Hyperlink Structure of Electronic Commerce Websites

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INTRODUCTION

The rapid growth of Internet and World Wide Web (WWW) has made drastic changes in many aspects of commerce world. Commercial companies have recognized the online business opportunities and are investing huge money in creating a user friendly and high quality Websites. These Websites are ultimately serving as the virtual stores of the brick and mortar companies on the Web (Flavian, Gurrea, & Orus, 2009). For online consumers, Website is the only channel to search out information about a product or service and to do online transaction (Hernandez, Jimenez, & Martin, 2009). A well-designed e-commerce Website creates a professional image of the company and enhances its credibility among shoppers (Kuzic, Giannatos, & Vignjevic, 2010).

WWW has facilitated many small and medium sized companies, to enter into the International market that is otherwise inaccessible physically. These types of companies are constrained with financial barriers, otherwise will be known only to the local region or country. As a result, the design of the Website plays a crucial role in the success of online business. Today buyers can search for products and/or services very easily and if they are not satisfied with the virtual store they can reach the competitor's website within a few clicks and at no extra cost (Lituchy & Barra, 2008). This feature of the Web has created a big challenge for e-commerce companies in attracting prospective visitors to their Website. Hence there is a need to identify the different ways to increase visibility of an e-commerce Website. This chapter attempts to find a solution for this challenge from Web structure mining in particular Webometrics perspective.

BACKGROUND

The World Wide Web is a complex and growing structure that exhibits strong patterns regardless of its dynamic nature and diversity. A systematic study about the WWW gives a macro level picture of the Web. To understand the Web to its micro level, studies are needed at the level of individual Websites. Understanding of Website structure is considered as a reverse engineering process that attempts to discover automatically the layout and hyperlink pattern of a Website. This knowledge helps in improving the architecture of the Website layout and the organisation patterns of the Web pages. Recently Web structure mining research has gained increasing attention in the light of the on-going growth of WWW, particularly in the commerce domain. This chapter reviews the existing studies on the applications of Web structure mining (WSM) and critically evaluates the methods and techniques that are applied to understand the hyperlink structure of e-commerce Websites.

Web Structure Mining (WSM) Research

WSM represents mining the hyperlinks between inter and intra Websites to understand the overall structure to extract patterns in the information architecture. Exploitation of hyperlink structure of the Web allows the identification of interesting information, such as the patterns linking the Web pages, and Websites, ranking and classifying of Web pages based on hyperlinks (Lappas, 2007). Hyperlink structure analysis of the Web is used as a basis to obtain search results (Espadas, Calero, & Piattini, 2008). Search engines use the hyperlinks to identify more relevant Web pages by ranking based on the number of links pointed to a Web page (Kosala & Blockeel, 2000). One of the well-known examples is the commercial search engine Google's, page rank algorithm which uses hyperlinks to rank the Web pages for a specific keyword search (Brin & Page, 1998). The Web page that receives more incoming links relatively is ranked higher than other similar Web pages.

Hyperlink structure has been studied and used in information retrieval algorithms to rank search results on the Web (Vaughan & You, 2005; L. Yan, Wei, Gui, & Chen, 2011). Statistical analysis of Web page links has been conducted by (Becchetti, Castillo, Donato, Baeza-Yates, & Leonardi, 2008) and they proposed spam detection techniques that are only based on the link structure of the Web page irrespective of the contents. Some studies have exploited commerce domain Websites' hyperlinks and found that the number of links pointing to a commerce company's Website is correlated with the company's business information such as revenue, profit and research expenses (Romero-Frias & Vaughan, 2010; Vaughan & Wu, 2004; Vaughan, 2004a). The findings of these research works suggest that hyperlinks to commercial Websites could be used as a business performance indicator. This knowledge is useful for competitive business intelligence and Web data mining.

Importance of Hyperlink Structure

Hyperlink structure is created when a connection is established between inter and intra Websites by linking individual Web pages. Hyperlinks of a Website can be further classified into external and internal, based on their connectivity type (Petricek, Escher, J.Cox, & Margetts, 2006; Petricek, 2007). The external hyperlink structure of a Website refers to the relationship of the target Website with other Websites on the Web. Thus external hyperlink structure is created when there are links pointing to or from the target Website to other Websites. This external link can be divided into external incoming link (inlink) and external outgoing link (outlink) considering its direction of linking. Hyperlink that points to a Website from other Websites is known as the external inlink and link that is pointing to other Websites is called as external outlink. Studies showed that external links have hidden information because they are created by individuals or organisations who think that linking to a Website is important or related with their business or interest. Existing studies have demonstrated that, Webometric analysis method can be applied to external hyperlink structure to extract valuable information (Holmberg & Thelwall, 2009; Lorentzen, 2014; Romero-Frias & Vaughan, 2010).

Webometric Analysis of Hyperlink Structure

Webometric study is originated from Information science research area, aimed to study the Web-based phenomena from hyperlinks data. Almind and Ingwersen named this field of study as 'Webometric' (Almind & Ingwersen, 1997). Bjorneborn and Ingwersen defined Webometrics as "the study of the quantitative aspects of the construction and use of information resources, structures and technologies

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