

Farfalla project: browser-based accessibility solutions

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ABSTRACT

Traditionally, Assistive Technology is deeply linked to the particular system on which a single solution runs. Cloud computing seems to be a promising approach, since solutions and services are no longer tied to a particular system. The Farfalla project is a step towards cloud-based Assistive Technology, for the creation of an *inclusive web* where accessibility solutions can be deployed together with contents.

Categories and Subject Descriptors

K.4.2 [Social Issues]: Assistive technologies for persons with disabilities; H.5.2 [Information Interfaces and Presentation]: User Interfaces

General Terms

Design, Human Factors

Keywords

Accessibility, Assistive Technology, Cloud Computing

1. INTRODUCTION

The aim of this project is to create an all-embracing web framework to raise the accessibility level of websites and to provide users with novel methods for browsing with fewer difficulties. Granting accessibility requires efforts on three main levels: standards definition, accessibility evaluation and AT tools development, not necessarily in this order. Standards are necessary for optimizing the whole process, but they are not enough for granting real accessibility [6]. Evaluating Web Accessibility is a quite difficult and time consuming task, especially if we are interested in evaluation through time [2]; such a task can be carried out with many distinct techniques [4, 1, 3]. AT solutions, on the other hand, can be very useful both for accessing information and for participating in everyday life matters, which are the two major 'functionalities' offered by the World Wide Web. Computer-based AT solutions often suffer from the fact of being deeply linked to a particular device or architecture.

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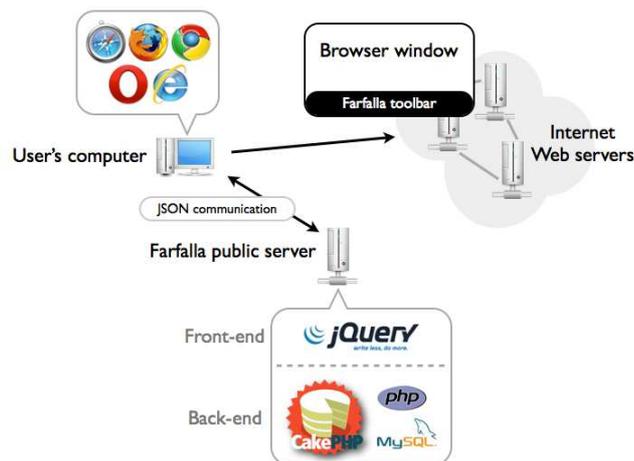


Figure 1: Farfalla architecture

Farfalla offers to its users a collection of lightweight, flexible tools that do not need to be installed on a machine. This essentially means that these tools can also be used on a system on which the user does not have complete control or administrative privileges.

The approach works by injecting an HTML code fragment into a web page and is described in [5]. This injection introduces a remote JavaScript file in the header of the page. The script relies on a remote database communicating with it through AJAX and JSON to evoke the user preferences and henceforth some plugins. At the time of writing, only template settings with pre-defined profiles are available: the possibility to configure a user's profile is planned as a future feature. Each plugin is a singular utility (e.g. text enlargement, virtual keyboard, text-to-speech) which can be used alone or in most cases in combination with other plugins.

2. TECHNICAL FEATURES

The software architecture is composed of a backend and a frontend interface. Plugins are organized in profiles. Both plugins and profiles information are stored in a MySQL database. The frontend is visually composed by a toolbar, generated by the JavaScript file injected in web pages, which allows the profile selection and activates the plugins.

The backend database has a web based graphical interface written using the CakePHP framework. It communicates with the frontend by producing a JSON output, including the list of existing profiles or, after a selection, the plugins included in a chosen profile. The frontend is mainly based on jQuery and jQuery-UI, two

JavaScript libraries which grant developers with the possibility of abstracting from the user's web browser, by actually creating a compatibility layer between different rendering engines. Farfalla plugins are also based on the same technologies, even if by the means of AJAX techniques it is virtually possible to include almost any web-based application in the Farfalla plugins list.

As mentioned above, planned improvements will provide users with the possibility to create a customized profile by selecting the plugins according to personal requirements. As a further improvement, single plugins will be made configurable in order to better adapt to users' needs.

3. CURRENT PLUGINS

The list of plugins (and subsequently, of profiles) is constantly on the rise. It currently includes:

- **Magnifier:** a text-magnification system, which renders the elements under the mouse in a dedicated part of the screen, enlarging the text and setting its color to white on a black background, in order to make it easily readable;
- **Virtual Keyboard:** a virtual keyboard is displayed whenever (and only when) the user clicks on 'textarea' or 'input' HTML elements to allow the user to enter text into the text fields;
- **Font-size:** increases or decreases the font size on the web page;
- **Hi-contrast:** changes the color of every element on the web page to a set of high-contrast colors;
- **Enlarged pointer:** enlarges the mouse pointer on the webpage; this plugin supports distinct pointers for normal text and links ¹;
- **Text to Speech:** the selected text is translated into speech; text selections can be performed either by mouse clicking or by moving a special highlighting frame using the arrow keys (two distinct plugins allow those actions).

Some of the existing plugins are not listed as they are only useful as a support for others (e.g., one of those plugins loads an audio player and allows text-to-speech). Some more plugins are under development and are not currently available on the project website:

- **AddAlt (Alternative Text in the cloud):** a kind of accessibility revamping plugin providing the option of adding an alternative text to an image on a webpage². The objective of this plugin is to allow users to participate in webpage improvements. On the user interface side, the plugin simply adds a transparent layer over images displaying a button. By clicking on this button, users will be allowed to add an alternative text. A backend database will contain the essential information such as the image URL and the alternative text suggested by a user. Such a database will be queried by another plugin for the retrieval of the alternative text, following three main steps:

1. Select all the images in a visited page and read their URLs;
2. Query the database for those URLs;

¹The cursors theme is taken from <http://wiki.sugarlabs.org>

²This functionality will resemble part of the IBM's *Social Accessibility Project*, <http://sa.watson.ibm.com/>, with the main difference of being completely cross-platform.

3. Dynamically add the eventual alternative text to the real webpage;

- **Dasher integration:** Dasher³ is a writing aid, written in Java, also available as a web applet. It enables users to write using only a pointing device, but at higher speed than using an onscreen keyboard.

The Farfalla project website⁴ offers a fully functioning live demo, which can be tried in any web browser. Some cookie issues have been detected in Apple Safari and Microsoft Internet Explorer, while free browsers as Mozilla Firefox and Google Chrome allow a less problematic experience. Apart from the demo, interested users can easily save a bookmarklet in their favourites list. Activating the bookmarklet by simple selection (e.g. by clicking on the corresponding entry in the favourites bar) brings the Farfalla toolbar on almost any webpage. This can be useful both for accessing contents and for testing basic accessibility issues. Together with the bookmarklet, a Userscript is available: this script can be installed as a native plugin in some browsers (like Google Chrome and its derivatives) and as an add-on for Greasemonkey and its derivatives⁵. Greasemonkey is a general purpose browser extension which enables users to customize the appearance and the content of web sites locally.

A video demo of the software is available⁶, while the whole source code can be viewed and downloaded from a repository⁷. The Farfalla Project is free and open source. Everybody can use it or contribute in improving it.

4. REFERENCES

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³<http://www.inference.phy.cam.ac.uk/dasher/>

⁴<http://farfalla-project.org>

⁵Mozilla Firefox: <http://www.greasespot.net/>, Microsoft Internet Explorer: <http://www.gm4ie.com/>, Apple Safari: <http://8-p.info/greasekit/>

⁶<http://goo.gl/mjRoO>

⁷<http://gitorious.org/farfalla/>