Prototyping a Browser for a Listed Buildings Database* with Semantic MediaWiki

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1   BauDenkMalNetz and its Intended Applications

Listed buildings, even if they are not top landmarks, are increasingly attracting visitors. People express interest in hidden gems in their neighborhood or along their travel itinerary, and in the history of the building they live in. All required data has been meticulously collected by the offices for historical monuments but is not flexibly *accessible*. In Bremen, the database of buildings (with location, map of the estate, construction history, architect, photos) is searchable and browsable online[3], but that only helps users who know how to use a rigidly structured database search form. Our beginning BauDenkMalNetz effort ("listed building web") aims at a wider purpose: modeling the semantic structure of these data, starting in Bremen but open for other data, and exposing them via a semantic web interface with enhanced querying and presentation capabilities. Requirements beyond interactive browsing comprise auto-generation of customized printed guides (e.g. "Bauhaus villas in my neighborhood"), on-demand presentation on mobile devices (e.g. "medieval churches along my travel itinerary"), and serving linked data for usage by other services.

2   Exploring Possibilities in Semantic MediaWiki

These requirements clearly demand semantic technologies. In this early phase, the *possibilities* of how to represent our knowledge, how to utilize it, and how to represent it to users are not yet entirely clear to us. Therefore, we have started building a *prototype* using Semantic MediaWiki (SMW [4]). Thanks to its stable MediaWiki foundation, its customizability and the wide availability of extensions, SMW is a preferred choice for building prototypes (see, e.g., [2]). In our case, another motivation is that it has already been used for conceptually similar applications. The Archiplanet [1] SMW site contains over 100,000 pages about buildings and architects, however, with a semantically rather weak ontology. We

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[3] http://194.95.254.61/denkmalpflege/

are instead planning to follow the existing, stronger database schema of our data for incrementally developing an initial ontology, which is easy in SMW. We have started manually annotating a small, strongly interlinked dataset of listed buildings in one district of Bremen in that way[4] and will explore first possibilities for services on these data, drawing on the abundance of available SMW extensions: *Semantic Forms* is an extension for form/template-based user interfaces, providing forms for adding, editing and querying data, that allows for complex in-document annotations, like embedding forms into other forms by using form templates. This feature will allow for representing fine-granular entities, which nevertheless have some properties of interest, as annotated fragments of larger wiki pages, instead of having very small pages created for them. The custom templates created with *Semantic Forms*, which are adapted to the structure of the data, will also help us in a later step of the project, when we will automatically import a large amount of data entries from the existing relational database by a bot. *Semantic Drilldown* allows for interactively drilling down through different dimensions (= properties) of data. The whole range of values and the number of values is visible from the beginning. This extension enables filtering by semantic properties based on: property values (e. g. the address of a building), page categories (e. g. the district to which a building belongs), date ranges (e. g. the years between which the house was built). *Maps* and *Semantic Maps* are extensions for integrating Bing and Google maps; we will display the locations of buildings on maps. *Semantic Maps* supports compound queries, like which category an item belongs to, that also work with geo-coordinates. *Semantic Graph* is an extension for visually representing results of complex queries as graphs. That can serve to illustrate relations inside the ontology, like "part of" (one building being part of another building) or "time" (by creating a chronological alignment of buildings).

3   Conclusion and Outlook

Using SMW and its extensions, we are creating a functional prototype of the "listed building web", which will be expanded into a full-fledged web portal. We are planning to enhance our initial project-specific ontology by reusing CIDOC CRM, a standard ontology for cultural heritage [5], and GeoNames, a standard ontology for geospatial information, for which a number of web services exist [3].

References

[1] *Archiplanet*. URL: http://www.archiplanet.org.
[2] Jie Bao, Li Ding, Rui Huang, et al. "A Semantic Wiki based Light-Weight Web Application Model". In: *ASWC*. 2009.
[3] *GeoNames*. URL: http://www.geonames.org.
[4] *Semantic MediaWiki*. URL: http://semantic-mediawiki.org.
[5] *CIDOC Conceptual Reference Model*. URL: http://cidoc.ics.forth.gr.

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[4] See http://mathweb.org/wiki/BauDenkMalNetz