THE UPDATING PROCESS FOR 3D CITY MODEL OBJECTS

Commission III
Session: TS02E – 3D Modelling

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Introduction

- New developments, constructions and renovations are inevitable especially in urban areas.
- Entities such as buildings will change through time
- Keeping track of these development activities is important

Introduction

Dubai

Shanghai

Introduction

Introduction

Introduction

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Introduction

- 3D city models represent real cities
- Changes should be tracked and recorded – to keep the 3D city models up-to-date and relevant for analyses

Introduction

- Detecting and updating the changes are important but replacing the whole existing data will cause loss of valuable information
- Selective updating is needed in order to update the changes while retaining the existing data

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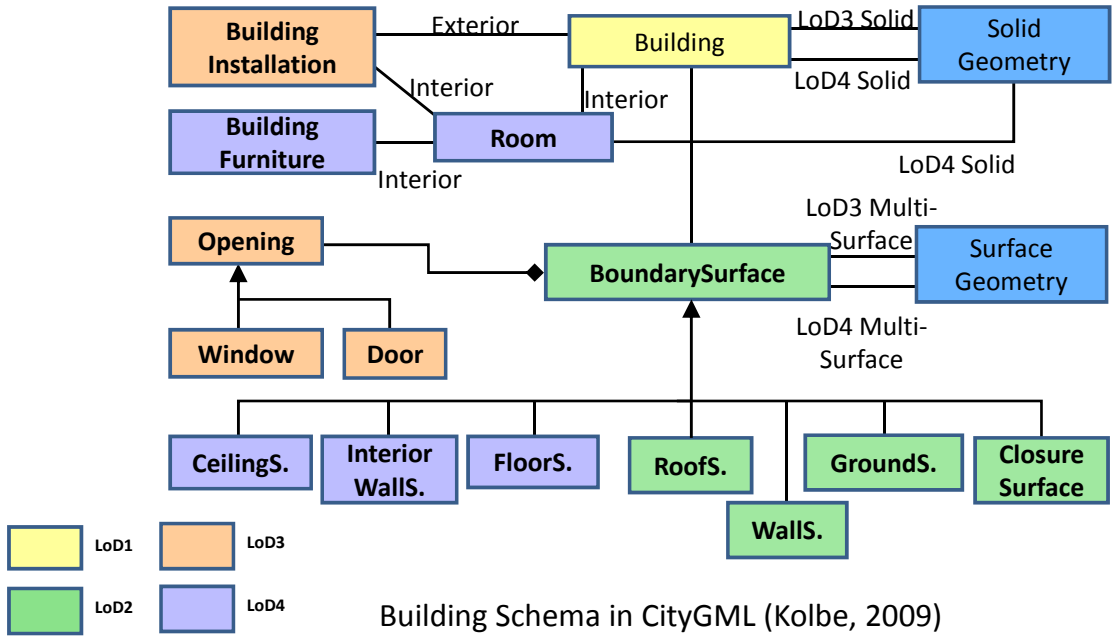
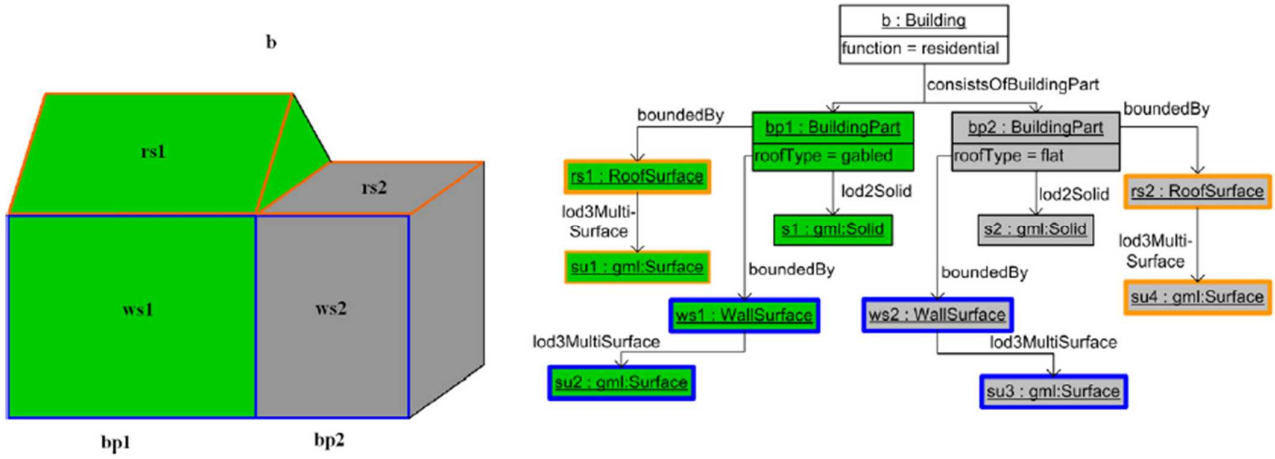
CityGML



