Integration of 2D architectural floor plans into Indoor OpenStreetMap for reconstructing 3D building models

-P5 Reflection

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All existing data sources used to reconstruct 3D building models have certain restrictions. IndoorOSM and 2D architectural floor plan are two promising alternatives. However, different problems exist in both of them. For IndoorOSM, the accuracy of the data is not guaranteed; for 2D floor plans, the existence of inconsistencies and ambiguities impedes the realization of full automation. The combination of these two data sources can be beneficial, because architectural floor plans can offer IndoorOSM better accuracy and extensive indoor information while IndoorOSM can provide a unified data structure and 3D reconstruction workflow for information extracted from floor plans. This thesis proposed a (semi-)automatic process to extract information from 2D architectural floor plans in the form of IndoorOSM for 3D reconstruction. Finally, it is proved possible that formatted 2D architectural floor plans can be automatically processed and integrated into IndoorOSM 3D reconstruction pipeline.

We give our reflection of this thesis with respect to the following questions:

Aspect 1 The relationship between the methodical line of approach of the Master Geomatics and the method chosen by the student in this framework.

The thesis is strongly related to Geomatics program since a large amount of background knowledge used in this thesis is acquired through courses, such as 3D modelling, GIS, Python programming, Geo database management. Besides, during this thesis, some new knowledge that are also widely used in Geomatics, such as symbol recognition, has also been acquired.

Aspect 2 The relationship between the conducted research and application of the field geomatics.

This thesis focus on processing 2D architectural floor plans into the form of IndoorOSM for 3D reconstruction. The modelling of indoor environment using data structure like IndoorOSM and 3D building reconstruction are related to the field of Geomatics, while the part of automatic information extraction from floor plans is more related to the field of Computer Science and Symbol Recognition. Therefore, this project is actually the application of Computer Science techniques in the data acquisition and processing for Geomatics field.

Aspect 3 The relationship between the project and the wider social context.

The output of this thesis can contribute to the market of LOD4 building models. Nowadays, people spend more time indoor than outdoors, as a result of which the demand of indoor information increases more than ever. LoD4 building model is an efficient tool to present indoor environment. It provides an immersive visualization allowing people to virtually wander inside the building to have a more intuitive perspective. Thus, it is commonly used in application fields, such as indoor navigation and disaster management. However, at present time the data source that can be used to create building models in LoD4 are very limited and all existing data sources have certain restrictions. By combining IndoorOSM and 2D architectural floor plans, both the accuracy and availability of the data source for LoD4 reconstruction have been greatly improved.