Chapter 12
CRUZAR: An Application of Semantic Matchmaking to e-Tourism

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EXECUTIVE SUMMARY

This chapter describes CRUZAR, a Web application that builds custom tourism routes for each visitor to the city of Zaragoza. This application exploits expert knowledge of the tourism domain (captured in rules and ontologies) and consumes a consolidated repository of relevant tourism resources (RDF instances extracted from different legacy databases: historical buildings, museums, public parks, restaurants, cultural events...). User profiles and interests, as well as user-defined constraints, are modeled with an ontology. A semantic matchmaking algorithm is applied to find the most interesting resources for each profile, and a planner organizes the selections into an optimal route. The authors discuss the main challenges and design choices.

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The web is a big showcase for tourism. Nowadays, many tourists plan their trips in advance using the information available in web pages. Cities compete against each other to offer the most attractive and complete information and services through the tourism section of their web sites. This competition often leads to information-bloated and multimedia-rich web sites which resemble digital versions of printed brochures.

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Every potential visitor is served with the same information on the web, regardless of his profile. On the other hand, when visitors enter a tourism office in the real world, they can obtain customized information and recommendations based on their profile and desires.

CRUZAR is a web application that uses expert knowledge (in the form of rules and ontologies) and a comprehensive repository of relevant data (instances) to build a custom route for each visitor profile. While some cities have compiled a few predefined routes for the most common profiles (such as “Visit Zaragoza in just three days”), CRUZAR can potentially generate an infinite number of custom routes and it offers a much closer fit for each visitor’s profile.

Tourism officials often desire to provide attractive and innovative services to promote the city, its tourism infrastructure and to increase the number of visitors. On the other hand, administrations, like city councils, would like to extract the most profit from the IT resources they already have. However, the deployment of new added value services is often hampered by the issue of integrating data coming from different sources (and parties). Moreover, recent history of the Web has shown increased value of contextualized services and targeted information. We demonstrate how semantic technologies can fulfill both aspects of the challenge: data integration and user contextualization.

There are a number of reasons that make Zaragoza (Spain) an excellent test bed for CRUZAR. In the first place, Zaragoza has a high density of POIs: its city center is packed with remarkable buildings, art galleries, sculptures and historical remains. Even more interestingly, these POIs cover a wide range of artistic styles and ages dating back to the Roman Empire, and therefore, they can attract a wide spectrum of visitors. Zaragoza is one of the biggest cities in Spain, and it enjoys a very dynamic cultural agenda, as well as frequent top-level sport events. Finally, the city council has extensive databases which contain descriptions of all these resources.

The CRUZAR system is split in the following three stages. The complete process is also shown in Figure 1:

1. Data Integration. At this stage, a unique access point to all the available tourism information is provided to the system. The result of this process is a coherent and integrated data model, build upon the partial descriptions of resources stored in independent and heterogeneous information repositories of the city council of Zaragoza.

2. Recommendation Algorithm. CRUZAR provides a web form where the user profile is captured, essentially her preferences and the trip context. Preferences, in conjunction with the previous integrated descriptions of tourism resources, are used by CRUZAR to suggest and to recommend the most suitable places for her visit.

3. Planning Algorithm. At this last stage, the system generates a customized route for the visitor. By the way, CRUZAR not only considers the distance between the POIs, but also the subjective interest of tourism resources, previously calculated, the particular circumstances of the trip (number of visitors or trip dates) and other relevant aspects for the route, such as opening and closing time of museums and churches.

The rest of the article is organized as follows. Data acquisition and representation is covered in the next two sections: Semantic Integration of existing databases describes how different sources of data were integrated using ontologies and the section User Profiling introduces the user profile ontology. Extending poi and profile descriptions with rules covers the extension of the data using rules. The route generation algorithm is the subject of route generation, while the user-defined constraints are addressed in the section Route customization. Section Related work reviews some interesting related work,
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