Building Schema in CityGML (Kolbe, 2009)

CityGML

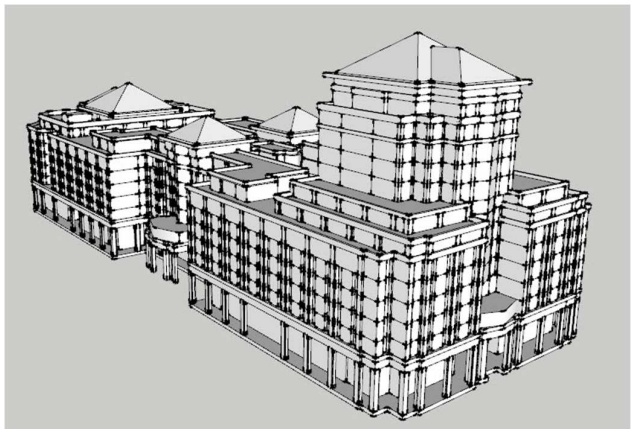


Spatial representation of LoD2 building and UML instance diagram for the structure of CityGML feature (Groger and Plumer, 2012)

3D Segmentation

- 3D building is always generated as 1 object in most database/applications
- Limited interpretation of building parts
- Lack of semantic information

3D Segmentation



3D Building

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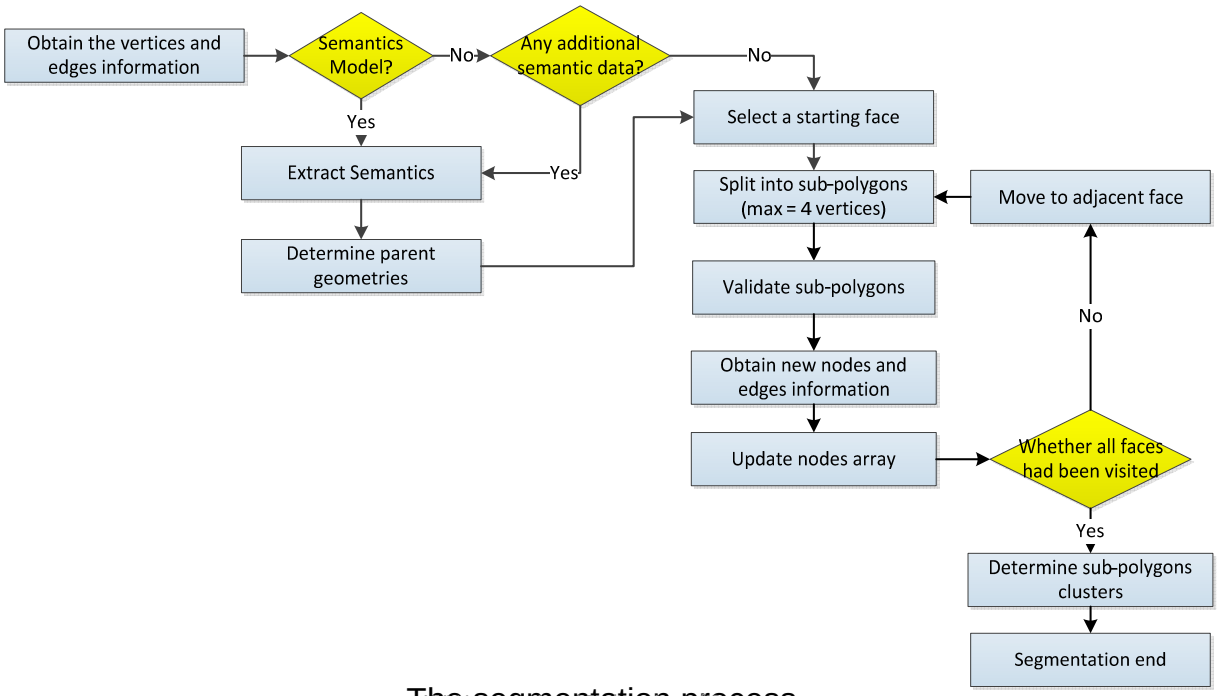
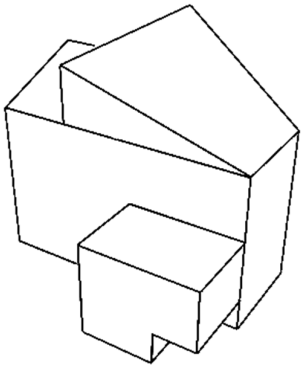
3D Segmentation

