Automatic Creation of User Profiles for Achieving Personal Web Accessibility

Markel Vigo, Amaia Aizpurua, Myriam Arrue, and Julio Abascal

University of the Basque Country, Informatika Fakultatea, Manuel Lardizabal 1, 20018 Donostia, Spain
{markel,scpaiaga,myriam,julio}@si.ehu.es

Abstract. Automatic capture of the user’s interaction environment for user-adapted interaction and evaluation purposes is an unexplored area in the Web Accessibility research field. This paper presents an application that collects user data regarding assistive technologies (be either software or hardware) in an unobtrusive way. As a result, CC/PP based profiles are created so that interoperability between components such as evaluation engines or server-side content adaptors can be attained. The implications that versioning issues and the potential user group of a given assistive technology have on the guidelines to apply are also remarked. The major benefit of this approach is that users can perform their tasks avoiding distractions while interacting with the World Wide Web.

1 Introduction

Adaptive user interfaces, intelligent help systems and explanation systems require maintaining user models to represent the characteristics of the user [1]. To this end, collecting information about the user and their environment is a key practice in user modelling related scenarios. In the first stages of this task the main objective is to collect data about the user and their behaviour so that preliminary assumptions can be made. User characteristics (language, abilities, etc.), preferences (settings in an application), behaviour (navigational styles), goals, a priori knowledge on a subject and likings are gathered to create a first user profile or assign a stereotype. Knowledge about the user can be obtained explicitly by asking questions or filling in forms while implicitly obtained knowledge, retrieved by monitoring user interaction, can be used to polish the first user profile or assign a profile that fits better with user characteristics.

Accessibility is about accommodating people with disabilities. Therefore, the research field of universal access to the World Wide Web (WWW) can take advantage of user-modelling practices in order to provide user-adapted interaction mechanisms for people with disabilities. In this sense, Stephanidis [2] presents several developments that prove the feasibility of this statement.

In this paper, a software component that collects data about the user and their access environment is presented. According to Sloan et al. [3], user characteristics and technological requirements are part of the “context of use” which has to be captured in order to obtain acceptable accessibility levels. Data gathering thus focuses on system features as well as assistive technologies. The later are necessary as they give clues about the user. For instance, if a determined screen reader is detected it can be inferred that the user is blind or visually impaired.
The fact that data are collected unobtrusively in order to not to cause the distraction of the user is one of the strong points of this contribution. Furthermore, after inferring some knowledge, hardware, software and user characteristics are automatically encapsulated in a profile that follows W3C CC/PP recommendation [4]. These profiles are the basis to achieve Personal Web Accessibility and can be useful in the scenarios described in Section 1.2.

1.1 Personal Web Accessibility

A website meeting accessibility guidelines such as Web Content Accessibility Guidelines 1.0 [5] does not ensure it is accessible [6] whilst in some cases it is not necessary to satisfy these guidelines for certain user groups to obtain an acceptable accessibility level. Amongst others, there are some reasons for such contradiction: guidelines are vaguely specified and therefore their application is ambiguous, some guidelines contain unresolved references to the user’s delivery context, or guidelines are incomplete. In order to overcome this situation, Personal Web Accessibility provides user-tailored accessibility resources by adapting web accessibility guidelines to the requirements of the user and their delivery context.

A preliminary sketch of a system that tackled personal web accessibility challenges was presented by Arrue et al [7]. Later, this system evolved into a more comprehensive framework which was extended in order to handle specific issues arisen by assistive technologies and access devices such as mobile devices [8]. Theoretical considerations were specified and the server-side evaluation logic was implemented. The framework is capable of managing different guideline sets and WCAG 1.0 and Mobile Web Best Practices, MWBP 1.0 [9] were implemented in the aforementioned work. Due to the release of the mobileOK Basic tests [10], which are the technical recommendations to partially implement the MWBP 1.0, the system has been enhanced especially in the case of mobile devices’ access to the WWW [11]. Aiming at a holistic approach of the framework, this paper presents the client-side components that capture the user environment constraints.

1.2 Application Scenarios

The software component presented in this paper has two major purposes in the context of Personal Web Accessibility:

- User-tailored accessibility evaluations: adaptive navigation support [12] can be provided by means of local and global guidance indicating the most accessible links according to a profile. In addition, information retrieval systems can consider web accessibility as a ranking criterion as demonstrated by Arrue et al. [13]. Moreover, the usage of profiles makes possible the development of websites for specific user groups. Once profiles are created they are stored in a remote database so that developers can make use of them for evaluation purposes. For such scenario, evaluation tools should interoperable with profiles obtaining profile-tailored evaluation reports. It would be the foundations to achieve universal access from an alternative path. This may sound contradictory with the established design-for-all paradigm. Yet, other authors support this idea coined as the design-for-one paradigm [14].