Tourism Destination Web Monitor: Beyond Web Analytics

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Abstract

The present technology-mediated world where the information flows from the physical to the cyber world, and vice versa, press a converged world accelerating the emergence of a **new paradigm**. It provides a novel ways to identify the most relevant information and prompts a new competitive environment. As a result, destination's stakeholders are needed of innovations to support intelligent visitor monitoring in order to anticipate and improve their performance. This paper presents an enhanced system for measurement, analysis and modelling of destination digital visitor named DWM.

Keywords: Tourism Destination Web Monitor; Web Mining; Web Analytics; Business Intelligence

1 Introduction

The present time has been recognized as a technology-mediated world, with computing and communication entities interacting among themselves, as well as with users. In this technology-rich scenario, real-world components interact with cyberspace thus driving towards what some scholars have called the Cyber-Physical World (CPW) convergence (Conti et al., 2012). Information flows from the physical to the cyber world, and vice versa, adapting the converged world to human behaviour and social dynamics. How to transfer information and knowledge from the cyber world toward the physical one is not obvious. This opens up the field for the creation of innovative research and advanced services to better understand and interact with the surrounding physical world as well as the social activities.

At this moment it is seeing a confluence of practices and technologies into Business Intelligence based on Internet that enable organizations intelligent actions to address time-sensitive business processes and benefit from analytics. As result, the new situation provides the opportunity to anticipate and estimate consumer habits on a changing environment (Alzua-Sorzabal, Gerrikagoitia, & Torres-Manzanera, 2013).

The change has brought new means of communication, characterized by a decentralized set of communication networks allowing fast, economical, direct and ubiquitous collections and generation of information. Hence, people are empowered to express, share, create, consume, and organize information in a new manner. Thus, the mass media comes into view as suitable tool to develop communication strategies within the context of strategic marketing.

The importance of Internet as mass media in the field of tourism is that it constitutes an important channel of marketing institutions and business network of the tourist

destinations, providing huge volumes of information available to potential tourists (Buhalis & Law, 2008). The new technology-mediated environment not only provides destinations a new means of promotion and enhancement of tourist activities but also, new means of learning about the tourist taste and preferences. Advance solutions, tolls and metrics, play a very important role in this process of developing a deep understanding of the present and future visitor. Beyond traditional web analytics, destination´s stakeholders are needed of innovations to support the intelligent monitoring of the visitors, in order to anticipate and improve their performance. DMO *(Destination Management Organization)* must find out to whom, to what, to how and to when to refer to the visitor.

In this context, CICtourGUNE (*Centre for Cooperative Research in Tourism*) has designed an enhanced system for measurement, analysis and modelling of destination *digital visitors* named DWM (*Destination Web Monitor*). This research note presents the technological fields which have been incorporated in recent years on the web sites of the DMOs and it defines the DWM and its scope.

2   Related work

The DMOs invest many resources: time, effort and money in order to have a presence on the internet; but very few of them are studying the subsequent processes of management, maintenance, improvement and exploitation of this appearance (Wang & Fesenmaier, 2006). Even though new disciplines appeared in the last decade, such as, Web Mining in order to move forward in discovering and analysing useful information from web sites (Agarwal, Bharat Bhushan Dhall, 2010). It implies areas and technologies related to information management and retrieval, artificial intelligence, machine learning, natural language processing, network analysis and integration of information (Wang, Abraham, & Smith, 2005). Currently three approaches can be recognized: Web Usage Mining, Web Content Mining and Web Structure Mining.

Web Usage Mining techniques are based on the process of discovering patterns of usage on web data (Iváncsy & Vajk, 2006). It is about getting users profiles inferring unobservable information about the user from their observable information. It is particularly interesting to discover the paths that are rarely followed by the visitor or the crossing of them among the most visited.

Within the second group, the Web Content Mining techniques define processes that try to discover useful information from the content of web pages (Srivastava, Desikan, & Kumar, 2005). At present, researches are turning their attention to Web Multimedia Mining techniques, which seek to recognize and select the images and video sections of interest (Ocaña, Martos, & Vicente, 2002).