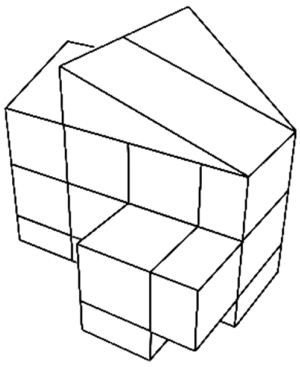


The segmentation process

3D Segmentation



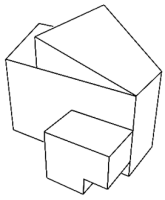
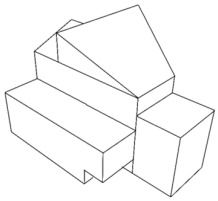
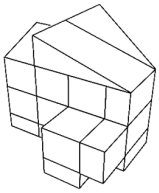
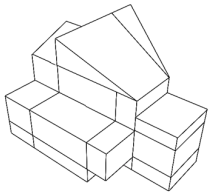
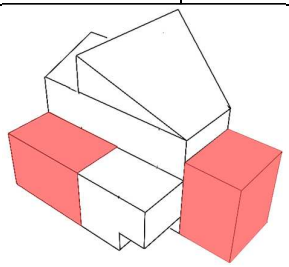
a) Original building



b) Segmented model

Segmentation result

Detecting Changes

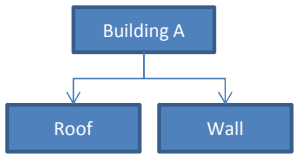
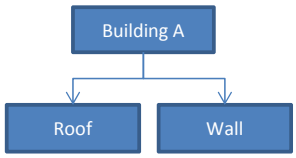
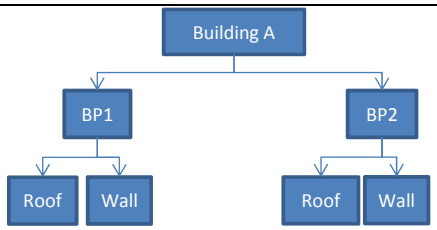
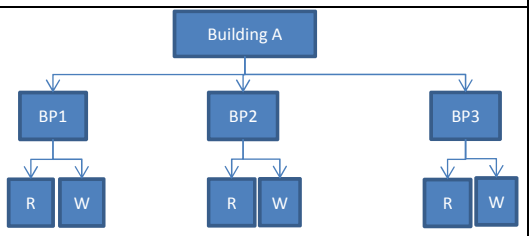
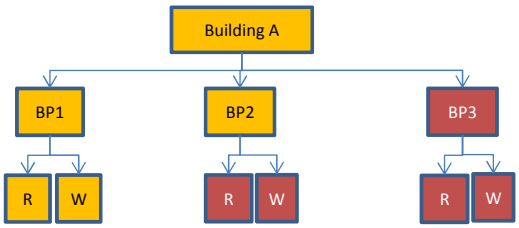
	Current Data	New Data
Original Building		
Segmented Building		
Changes Detected (Shaded)		

The updating process

Updating Process

- The change detection process will be done by comparing the new data against the existing data
- Segmentation will allow building parts to be defined and enable changed structures to be localized
- The change detection results will be used for the updating process

Updating Process

	Current Data (Semantics)	New Data (Semantics)
Original Building		
Segmented Building		
Selected Data For Updating Process		

The updating process

Conclusions

- Updating 3D city models can be very difficult especially for large cities.
- Replacing the whole model is easier but the action might cause the loss of data.
- The proposed method should be able to update the 3D building based on the changes that occurred and retain existing information

Conclusions

- The proposed segmentation technique for buildings in 3D city model should be able to add more information on the building, semantically and geometrically

- For future work, integration of the proposed method with façade detection method should enable the support for higher LoD (LoD3) models.

Acknowledgment

- Malaysian Peninsular Land Surveyors Board (LJT).

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Thank you for your attention!

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