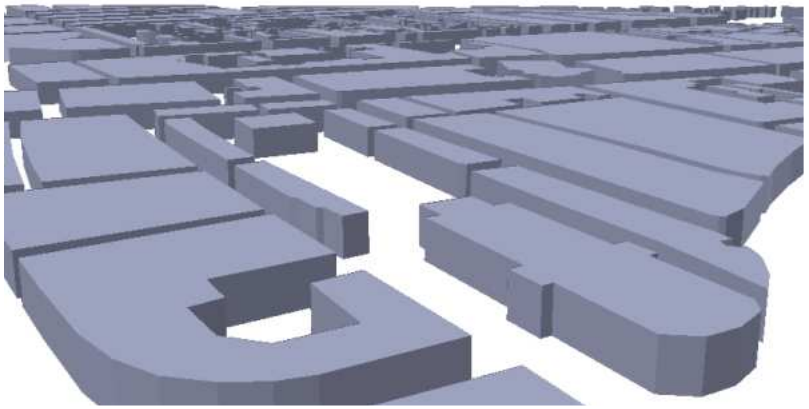
7D Spatial metadata

- 3-axis compass
  - Heading, roll, pitch, timestamp
- GPS
  - latitude, longitude, height, timestamp
- Camera
  - timestamp (+ focal length, subject distance)

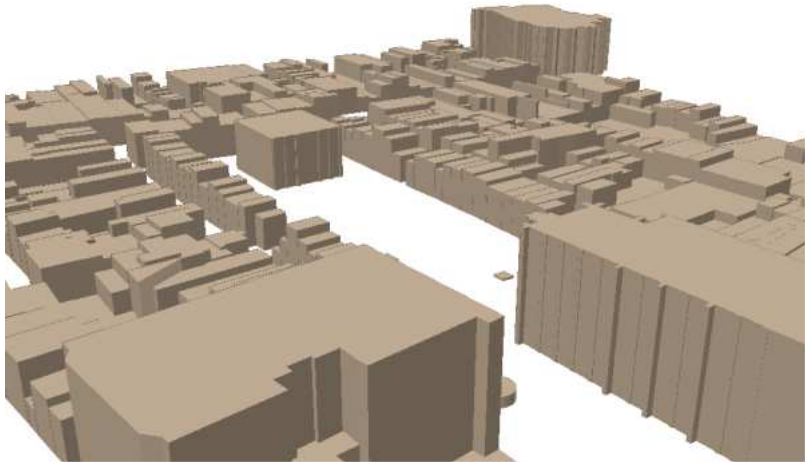
Data collected	
ID	2014
POI_coord	(84485.89177 447579.9073 10.3164)
POC_coord	(84409.194 447510.0159 0.6771951)
Heading	47.66º
Pitch	4.44º
Roll	0º
Subject distance	104.027 m
View angle	30º
Focal Length	8 mm
Timestamp	8/8/2007 15:04
Resolution	640x480
Device	Topcon GPT-7003i
Sensor	0.3M pixels (VGA) CMOS Sensor

Spatial data preparation

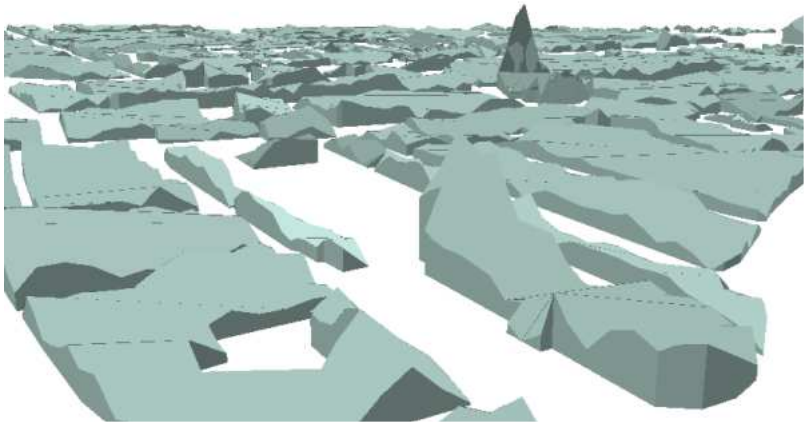
Three-dimensional models from 2D footprints and DEM data