Web Structure Mining techniques are focused on inferring knowledge from websites through the "links" that they host. In this context it underline the work carried out by (Piazzi, Baggio, Neidhardt, & Werthner, 2011). The existing literature on the diverse Web Mining techniques applied to tourism destination shows that the acquired information about the behaviour of visitors, allows to customize the navigation scheme and/or the content to new visitors according to previously defined behaviour

patterns. More recent studies are using the implementation of a script on the websites (Plaza, 2011; Arbelaitz et al., 2013) in detriment the analysis performed on the log of the server where the site is hosted.

3 The DWM System

Destination Web Monitor, DWM, is defined as "*A system to measure, analyse and model the behaviour of visitors in different virtual areas (region, territories, tourist brands, associations, capitals, districts, municipalities) in which a destination is promoted and with the objective of providing benchmarking ratios that facilitate strategic surveillance and intelligent marketing policies*". MWD contributes to gain a holistic understanding of the destination; that facilitates the extraction of explicit and tacit knowledge of the networked system comprising different sites in its two aspects: relations between them and the interaction of the visitor in each of them.

The design of the DWM satisfies the five levels of the Web Analytics maturity model (WAMM) (Gassman, 2008); a set of best practices that it covers the entire lifecycle of a product or service from conception to delivery and maintenance. Professional Web Analytics tools, whose degree of maturity is positioned in the technical details (Level I), respond to basic questions such as: fractional number of visits by nationality and location; engine search references other websites, direct traffic, social networking; number of unique users; number of new visits versus number of concurrent visits; number of hits per page, number of visited pages, pages viewed by language, ratio of pages per visit, bounce rate number, etc. (Peterson, 2006).

In addition, the maturity level of the DWM base allows formulating more elaborated questions, as the one collected in

Table 1. These enriched answers are displayed on a scoreboard that displays data on the performance, behaviour and, trends and predictions. The generic indicators of performance include workload, efficiency, effectiveness and productivity. The behaviour indicators respond to the behaviour of visitors and the generic indicators over trend and prediction are focused on discovering new preferences and projections focusing on the visitor and the behaviour.

Table 1. Questions that are answered by applying KDD techniques to DWM

QUESTIONS	TECHNICAL
What do our users?	Sequential patterns
What do they like most and which least?	Association rules or patterns frequently
How have they found? (Entry platform, etc.)	Analysis of classification
Are there groups differentiated by origin?	Analysis of clustering and classification analysis
What are the most common profiles by origin/topic?	Association rules or patterns frequently
Are there behaviours differentiated by origin/topic?	Clustering and other statistical techniques
What are the most common tour paths?	Sequential patterns
What is the user behaviour over time? Comparison between periods, trends, etc.	Other statistical techniques

What are the buying habits of tourists?	Analysis of classification and association rules or patterns frequently
What are the features they have in common successful products and services?	Association rules or most frequent patterns and other statistical techniques

4 Conclusions and future work

Internet and the web presence of the DMOs have broken heavily on custom and everyday uses for travel research as well as moderator of the image formation and the willingness to travel to a destination. Intelligent systems in the tourism, as it is the case with DWM, support tourism organizations to better understand the business environment and potential customers. The new generation of information systems provide a novel ways to identify the most relevant information, greater decision support, greater mobility and ultimately, greater enjoyment of the tourist experience (Gretzel, 2011).

The DWM as a platform for competitive intelligence improved online marketing strategies. The DMO´s decision making will be supported by evidences on the effect of marketing strategies as far as on attracting new customers, increase the degree of loyalty of the visitors, launching programs to encourage the spontaneous recommendations. In this way, the user is at the centre of the system and their behaviour with the DMO site is interpreted in a quantitative and qualitative mode.

Future efforts in the investigating of the architectures and the algorithms that exploit the data within DWM promise to lead us to the next generation of intelligence within website of the DMO.

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