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Abstract

Geographical Information System (GIS) data describing a building can help enrich our understanding of a building and its surroundings. There currently exists challenges in relating a GIS building to its corresponding Building Information Modelling (BIM) building. This is primarily due to the use of different geometric representations and coordinate systems which act as a blocker in the integration of the two domains. Seamless movement between BIM and GIS would allow for the exploration of a how a BIM building interacts with its external environment.

This dissertation presents work that addresses the challenges in aligning BIM and GIS building representations by using a Linked Data approach. Industry Foundation Class (IFC) BIM models are processed as ifcOWL to extract a 2D GIS representation of the 3D BIM model, based on the geolocation of the building. GeoSPARQL querying can be performed on the data to extract 2D GIS geometries. This facilitates the interlinking of data with other domains, using the extracted 2D building geometry as an alignment property.

The complexities associated with developing BIM data act as a deterrent for new BIM developers. This dissertation explores the Building Topology Ontology (BOT) as a more accessible means of representing BIM data. This is an important step towards the iterative integration of ever more complex BIM models into the wider web of data.

Lastly, a method of representing a BIM model as 3D GIS is presented in this dissertation. A 3D GIS building is created from a 3D BIM model, facilitating the exploration of a BIM building in a 3D GIS context. In total, four BIM and GIS integration methods are presented in this document. Each method provides a different approach of relating BIM and GIS buildings, based on the varying needs of a user.