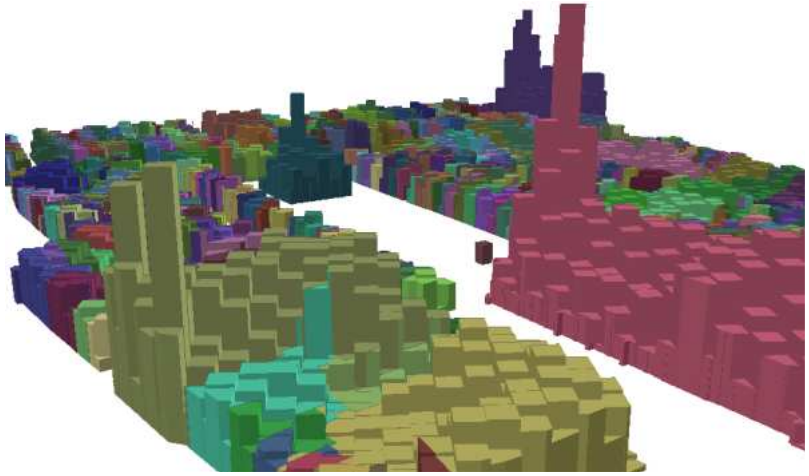
Model 1. Assumed height values



Model 2. Update centroid with AHN



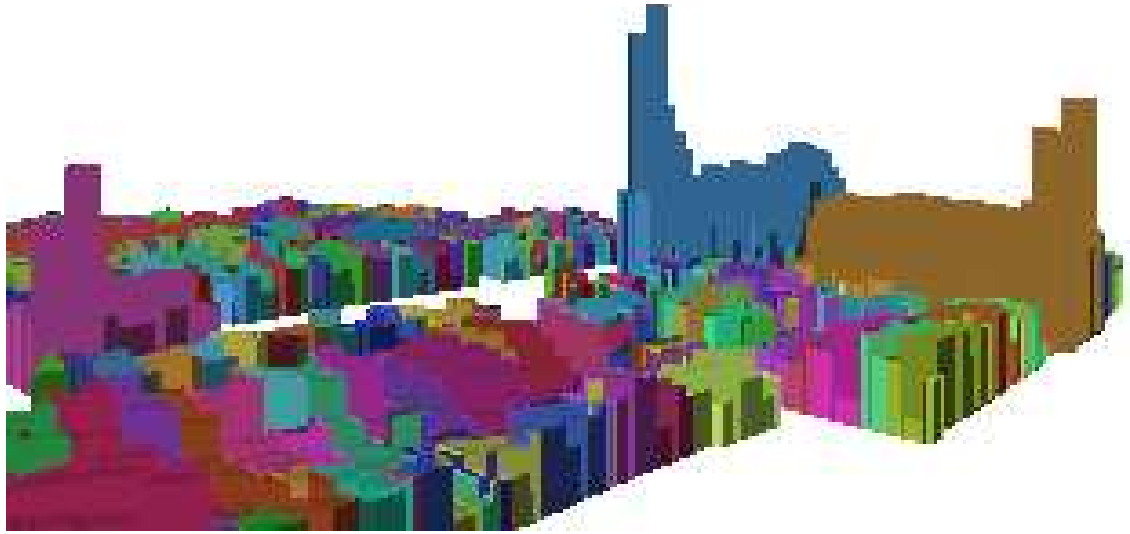
Model 3. AHN for base heights



Model 4. Sticks from AHN-to-vector

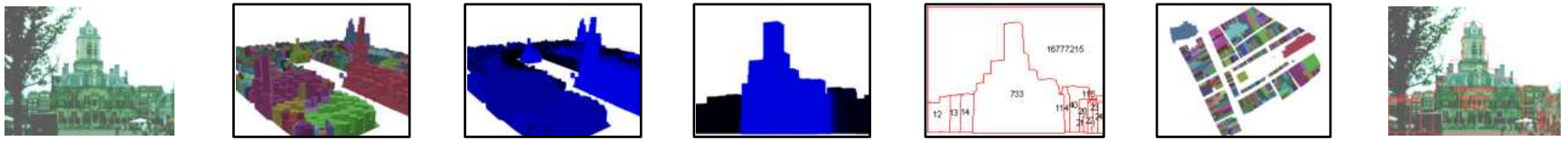
Extrusion of DEM cells

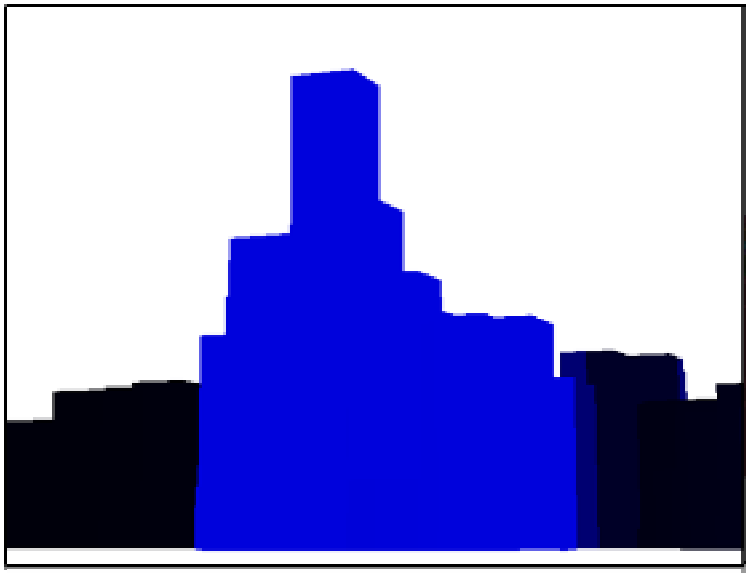
