

Web Accessibility Assist Tool: WebUD

● Tomoyuki Ito ● Masahiko Suzuki

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The formulation of the e-Japan Priority Policy Program - 2004 and establishment of JIS X 8341, "Guidelines for older persons and persons with disabilities," have impacted activities for achieving compliance with Website accessibility requirements primarily in the field of public services. Ensuring Web accessibility for all citizens requires a thoughtful consideration for the elderly and disabled persons who have difficulty accessing Websites with standard browsers. Fujitsu has developed and offered WebUD, a Web accessibility assist tool intended for elderly and disabled persons. This tool has accessibility functions that can read out text, show kanji readings in kana, enlarge and reduce characters and images, change text and background colors, and assist input operations. WebUD is available on local government Websites, and anyone can download and install it on a personal computer simply by consenting to the license agreement on the Website. This tool helps elderly and disabled persons use the Internet actively and independently. This paper chiefly illustrates the accessibility functions of WebUD and also describes the requirements set out for WebUD development and the WebUD installation procedure.

1. Introduction

An advanced information network society should guarantee an environment in which all citizens can use the Internet easily and actively regardless of age or disability. Public services, in particular, must be provided equally to all citizens. The e-Japan Priority Policy Program - 2004 specified the correction of the digital divide as a cross-cutting issue and stipulated that, when creating an electronic form of government, the Japanese government would exert efforts to provide citizens with systems and Websites designed with sufficient consideration given to the ease of use by elderly and disabled persons. The government thus intends to assure public accessibility to administrative information services. Moreover, JIS X 8341-3 "Guidelines for older persons and persons with disabilities — information and com-

munications equipment, software and services — Part 3: Web content" was established on June 20, 2004, as the first public standard (Japan Industrial Standards) concerning Web accessibility in Japan.

This trend dictates that government offices and municipalities must ensure and improve Web accessibility by supporting text-reading software and providing alternate methods of access. Consequentially, Fujitsu developed WebUD as a Web accessibility assist tool that supports accessibility functions for enabling elderly and disabled persons to access Websites.

This paper describes the requirements set for WebUD development, the accessibility functions provided by WebUD, and the WebUD installation procedure.

2. Web accessibility implementation by WebUD

Ensuring and improving Web accessibility are tasks that require different approaches, such as formulating accessibility guidelines for various Websites,¹⁾ using accessibility check tools,²⁾ supporting accessibility through a content management system (CMS), and complying with JIS X 8341-3. These approaches enhance the accessibility of Website content. Assuming that Website content conforms to accessibility standards, we also believe that browsers (used to display Website content) must support accessibility. To implement Web accessibility by a browser (WebUD), we took the steps for product planning, product development, and product evaluation by users as shown in **Figure 1**. In the development phase, we set the two requirements below as conditions for supporting Web accessibility by a browser.

- 1) Delivery of a browser with accessibility functions

A browser³⁾ with accessibility functions that are not supported by standard browsers must be provided to elderly and disabled persons who have difficulty accessing Websites with standard browsers.

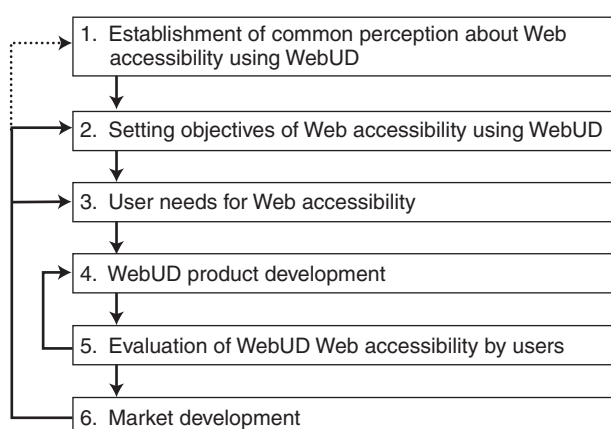


Figure 1
Steps for achieving Web accessibility by WebUD.

- 2) Easily available manner of delivery for elderly and disabled persons

Software vendors have recently marketed software products for reading text and enlarging screen display for persons with visual disabilities, and assisting physically disabled persons in operating the keyboard and mouse. However, users must purchase and install each of these software products individually, thus imposing an economic burden. Therefore, to popularize browsers that support accessibility and ensure and improve Web accessibility, browsers must be delivered so that users can easily obtain and use the products, and at no cost to the users.

To meet requirement 1), Fujitsu has developed and delivered WebUD as a Web accessibility assist tool to assist elderly and disabled persons in accessing Websites. WebUD has accessibility functions to read text aloud, show kanji readings in kana, enlarge and reduce characters and images, change text and background colors, and assist input operation by using a software keyboard. **Table 1** lists the accessibility functions of WebUD and the targeted users.

To meet requirement 2), Fujitsu has delivered WebUD via local government Websites.

Table 1
Accessibility functions of WebUD and targeted users.

