KawaWiki: A Template-Based Semantic Wiki Where End and Expert Users Collaborate

Kensaku Kawamoto, Yasuhiko Kitamura and **Yuri Tijerino**
Kwansei Gakuin University
2-1 Gakuen, Sanda-shi, Hyogo 669-1337, JAPAN
{kkensaku, ykitamura}@ksc.kwansei.ac.jp, yuri@tijerino.net

Abstract

This paper introduces a new Semantic Wiki authoring system called "KawaWiki" on which end users and Semantic Web experts can collaborate to author Semantic Web content. KawaWiki generates RDF descriptions from user-authored content by introducing an intermediate representation in the form RDF templates to hide the complexities of Semantic Web formalisms from end users. The Semantic content is then validated for consistency based on RDFS descriptions created by ontology engineers. KawaWiki enables ontology engineers to generate rich RDFS descriptions either by creating them from scratch or by associating them with concepts found in Semantic Web ontologies.

1 Introduction

Recently, several Semantic Wiki prototypes have been reported in the literature [2; 3; 4]. However, the main challenge for Semantic Wiki research remains to enable end users to author Semantic Wiki pages without having extensive knowledge about Semantic Web standards or about ontology engineering. This paper introduces a new Semantic Wiki system called "KawaWiki", which aims to provide a Wiki-like environment, where end users and Semantic Web expert can collaborate to author and publish useful and semantically consistent Semantic Wiki content associated to relevant RDF description.

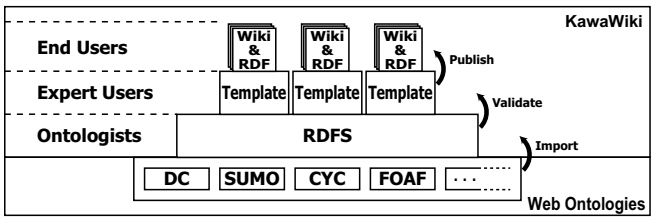

Figure 1: KawaWiki layercake.

2 KawaWiki Users

KawaWiki provides a Wiki-like, interactive environment where three types of users seamlessly collaborative to publish or modify Semantic Web content. The category and roles of these three types of users are summarized as follows:

- Ontology Engineers, who have expertise on Semantic Web ontologies, create a RDFS descriptions from scratch or by combining concepts from Semantic Web ontologies available in the Web. KawaWiki supports ontology engineers by providing tools for RDFS authoring and for associating the resulting ontology with other conceptual definitions found in Semantic Web ontologies.
- Expert users, who have basic knowledge of RDF, create RDF templates. KawaWiki provides tools to edit RDF templates and guarantees that they are consistent with the RDFS definitions by using a built-in validation mechanism.
- End users, who know nothing or little about the Semantic Web, author KawaWiki content through easy to use form-based interfaces automatically generated from RDF templates. The resulting content is in turn used to generate RDF-based content descriptions through the RDF templates. In this manner, KawaWiki allows users to focus on content authoring while effectively hiding the representational complexities inherent in the RDF formalism.

Figure 1 illustrates the relationships between these three types of users.

3 Authoring Content with KawaWiki

KawaWiki uses the RDF syntax as its Semantic Web description language. However, it conceals the complexity of the RDF syntax from end users by introducing an intermediate repesentation in the form of RDF templates. KawaWiki enables RDF experts to author RDF templates in the context of meaningful classes of Web pages such as "personal page" or "project page". These templates are consistent with RDFS definitions created by ontology engineers and are instantiated by end users through an automatically generated form-based content authoring interface.

As shown in Figure 2, RDF templates consist of RDF tags that have been generated automatically for the templates from RDFS descriptions. End users instantiate the templates by filling a form-based interface. For example, the blank text boxes are labeled with the appropriate name to show the type of the data associated with a particular concept on the RDF template definition. The RDF template can also constrain the value ranges of instance data by using regular expression or by specifying the range of corresponding resources in the RDF description.

Since KawaWiki generates editable form-based components based on RDF templates, end users need only to worry about the instance data required to complete the generation of meaningful classes of pages by filling in the text boxes, clicking on radio or check buttons, or by selecting from pull-down menus. After KawaWiki has validated the consistency of the end-user instantiations, it generates an RDF description for the content and at the same time the corresponding KawaWiki page. Figure 2, illustrates this process through a simplified RDF template used to author KawaWiki content and their corresponding RDF descriptions in the context research lab members using a FOAF ontology.