Approximates building shapes



Object identification

Virtual scene from perspective viewer service



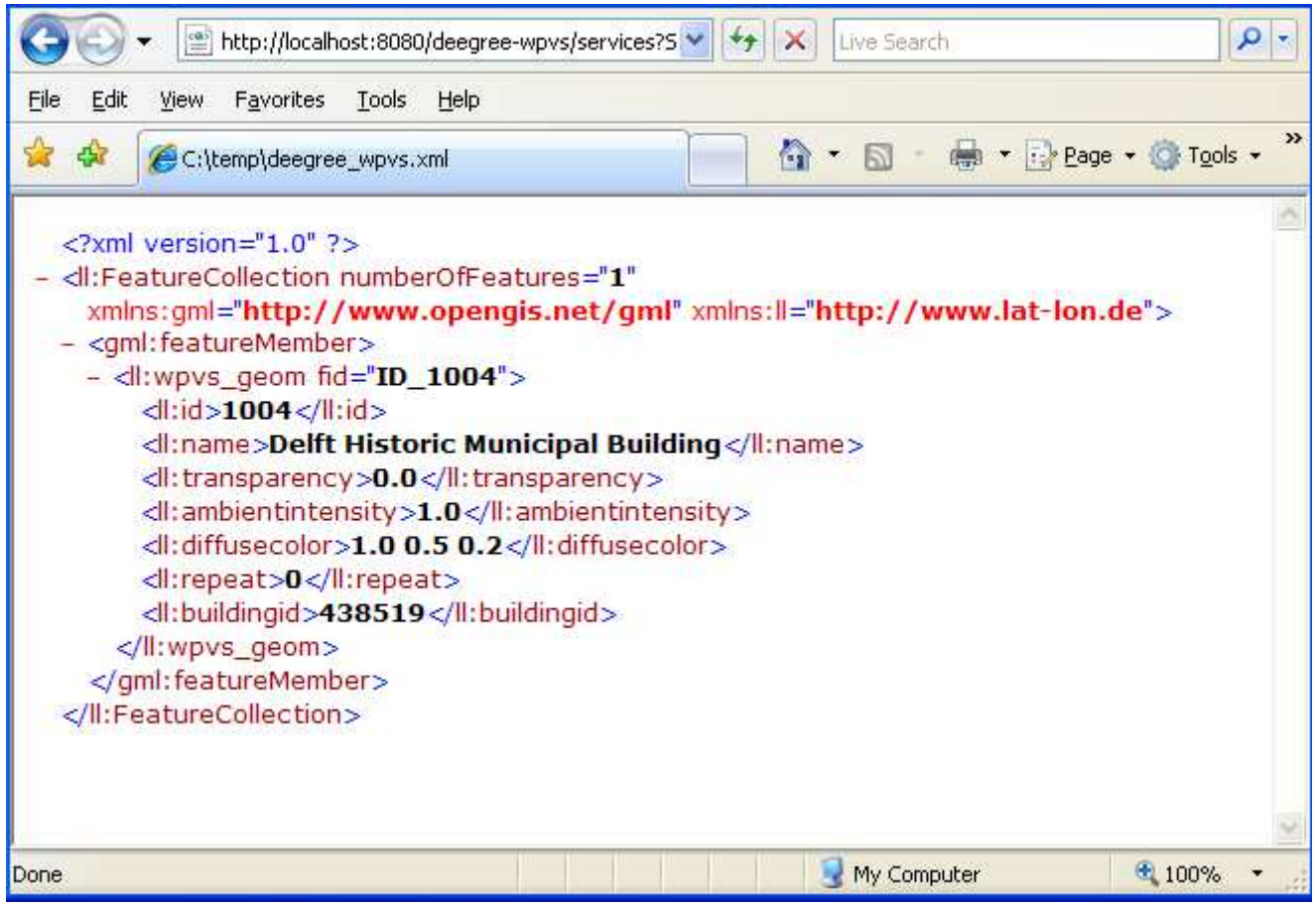


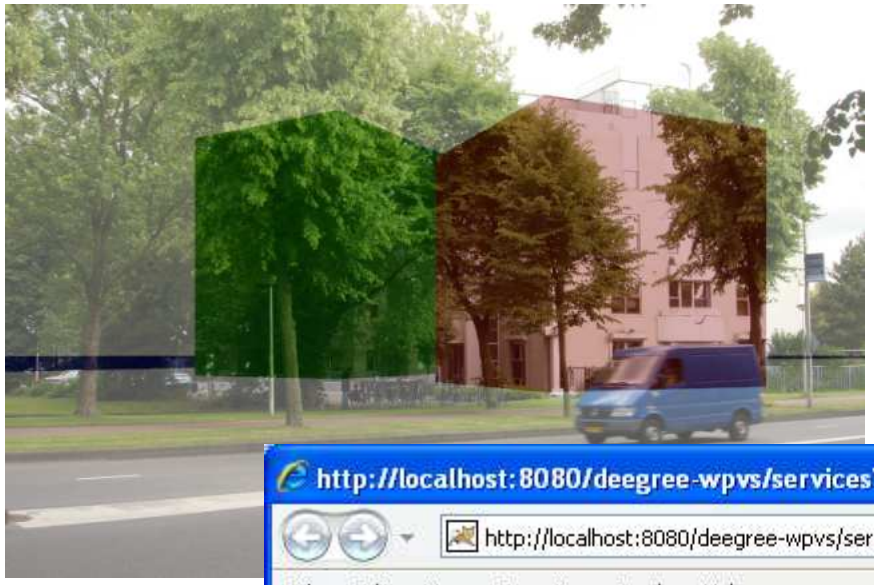
3D analysis / WPVS

Reverse Color engineering

Deegree WPVS offers

- Get3DFeatureInfo:





http://localhost:8080/deegree-wpvs/services?SERVICE=WPVS&REQUEST=Get3DFeatureInfo&BOUNDINGBOX=1 - Windows Int

http://localhost:8080/deegree-wpvs/services?SERVICE=WPVS&REQUEST=Get3DFeatureInfo&BOUNDINGBOX=12100(

File Edit View Favorites Tools Help

http://localhost:8080/... http://localhost:8080/... http://localhost:8... http://localhost:8080/...

