Chapter 130
Semantic Enrichment for Geospatial Information in a Tourism Recommender System

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ABSTRACT

Geospatial information is commonly used in tourism to facilitate activity planning, especially in a context of limited information on the territory, as it is common in the case of complex and heterogeneous tourism destination regions where the constrained spatial activity of visitor is likely to generate inefficiencies in the use of assets and resources, and hinder visitor satisfaction. Because of the large amount of spatial and non-spatial data associated with different resources and activities, it is a logical choice to use geographic information systems (GIS) for storing, managing, analyzing, and visualizing the data. Nevertheless, in order to facilitate personalized recommendations to visitors, interaction with Artificial Intelligence is needed. This chapter presents SigTur/E-Destination, a tourism recommender system based on a semantically-enriched GIS that provides regional tourist organizations and the industry with a new powerful tool for the sustainable management of their destinations. The recommendation system uses innovative Artificial Intelligence techniques, such as a hybrid method that integrates content-based and collaborative filtering and clustering methodologies that improve computational time.

INTRODUCTION

Once tourists have full information about the location, access, quality of the attractions, and complementary services in a destination region, they are more likely to organize their stay in a way that matches their interests. Moreover, an efficient design, organization, and communication of opportunities in the region may lead to a more balanced tourism activity, spatially, thematically and financially, with important returns in terms of sustainable development.

However, once this knowledge has been acquired, it is then necessary that destination management organizations provide the necessary infrastructure to facilitate the spatial activity of visitors. In this sense, the fusion of Artificial Intelligence and GIS in a recommender system provides the appropriate response to this challenge. These technologies allow users to reduce and make more effective their travel planning time by receiving personalized assistance (Ricci, et al., 2009).

Recommender systems are emerging as important elements in the development and management strategies of destination regions and cities, with increasing degrees of sophistication. This chapter presents SigTur/E-Destination, a tourism recommender system developed by the Science and Technology Park of Tourism and Leisure of Vila-Seca, based on the interaction of GIS and Artificial Intelligence algorithms. On one hand, GIS enable to store large collections of geospatial information related to tourism and leisure activities. On the other hand, Artificial Intelligence techniques, such as ontologies, provide semantic integration of geospatial information within the recommender system, while content and collaborative methods provide personalized recommendations. SigTur/E-Destination makes the whole range of products and itineraries accessible to visitors that plan their visits in the region of Costa Daurada and Terres de l'Ebre, as well as to those that being already there want to enjoy richer experiences. The system provides users with a great range of possibilities to identify leisure activities according to their profile and, beyond that, facilitates the planning of the trip and the decision-making process before and during the stay.

This chapter aims to provide a new perspective of the usage and combination of Geographical Information Systems and Artificial Intelligence, focusing on the experience of the project SigTur/E-Destination. The rest of the chapter is organized as follows: first, an analysis of previous related works is presented; then, the SigTur/E-Destination system is introduced, paying special attention to geospatial-tagged activities and how they are handled by the recommender; finally, a set of future lines of research is also devised.

BACKGROUND

The constant evolution of Information Technology has created new opportunities in the systems of resource management and tourism services online. The emergence of the Semantic Web and the increasing presence of geospatial information in applications for the general public have opened new perspectives in the way of providing tourism activity planning. In the following, it is analyzed how GIS and Artificial Intelligence are applied to tourism resources management.

GIS and Tourism

Geographical Information Systems (GIS) are defined as information systems used to input, store, retrieve, manipulate, analyze, and output geographically referenced data or geospatial data in order to support decision making for planning and management (Goossen, et al., 2009). GIS are applied in most fields where the object of study has a spatial representation over the territory. GIS are equally useful in tourism, which consists of a wide variety of aspects, including facilities, activities, services, and industries, which deliver a travel experience. Spatial data play an

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