Semantic Layering with Magpie

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Summary. Web browsing involves two tasks: finding the right web page and then making sense of its content. So far, research has focused on supporting the task of finding web resources through ‘standard’ information retrieval mechanisms, or semantics-enhanced search. Much less attention has been paid to the second problem. In this paper we describe Magpie, a tool which supports the interpretation of web pages. Magpie offers complementary knowledge sources, which a reader can call upon to quickly gain access to any background knowledge relevant to a web resource. Magpie automatically associates an ontology-based semantic layer to web resources, allowing relevant services to be invoked within a standard web browser. From this perspective, Magpie may be seen as a step towards a semantic web browser. The functionality of Magpie is illustrated using examples of how it has been integrated with our lab’s web resources.

27.1 Introduction

Browsing the web involves two main tasks: finding the right resource and making sense of its content. A significant amount of research has gone into supporting the task of finding web resources, either by means of ‘standard’ information retrieval mechanisms, or by means of semantics-enhanced search [11, 17]. Less attention has been paid to the second problem, supporting the interpretation of web pages. Annotation technology [15, 21, 25] allows users to associate meta-information with web resources, which can then be used to facilitate their interpretation. While this technology provides a useful way to support group discussion and shared interpretation, it is nevertheless very limited. Annotation is normally carried out manually, which means that the quality of the sensemaking support is dependent on the willingness of stakeholders to provide annotation and their ability to provide valuable information. This is of course even more of a problem, if a formal approach to annotation is assumed, based on semantic web technology [1].
This chapter describes Magpie, a technology supporting the interpretation of web pages. Magpie acts as a complementary knowledge source, which a reader can call upon to quickly gain access to any background knowledge relevant to a web resource. Magpie follows a different approach from that used by the aforementioned annotation technology: it automatically associates a semantic layer to a web resource, rather than relying on manual annotations. This process relies on the availability of an ontology [10], an explicit, declaratively specified representation of a domain of discourse. Ontologies are the cornerstone of the emerging semantic web: they provide the conceptual interoperability needed to allow semantic agents to make sense of information on the web and to collaborate with other semantically aware agents. Magpie uses ontologies in a similar way: to make it possible for Magpie to associate meaning with the items of information found on a web page and then, on the basis of the identified meaning, to invoke the relevant services, or offer the user the appropriate functionalities.

The Magpie-mediated association between an ontology and a web resource essentially provides an interpretative viewpoint or context over the resource in question. Indeed the overwhelming majority of web pages are created within a specific context. For example, the personal home page of a member of the Knowledge Media Institute would have normally been created within the context of that person’s affiliation and organizational role. Of course, some readers would be very familiar with such context, while others would not. In the latter scenario the use of Magpie is especially advantageous, given that the context would be made explicit to the reader and context-specific functionalities will be provided. Because different readers have differing levels of familiarity with the information shown in a web page and with the relevant background domain, they require different levels of sensemaking support. A semantic layer in Magpie is consequently designed with a specific type of user in mind.

In a seminal study of how users browse the web, Tauscher and Greenberg [24] found the following statistics on the types of actions users typically carry out:

- 58% of pages visited are revisits,
- 90% of all user actions are related to navigation,
- 30% of navigation actions are through the ‘Back’ button,
- less than 1% of browsing actions use a history mechanism.

A fairly obvious conclusion of these statistics is that web users need support in capturing what they have seen previously. Current history mechanisms, ‘Back’ button aside, are of little help. Magpie, automatically tracks interesting items found in a browsing session within a semantic log. The semantic log allows trigger services to be created, which are activated when a specific pattern of items has been found. One type of trigger service offered in Magpie is a collector, which collects items from a browsing session using an ontology-based filter; e.g., displaying all instance of a particular class satisfying a given condition. The following sections present several examples of the collectors as well as the illustration of sensemaking support through semantic services.