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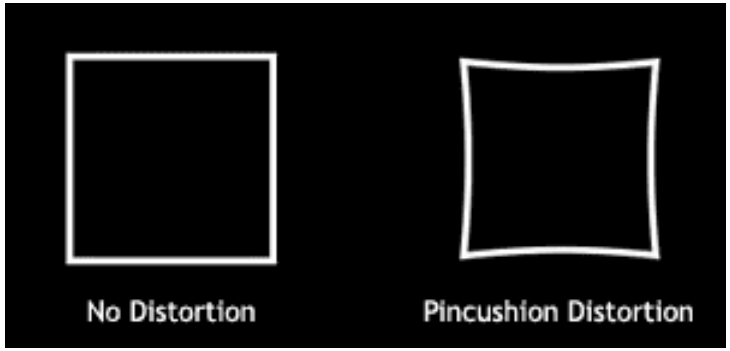
Done

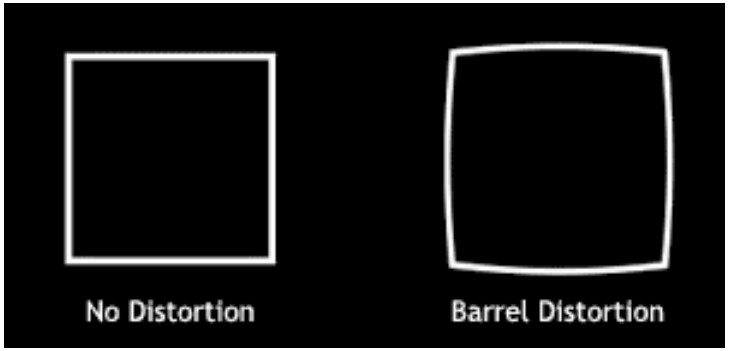
4. Effects of distortions and inaccuracies

