
Transparent and reusable semantic enrichment of place name data in Australia

Accepted Abstract Talk, GIScience 2025

In: Proc. Thirteenth International Conference on Geographic Information Science (GIScience 2025)

August 26–29, 2025
Ōtautahi | Christchurch
Aotearoa | New Zealand

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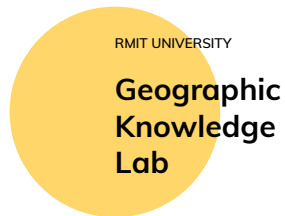
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ABSTRACT

Semantic enrichment is the process of augmenting data with additional contextual information that helps disambiguate its meaning. In practice, the semantic data enrichment process typically involves uplifting traditional data sources, such as tabular or object-relational, with connections to standard published ontologies. Conventional semantic data enrichment approaches are often based on ad hoc scripting and coding pipelines. Consequently, these bespoke approaches result in substantial development and maintenance costs, time, and manual effort. They may also undermine the quality and scalability of the enrichment applications, give rise to significant duplication, and negatively impact their long-term usability. To address these challenges, our approach explores the use of declarative mapping languages to enrich spatial data. The approach is founded on separating the semantic mapping logic from the mechanism of performing the mapping, two aspects that are conflated by scripting and coding pipelines. Separating these aspects is expected to lead to the development of more transparent and reusable semantic data enrichment techniques. However, to date, most such explorations have focused solely on non-spatial data.

We employed Australian place name data as a case study to evaluate the effectiveness of semantic spatial data enrichment using declarative mapping. RDF Mapping Language (RML) was used to semantically enrich place names across each state in Australia, resulting in a national placename knowledge graph. Place names were enriched with metadata and contextual information using



standard ontologies, including Place Names Ontology, Data Catalog Vocabulary (DCAT), Data Quality Vocabulary (DQV), and GeoSPARQL Ontology.

The proposed transparent and reusable approach enhances the quality of insights derived from the knowledge graph while minimizing the overall cost of the transformation process. It results in a more efficient and effective semantic enrichment process. The place name knowledge graph can quickly adapt to new modifications with minimal resources and ensure long-term usability and maintainability of the application.

ACKNOWLEDGMENTS

The authors would like to acknowledge helpful advice and discussions with Nicholas Car and Rob Atkinson in the development of this work.