Semantically Linking Information Resources for Web-Based Sharing

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ABSTRACT

Digital information resources on the web have been playing an important role during the information and knowledge propagation. Advanced applications such as intelligent information retrieval and information recommendation need the semantic relations among the digital information resources. Massive hyperlinks have existed in the current web; however, the semantic relations among the information resources are implicit or missing, and this has hindered the efficiency and effect of information sharing and information reuse, so it is necessary to evolve the hyperlinks to semantic links for enhancing the semantic connections between information resources on the web. Implicit and missing semantic links among the digital information resources are needed by the intelligent applications. In this paper, the authors propose an approach to enhance the semantic associations among digital information resources for realizing a semantic linked web. Applications based on semantic links are discussed and compared with applications on the current web. The semantic linked web can be regarded as a promising stage in the way to the semantic web.

Keywords: Digital Information Resources, Information Sharing, Relationship, Semantic Link Network, Web Information Resource

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INTRODUCTION

Digital information resources become popular and play an important role in the work and daily life of people in the Internet age. Digital information resources have been shared quickly and widely on the Internet. Information sharing is mainly promoted by communication technologies and the HTTP mechanism of the Web. HTTP has been used to connect the digital information resources identified by the URI. Study the rules of connections between information resources is very important for promoting the information sharing. Improving the shortcomings of the current linking mechanism has been the hot research topic of building the intelligent web applications.

Relationships are crucial for organization and search of information. Hyperlinks have connected web resources into a huge global information network. Each hyperlink means a certain association between the connected resources. Each resource in the web is represented by a URI. Semantic association is closely related to the cognition, and it is a cognitive concept. When a concept or a word is mentioned, some associative concepts will occur in people’s mind. For example, when “car” is mentioned, the word “gasoline” will occur, and then semantic associations exist between “car” and “gasoline”. The semantic association can be explained with different specified relationships, such as “gasoline in car” and “car use gasoline”. Relationships are the specified semantic associations, while the semantic association is more general.

Semantic relationships are implied in the hyperlinks between URIs. For example, friend, classmate and relatedness exist between two persons, sequential and causeEffect exist between two web pages, and partOf and subclass could exist between two resources. However, these relationships have not been represented by the hyperlinks explicitly and directly, which has hindered the efficient sharing and understanding of information. It is necessary to find a new way to represent the relationships between web resources and make the information sharing more effective. To make the relationships among web information resources explicit, it is necessary to change the hyperlinks into semantic links. One possible way is to attach semantic relationships on the hyperlinks.

Some semantic connections between online and offline information resources are missing. Shared digital information resources on the Web are only a small part of the digital information resources in the world. More resources are stored in folders of users and lack of relationships. Private resources and their relationships formulate a semantic link network, and it could be merged into the semantic linked web by establishing the bridged semantic links or sharing resources in the existing web. The status of the connections between digital information resources is as follows: (1) connections between online information resources: hyperlinks have connected online resources, but some semantic links between the information resources are missing; (2) connections between offline information resources: the hyperlinks and semantic links among offline resources are both missing. The Web has connected online resources, while more offline information resources are stored in the personal computers. Offline information resources are even more than the online information resources. Online web resources and offline information resources are tightly connected during our work and life. So it is necessary to organize the online and offline digital resources together. If offline information resources become online resources, the information will be richer for users to choose, and the decisions could be made with more background information.

Offline resources could enter the web by constructing connections to online information resources. One way is establishing semantic links to connect the existing information resources in the web, and another way is publishing folders that contain resources as a sub-directory of a website. The former way adds semantic links manually by the authors of websites, while the latter enables the resources to be visited, but the semantic links between resources are implicit. The latter way is not