

An Ontology Based Approach for the Construction of an Address Gazetteer: the IDEZAR Gazetteer Use-case

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Visser, P.R.S., Jones, D.M., Bench-Capon, T.J.M., Shave, M.J.R.: An Analysis of Ontological In order to create the contents of an address gazetteer service that forms part of the Spatial Data Infrastructure (SDI) of local administrations such as a city council, the SDI developers must perform a work of analyzing and harmonizing all the existent repositories containing address information in the different offices of the council.

In our case, we have faced the problem of creating an address gazetteer service for the Zaragoza council SDI [Portoles-Rodríguez et al., 2005], which is specialized in the Urban Networks of this city. And analyzing the information related with addresses and urban transport networks in the Spanish local administration, we have faced that different taxonomies are used for the identification of urban network feature types in different administrative processes. For instance, one of these taxonomies is the one used in the central database repository managed by the council Informatics office. However, when the city council needs to exchange information with external organizations like the National Cadastre Office or the National Statistics Institute, the information needs to be reformatted in order to comply with the feature types accepted by these institutions. Moreover, it is usual that this reformatted information is stored in parallel repositories (e.g., tax office databases, urban planning office databases) whose updates are not synchronized with the central repository.

In order to overcome this existent heterogeneity in the different repositories, it seems sensible to establish a unified model of the feature types that can be found in this domain, and make the necessary mappings to the particular taxonomies that must be used in external organizations or in the different repositories maintained at council level. This feature type model could be formally represented by an ontology that defines explicitly the concepts and relationships between these concepts in a domain [Gómez-Pérez et al, 2003; Visser et al., 1997].

Having observed this necessity of defining an ontology for feature types in the urban networks domain, the objectives of this work are three-fold. The first objective is to analyze the different taxonomies in the public administration for urban networks [Levoleger and Corbin, 2005].

The second objective is to use these source taxonomies in order to define later a unified urban network ontology overcoming the existent heterogeneity. On the one hand, this unified ontology will facilitate the interoperability with external administrative organizations. And on the other hand, it will enable the modelling of the contents served by the Gazetteer service in the Zaragoza council SDI (IDEZAR, <http://www.zaragoza.es/idezar/>).

And the third and final objective is to use this experience of defining this unified ontology in order to provide some guidelines for the construction of ontologies. More specifically this work will provide feedback to the Towntology project (<http://www.towntology.net>). This project is funded by COST (intergovernmental framework for European Cooperation in the field of Scientific and Technical Research) through the action COST C21 in the Urban Civil Engineering (UCE) domain and it aims at increasing to increase the knowledge and promote the use of ontologies in the domain of Urban Civil Engineering projects [Teller et al., 2005], in the view of facilitating the communications between information systems, stakeholders and UCE specialists at a European level (Groupware).

The full paper version of this contribution will analyze the use-case selected for this work explaining the different urban network databases (including their different feature type taxonomies) that must be used for the creation of a gazetteer. Then, it will be described how the contents of the gazetteer can be created using two different approaches. Whereas the first approach will describe an ad-hoc manual mapping among taxonomies used in the source repositories, the second one will describe how to establish a formal urban network ontology that integrates the mappings among the different taxonomies. For the

formalization of the ontology in this second approach we will explore the use of ontology editing tools like Towntology [Keita et al., 2004] (visual tool to facilitate the discussion among experts of the ontology construction) or Protegé [Noy et al., 2000] (enabling the use of more formal language specifications). The main aim of this experimental part of the work is to demonstrate that the second approach provides more flexibility and scalability, facilitating the upload process and possible future extensions.

References

- Mismatches: Heterogeneity versus Interoperability. In: AAAI 1997. Spring Symposium on Ontological Engineering, Stanford, USA (1997)
- Alistair, M., Matthews, B., Wilson, M.: SKOS Core: Simple Knowledge Organization for the Web. In: Proceedings of the International Conference on Dublin Core and Metadata Applications, Madrid, Spain (2005)
- Berman, M.L.: Semantic Interoperability and Cultural Specificity: Examples from Chinese, Japanese, Mongolian and Uighur. In: Proc. of Social Science History Association meeting (SSHA'2003), Baltimore (2003)
- Gómez-Pérez, A., Fernández-López, M., Corcho, O.: Ontological Engineering. Springer-Verlag, London (United Kingdom) (2003)
- Keita, A., Laurini, R., Roussey, C., Zimmerman, M.: Towards an Ontology for Urban Planning: The Towntology Project. In: CD-ROM Proceedings of the 24th UDMS Symposium, Chioggia (2004)
- Levoleger, K., Corbin, C.: Survey of European National Addressing as of May 2005, v3. AWP 2005, EUROGI (2005)
- Noy, N.F., Ferguson, R.W., Musen, M.A.: The knowledge model of Protege-2000: Combining interoperability and flexibility. In: 2th International Conference on Knowledge Engineering and Knowledge Management (EKAW'2000), Juan-les-Pins, France (2000)
- Portoles-Rodríguez, D., Álvarez, P., Muro-Medrano, P.: IDEZar: an example of user needs, technological aspects and the institutional framework of a local SDI. In: Proceedings of the 11th EC GI & GIS Workshop, ESDI Setting the Framework.(2005)
- Teller, J., Keita, A.K., Roussey, C., Laurini, R.: Urban Ontologies for an improved communication in urban civil engineering projects. In: Proceedings of the International Conference on Spatial Analysis and GEomatics, Research & Developments,SAGEO 2005, Avignon, France (2005)

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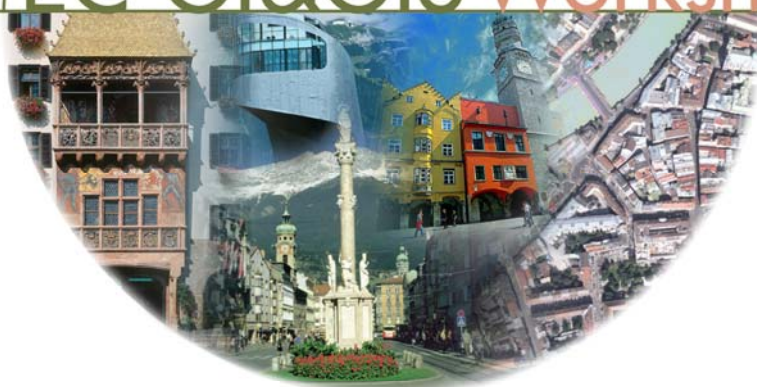
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