Lens distortions and GPS and compass inaccuracies

Lens distortions

- Barrel and pincushion distortion

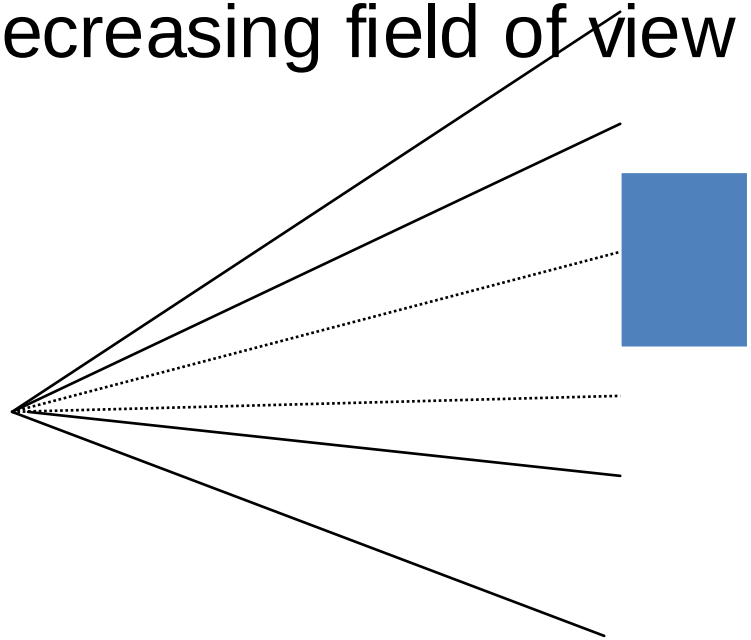




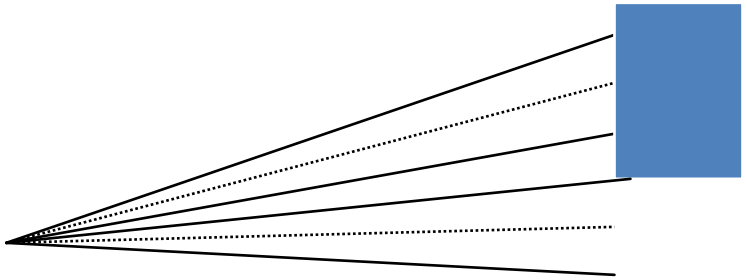
GPS inaccuracies

Compass inaccuracies

- Misidentification of objects increases with decreasing field of view angle



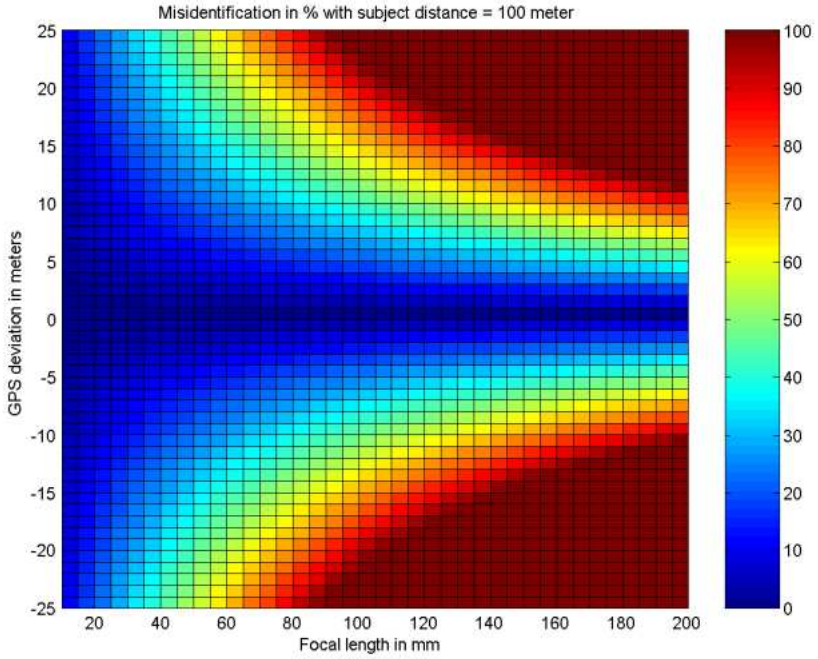
Field of view – wide angle



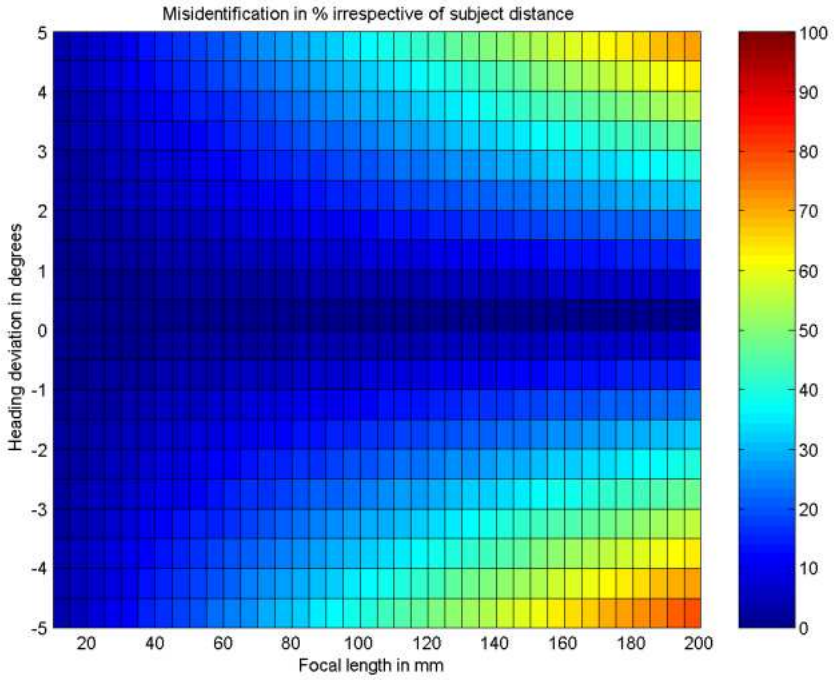
Field of view – narrow angle

GPS and compass inaccuracies

GPS inaccuracies



compass inaccuracies



Conclusion

“objects on a digital photo can be identified using the photo’s full spatial metadata”

“methodology for object identification in digital imagery alternative from the existing methodologies”

“GIS technology and spatial data to create a virtual scene as output of perspective viewer services”

“problem of label placement in 3D Geo-Environments reduced to a 2D map labeling problem”

More information:

www.projecttripod.org

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