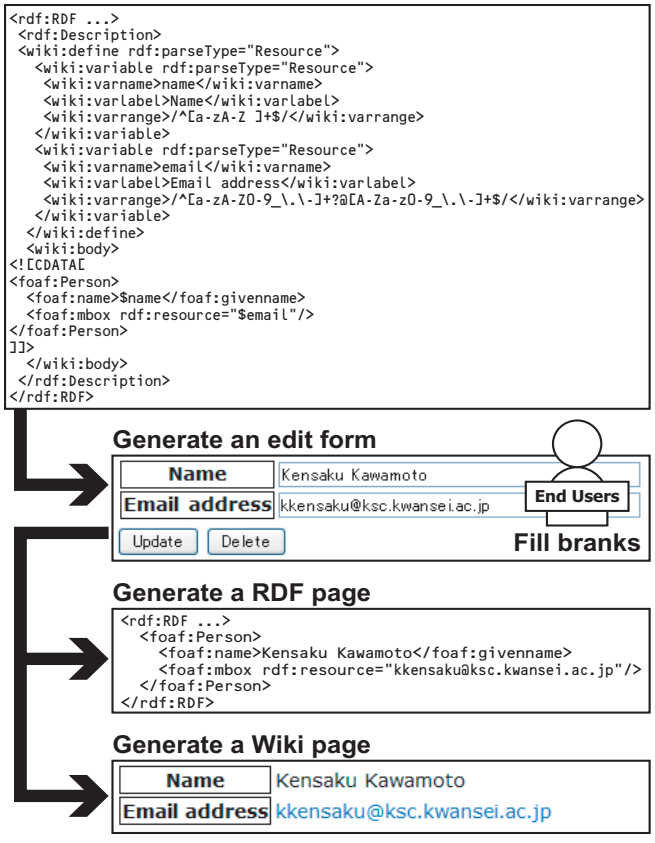

Figure 2: KawaWiki template system.

4 Validation Checking based on RDFS

Contrary to conventional Wikis, in which users sometimes produce inconsistent pages including errors and conflicting personal views, Semantic Wikis generated through the KawaWiki framework can produce semantically consistent pages by performing syntactic and semantic validation checking on the resulting RDF descriptions.

Whenever an expert user creates or updates a RDF template, KawaWiki checks its consistency with the RDFS description created a priori by the ontology engineers. If it finds any inconsistency with the RDFS, it indicates an error to the expert user and suspends the creation or the updates. Although this effectively prevents expert users from creating inconsistent RDF templates, we are expanding this method to provide meaningful guidance to better enable the expert users to create consistent RDF templates.

4.1 Reuse of Web Ontologies

KawaWiki enables ontology engineers to incorporate definitions from Semantic Web ontologies defined in standards such as DC, SUMO, CYC and FOAF in its RDFS and RDF-template definitions. This allows KawaWiki pages not only to be accessible to the universe of Web users, but also to interoperate with software agents, Semantic Web services and other Semantic Web based systems on the Internet.

Because RDF descriptions on KawaWiki pages is consistent with the RDFS descriptions via the RDF templates, in turn these RDF descriptions are also consistent with public Semantic Web ontologies when they are used in the RDFS descriptions. Furthermore, if the Semantic Web ontology is not enough to describe a particular KawaWiki site, the ontology engineers can expand the RDFS descriptions with internal definitions or by combining several Semantic Web ontologies into a broader RDFS description.

5 Conclusion

KawaWiki aims at providing an environment where end users, expert users, and ontology engineers can collaborate a various levels of abstraction to publish Semantic Web information in a Wiki-like authoring paradigm. We have developed a RDF template system to conceal the complex RDF syntax from end users and a validation checking mechanism to guarantee the consistency of RDF data. We are developing the Semantic Web ontology association mechanism at present time.

References

[1] Bo Leuf and Ward Cunningham. *The Wiki Way: Collaboration and Sharing on the Internet,* Addison-Wesley Professional, 2001.

[2] Roberto Tazzoli, Paolo Castagna, and Stefano Emilio Campanini. Towards a Semantic WikiWikiWeb. *Poster Track, 3rd International Semantic Web Conference* pp. 7-11, November 2004.

[3] Hideaki Takeda and Muljadi Hendry. Towards Semantic MediaWiki (in Japanese), SIG-SWO-A404-06, 2004.

[4] David Aumueller. Semantic authoring and retrieval within a Wiki. *2nd European Semantic Web Conference,* 2005.