A Semantic Framework for Touristic Information Systems

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EXECUTIVE SUMMARY

The Web is a crucial means for the dissemination of touristic information. However, most touristic information resources are stored directly in Web pages or in relational databases that are accessible through ad-hoc Web applications, and the use of automated processes to search, extract and interpret information can hardly be implemented. The Semantic Web technologies, aiming at representing the background knowledge about Web resources in a computational way, can be an important contribution to the development of such automated processes. This chapter introduces the concept of touristic object, giving special attention to the representation of temporal, spatial, and thematic knowledge. It also proposes a three-layered architecture for the representation of touristic objects in the Web. The central part is the domain layer, defining a Semantic Model for Tourism (SeMoT) to describe concepts, relationships, and constraints using ontologies. The data layer supports the mapping of touristic information in relational databases into Resource Description Framework (RDF) virtual graphs following the SeMoT specification. The application layer deals with the integration of information from different data sources into a unified knowledge model, offering a common vocabulary to describe touristic information resources. Finally, we also show how to use this framework for planning touristic itineraries.

1. INTRODUCTION

The touristic communities, the suppliers of touristic information, and other groups of interest, namely the consumers of touristic information, rely on the Web for exchanging ideas, information and knowledge. In this sense, the touristic information resources made available by these communities have increased exponentially. These resources about recommended or advertised touristic objects, are mostly specified in a syntactic manner, complying with the grammatical rules of the language in use and guided towards the structuring of the content. Thus, the current structure of the Web, which discloses touristic phenomenon using mainly syntactic and structured, semi-structured and non-structured resources, is short on the schematisation of data and is not able to ensure effective and comprehensible information retrieval, transfer, search and automated processing. Hence, the role of the Semantic Web emerges to contribute to the organisation of knowledge through significance (or meaning), purpose and context of use. In other words, the Semantic Web can establish a bridge or a mapping of meanings, through specific (thematic) areas of speech associated with the touristic phenomenon. These meanings enable computational agents to filter, aggregate and transform knowledge autonomously.

This chapter highlights the role of the integration of information for each (sub) domain involved in the touristic phenomenon, and puts in evidence the importance of the availability of semantically enriched information to the agents involved in the touristic phenomenon, in particular, to the touristic web-users (tourists). These users look for singularities and recreational aspects on available and recommended touristic objects, according to their preferential, motivational and restrictive patterns. The quality of the data retrieved to answer user queries depends on the schematisation of the data sources (particularly, relational databases schemas), as well as on the methods of integration or mapping to be used to resolve the heterogeneity of the touristic data at different levels: the syntactic level, the schematic level and the semantic level. The challenge is to integrate touristic information from different data sources at the schematic level (here we try to use unified data representation schemas to map different concepts from several areas of knowledge) and the semantic level (with the additional use of vocabularies (ontologies) in the integration of data).

This chapter is organised as follows. Section 2 presents an overview on the main semantic information systems proposed for the touristic domain. Section 3 introduces the concept of touristic object and presents a semantic model for tourism based on three main dimensions: thematic, spatial and temporal. Section 4 presents an ontological architecture to handle the semantic interoperability among distinct data sets. Section 5 deals with the mapping of relational data sources into RDF data models and the integration of RDF data models. Section 6 gives some examples that use

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