

Chapter 40

Supporting Accessible User Interfaces Using Web Services

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ABSTRACT

Web services are an emerging technology that has attracted much attention from both the research and the industry sectors in recent years. The exploitation of Web services as components in Web applications facilitates development and supports application interoperability, regardless of the programming language and platform used. However, existing Web services development standards do not take into account the fact that the provided content and the interactive functionality should be accessible to, and easily operable by, people with disabilities. This chapter presents a platform named myWebAccess, which provides a mechanism for the semi-automated “repair” of Web services’ interaction characteristics in order to support the automatic generation of interface elements that conform to the de facto standard of the Web Content Accessibility Guidelines 2.0. myWebAccess enhances interaction quality for specific target user groups, including people with visual and motor disabilities, and supports the use of Web services on diverse platforms (e.g., mobile phones equipped with a browser). The Web developers can build their own design templates and the users of myWebAccess can create a personalized environment containing their favourite services. Thus, they can interact with them through interfaces appropriate to their specific individual characteristics.

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INTRODUCTION

The number of World Wide Web users is growing steadily over the last decade, and its usage is permeating all aspects of daily life. The web has a great potential to improve the quality of life of citizens, by facilitating the provision of services in basic aspects such as employment, education, marketplace and health. Especially for citizens who face barriers in accessing physical services, the web, if utilized properly, offers one – and perhaps the only – alternative solution. These citizens include:

- People with disabilities, who constitute more than 10% of the world's population. About one billion of people face problems of physical access on a daily basis¹.
- Aging people, whose number is increasing to the point where one in five people in the European Union is considered elderly².
- Citizens with temporary inability to exploit some senses due to health problems.
- People with a low level of understanding and experience of technology.

The World Wide Web Consortium (W3C) has established the “Web Accessibility Initiative” (WAI-W3C), whose main objective is to provide solutions to Web Accessibility for people with visual, hearing, physical, cognitive and neurological disabilities. The results³ of this initiative include mainly technical guidelines such as the Web Content Accessibility Guidelines (WCAG), the Authoring Tool Accessibility Guidelines (ATAG), and the User Agent Accessibility Guidelines (UAAG). In addition, Mobile Web Best Practices provide generic instructions for building applications for mobile devices (Chuter & Yesilada, 2009). WCAG is the most renowned de facto standard, as it provides guidelines on how to create accessible interface and content elements in such a way that they can be read and manipulated by assistive technology solutions. Moreover, their

applicability it facilitates interoperability with new and emerging technology solutions (e.g., navigator with voice recognition for car drivers). It is worth pointing out that some of these guidelines are included in policies all over the world (e.g., the international standard ISO/IEC 40500:2012, which is exactly the same as the WCAG 2.0, is part of an EU proposal for a directive⁴). However, one major problem is that their application requires manual forethought, since existing development tools are not directly support compliant code (and outcome) generation.

Currently, the typical production of a web service (Alonso et al, 2003) as a function can be achieved through several development tools, greatly influencing the quality of the produced web content. In addition, interface and other content elements are integrated by the responsible development team or somehow inherited by the environment in use, so that every service acquires a similar look and feel presentation. However, a great advantage introduced by web services is the fact that their function can be reutilized and their input and output elements can be treated at other stages and by other development teams without having specific knowledge of how this web service operates, but only of the results it produces. Therefore, to support accessibility, web service core elements responsible for presentation issues must have an appropriate degree-of-freedom in order to:

- Support integrated and independent cooperation with assistive technologies (e.g., interoperability with screen readers, large keyboards, alternative pointing devices).
- Exhibit user interface which can adapt to users' preferences.
- Generate user-friendly auxiliary functionality (e.g., forms which can be filled out by using only the keyboard and quick access to areas of content).
- Upgrade with technological development (i.e., forward compatibility).

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