The Updating Process for 3D City Model Objects

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SUMMARY

In spatial information system, the semantics attached to a land parcel is as important as it spatial counterpart. The similar concept is adopted by the 3D city model standard and data model, known as CityGML. It has been accepted by the Open Geospatial Consortium (OGC) as one of the international standards for 3D city models that is able to represent the geometry, topology and appearance of 3D city models in five Level-of-Details (LoD), namely LoD0 to LoD4. Apart from the spatial features, CityGML also emphasized on the importance of spatio-semantic coherent model as every spatial feature in each 3D city model object should be accompanied by its corresponding semantic information to ensure that the model is spatially and semantically correct. The process of generating 3D city models has been greatly improved with the availability of sophisticated tools such as Lidar, terrestrial laser scanning equipments and high resolution cameras where the 3D data obtained and generated are more accurate and cost-effective. However, the task of updating the data is still a major predicament in 3D city model. While it is easier to replace the whole current 3D city models with the newly generated ones, the action will result in the loss of valuable data. This paper attempts to introduce a method that could improve the 3D city models updating process by implementing a selective updating where 3D buildings will be updated based on the changes on its geometries or semantics. The proposed method utilizes a hybrid 3D segmentation method that based on semantic and geometric decomposition for 3D buildings in order to detect and pinpoint the location of any changed structures. Based on the change detection results, the method will selectively determine the segmented geometries and semantics that will be updated on the geospatial database of the 3D city model. For future work, the proposed method will be extended for automatic features extraction from un-interpreted 3D models.