

Ontologies at Work: Publishing Multilingual Recreational Routes Using Ontologies

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Abstract

Even though there is nothing new about the idea, ontologies are a hot topic. Built for many reasons and appliances, the use of ontologies in real-life applications remains limited. The WalkOnWeb project has developed ontologies in the area of recreational routing and applied them in a real application. This demonstration will show these applications and explain how they use ontologies. With the “Walk Planner” hikers can plan their trip by looking for trails, creating new routes and getting detailed information in print, web or mobile format. Authors can create and describe routes using the “Authoring Tool”. By creating ontologies and using them in these applications the WalkOnWeb project has developed a system to publish electronic routes in a flexible and personalized way.

Keywords: ontology; navigation; XML; SVG

1 Introduction

Ontologies are well-structured representations of knowledge in a certain domain. They consist of concepts and relations between them, described in a computer readable form while still being descriptive for humans. Applied in many areas, their use often remains theoretical, so that the practical utility of ontologies in real applications remains unclear. The European research project WalkOnWeb [1] has tried to break with this tradition by applying ontologies in a real-life application area: outdoor navigation.

2 Publishing Recreational Routes Electronically

One of the problems the WalkOnWeb application is trying to overcome is the lack of flexibility offered to outdoor enthusiasts by traditional publications. Hiking guidebooks for example describe a route in only one direction, one language and from a fixed starting point. When switching to an electronic publishing paradigm a hiker can expect more flexibility: she should be able to get information about itineraries via the Internet, whichever country she is visiting. She expects to get information in her own language, to choose her preferred starting point and walking direction, and maybe even combine parts of existing routes to a new, personalized route.

For publishers this type of requirements poses huge challenges when publishing their material in an electronic form. In theory electronic publishing should be more cost effective, avoiding high fixed costs for printing books. In practice however the issue is not that simple. First, users expect to get up to date information, forcing publishers to continuously provide updates. Second, multilingual publishing involves high translation costs. Finally, the material used for paper publications does not support the type of flexibility expected in electronic publishing, both in terms of content and technology.

3 Information Model

Taking these considerations into account WalkOnWeb has defined a new information model for flexible electronic publishing of recreational routes. A walk ontology was developed for this purpose. Using an innovative software engineering process this ontology was then converted automatically to Java business objects and mapped to a relational database. This paved the way for practical application development.

The figure below depicts the information model developed during the project. Using topographic map data as a basis an author creates a networks of paths on which hiking is possible, nice, safe, legal, etc. The author then

enriches the map data further by linking all kinds of information to a route: points of interest, pictures, texts, and others. The *walk ontology* includes concepts for many of these information items. For example: practical info could be “keep dogs on leash”, “hunting season” or “dangerous crossing”.

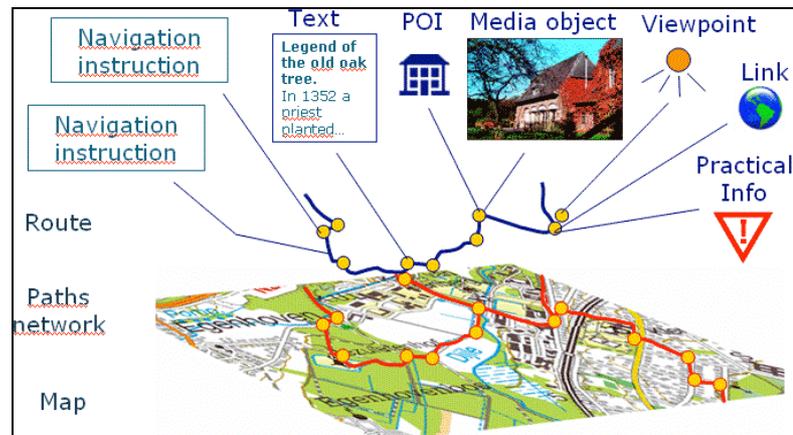


Figure 1: WalkOnWeb information model

In addition a navigation ontology was created to allow a new way of describing navigation instructions. Taking into account costs involved in traditional multilingual publishing this approach allows authors to describe a route in a language independent way, using a set of predefined ontology concepts (“building blocks”). We have first developed this ontology in theory (described in [2]) and then brought it to practice in two applications: the Walk Planner and the Authoring Tool.

4 Real-life Applications

On the "Walk Planner" website hikers can search for hiking trails using criteria like duration, difficulty, child friendliness and geographic location. All walks are shown on a geographic map using SVG. Hikers can also compose their personal walk based on parts of existing trails (see Figure 2, where the user has composed a walk from the green flag up to the red flag). Finally they can export detailed information for a walk to paper, electronic document or mobile device. This publication happens on the fly, based on user preferences: language, type of information, starting point and walking direction. For navigation instructions this means that the system generates a readable text from the navigation ontology concepts that the author has selected.



Figure 2: Walk Planner: compose a walk

With the "Authoring Tool" application authors are able to create and describe routes in a language independent way. This means that they apply the model depicted in Figure 1 and use ontology concepts for describing the details of the itinerary.

Notes and References

- [1] PAEPEN, B et al. *WalkOnWeb project website*. www.walkonweb.org Leuven, 2006.
- [2] PAEPEN, B; ENGELN, J. *Using a Walk Ontology for Capturing Language Independent Navigation Instructions*. In ELPUB2006. Digital Spectrum: Integrating Technology and Culture - Proceedings of the 10th International Conference on Electronic Publishing held in Bansko, Bulgaria 14-16 June 2006 / Edited by: Bob Martens, Milena Dobrova. ISBN 978-954-16-0040-5, 2006, pp. 187-196

