SUMMARY OF Ph.D. DISSERTATION

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Title

Web Reengineering Utilizing Existing Resources toward Effective Development

Abstract

With dramatic improvements in computing power, network infrastructure, and data processing techniques, the role of the World Wide Web has been diversified. The importance of the web has increased, not only as a platform to exchange information, but in various fields, such as electronic commerce, remote education, and formation of communities. Such a diversified implies that the server-side architecture of web has been changed from the style of delivery of static contents to the dynamic contents and a means of providing interfaces for executing applications. Thus the more web becomes used for multi-purposes, the more server-side technology become complicated. Furthermore, evolving of web environment is remarkable taking into account the fact that various kind of client devices such as PDA, cell phones is used to access the web, various kinds of markup languages to describe web contents is emerging, a lot of client scripts such as JavaScript, Flash appears.

Along with this diversity, effective development of web becomes crucial. Not only utilizing forward engineering technology such as content management systems, development support tools, model driven development approach and so on, but also employing reengineering approach to reusing existing resources is necessary.

In the area of information delivery, it is effective to add metadata to the web contents describing hints in terms of the purpose of reuse such as adding meanings to ambiguous expressions for internationalization of the web. However, the lack of framework of annotation causes the high cost to reuse existing web contents. In the area of web applications, it is difficult to reuse existing application when migration of web application platform, such as migration from CGI to J2EE platform.

In this theme, firstly I introduce a framework to give annotations to web contents. This approach supports web contents' reuse without modification of the original contents. It realizes web contents adaptation for various kinds of information appliances such as cell phones or creation of portal site by users' preferences, for example. As an application of my approach, I introduce web transcoding to support access to web via small-screen devices. Then I also introduce web clipping technology to develop portal sites. These application shows that my proposed method effectively supports to reuse existing web contents.

Then, to establish an effective restructuring of existing web application, I propose a method for eliciting an MVC-based web application model. Web application development using an MVC-based web application model improves efficiency and reusability when restructuring an existing web application. However, there exists

many web applications developed without MVC model, and it is difficult to create web application models that clarify the whole behavior of these existing web applications only with analysis of the server-side resources. In this thesis, by using dynamic analysis focusing on the HTTP information exchanges, I clarify the whole behavior of a web application. I experimented with eliciting models from actual web applications. The results show that it is possible to elicit models that express the behavior of web applications by using the proposed method.

The two proposed methods can support to reuse existing resources in the area of both information delivery and web application toward effective web development.