Towards Web Usability: Providing Web Contents According to the Readers Contexts

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Abstract. Web usability has been considered as a key issue to the success of the Web. However, Web readers typically face difficulties since Web pages are presented according to the local contexts of Web authors. Web authors and readers follow their own local contexts to represent and interpret Web contents as they originate from different communities. Hence, there is a need to transform Web contents created according to the authors' contexts into the different contexts of their readers.

In this paper, we aim at presenting a solution that provides Web contents according to the reader's context. Our solution is based on an explicit representation of the authors' and readers' local contexts. We rely on RDFa to annotate contents with the author's context and we provide an adaptation process on the client-side that generates contextualized Web contents according to the readers' contexts. We validate our approach through a Firefox extension.

1 Introduction

Recently, the Web has successfully evolved into a "semantic" Web, where *Web authors* can describe Web contents with semantic information such that software applications (e.g., Web browser) can interpret them and hence handle *Web readers'* requests more effectively. For instance, a Web author may describe Web contents such as *events* with semantic information such as *starting date* and *ending date*, *location*, etc. Accordingly, a reader application can search, aggregate, or export any events with respect to a specific day or a location.

Open Data in XHTML is a bottom-up approach towards the semantic Web (called small-s semantic Web). small-s reuses the current Web as it is and relies on the authors to annotate their contents with semantic metadata, so that the former become machine interpretable. In this field, the main emerging technologies are RDFa and microformats [10]. Our previous work concluded that microformats are inextensible as they propose a finite set of specifications [8].

RDFa provides an abstract solution that aims at expressing RDF statements in XHTML documents. More precisely, RDFa provides a collection of XHTML attributes (reuses existing attributes such as *content* and *rel* and introduces new ones such as *about* and *property*) to embed RDF statements in XHTML, and provides processing rules to extract these statements.

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1.1 Web Usability and Local Context

The evolution of the Web raises new challenges, notably regarding *Web usability*. Our understanding of Web usability is derived from the ISO 9241-110:2006[1] specification. Web usability is defined as the effectiveness, efficiency, and satisfaction of the interaction between Web readers and Web pages. *Effectiveness* refers to the extent Web readers interpret Web contents accurately and completely. *Efficiency* refers to the efforts expended (e.g., time) to interpret Web contents effectively. *Satisfaction* refers to the readers' acceptance of the interaction.

In this sense, interactions between Web readers and Web contents are typically ineffective and inefficient. Indeed, authors and readers of Web contents originate from different communities. Web authors follow their local contexts for representing Web contents. This leads to an additional effort for the readers as they need to interpret these contents according to their own local contexts.

By *local context*, we mean a set of common knowledge shared by members of a community [11,2], like common language and common local or cultural conventions, such as measurement units, keyboard configurations and notational standards for writing time, dates, numbers, currency, etc. For instance, let us assume a French reader who needs to register to a summer school course on a Web site which is authored by a British author. In this context, the course price is in British Pound and follows the British currency format (e.g.: 1,234.50). As the French currency is Euro and uses a different format (e.g.: 1 234,50), the course price must be converted from British Pound to French Euro by the reader. Note that the situation can be even worse as the reader can misinterpret the attendance date of the course. For example, he could interpret the attendance date (e.g.: 07/08/2008) as the 7^{th} of August 2008 (following the French format) instead of the 8^{th} of July 2008 (following the British format).

1.2 Objectives

To enhance Web usability, we aim at resolving semantic discrepancies between contexts of Web authors and readers and at adapting context-sensitive contents (called adaptable Web contents) according to readers' contexts.

This paper is structured as follows. Section 2 presents our approach to annotate adaptable Web contents with authors' contexts and adapt them to readers' contexts. Section 3 discusses related works and Section 4 concludes the paper.

2 A Semantic Context-Based Approach with RDFa

This paper proposes a semantic context-based approach that relies on RDFa to annotate and adapt Web contents. This approach firstly introduces a set of adaptable concepts and a set of contextual attributes to specify the semantics of adaptable Web contents and the local contexts of Web authors and Web readers, respectively. Secondly, it exploits the idea of *semantic object*, which was detailed

[1] `http://www.iso.org/`