Targeted users Functions	People with amblyopia	Color-blind people	Aurally impaired	Intellectually disabled	Physically disabled	Elderly people	Foreigners
Text reading	○			○		○	○
Kanji readings in kana			○	○			○
Enlarging and reducing characters and images	○					○	
Changing text and background colors	○	○					
Software keyboards				○	○		
Software operation only using key input	○				○		
Automatic mouse clicking					○		

○: Functions available for targeted users.

Anyone can download and install it from such a Website on his or her personal computer by simply consenting to the license agreement on the Website (**Figure 2**).

The following sections describe details of the accessibility functions, the WebUD installation procedure, and how to use WebUD, thus complying with requirements 1) and 2).

3. Accessibility functions of WebUD

This section describes the accessibility functions of the WebUD browser as listed in Table 1. Visitors to Websites with WebUD installed can operate all accessibility functions (except input assistance supported by WebUD) with the function buttons as shown in **Figure 3**. The input assistance feature helps users to input search-

target characters and URL, and perform operations on Web pages by only using a software keyboard.

The input assistance functions of WebUD can also be used also for Websites that do not incorporate WebUD.

3.1 Reading text

For users who have difficulty reading the text on Web pages, WebUD reads the text aloud by synthetic voice from the top of a Web page when the text reading function is selected. When the user specifies a range of text by dragging the mouse and then clicking the text-reading button, WebUD reads the specified range and subsequent portion of text aloud. If the user presses the Enter key while WebUD is reading a portion of text linked to another page or site, WebUD jumps to the link destination.

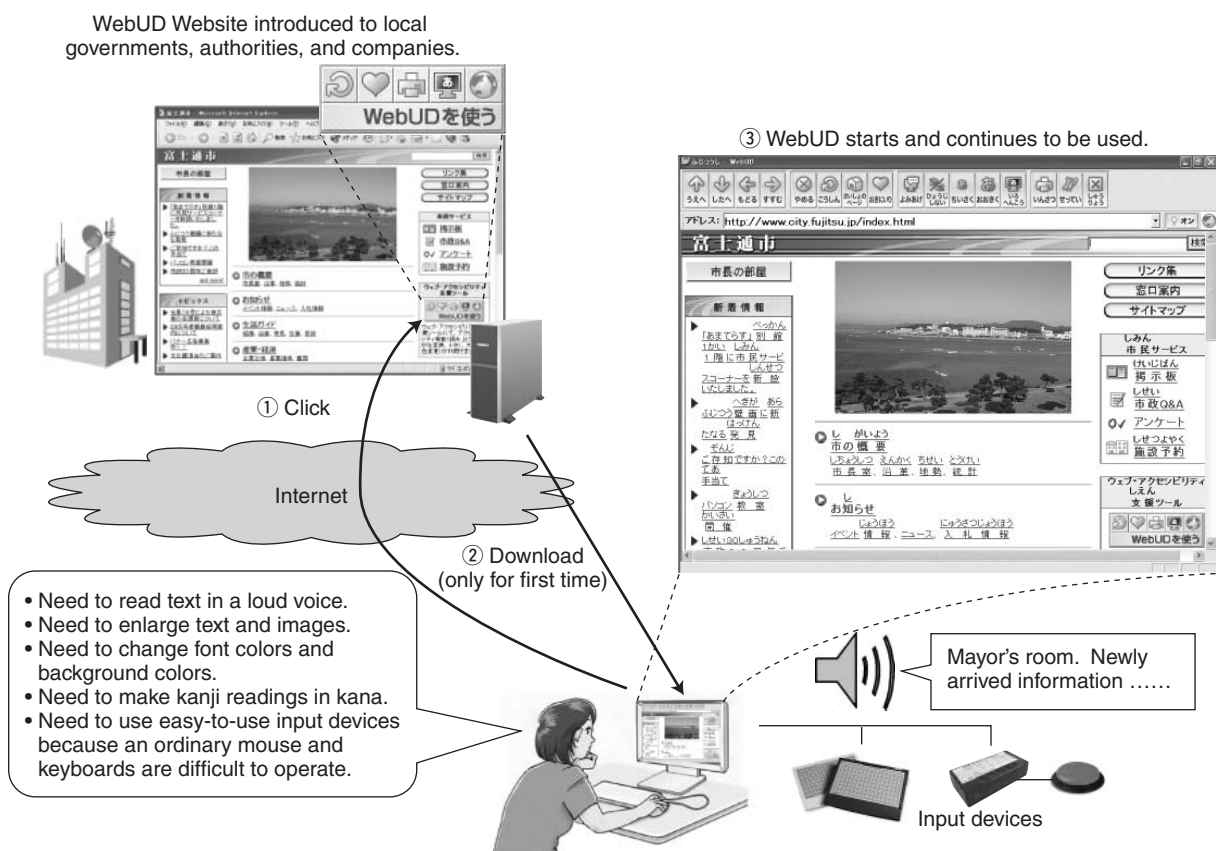


Figure 2
Overview of WebUD.



Figure 3
Accessibility function buttons except input assistance buttons.

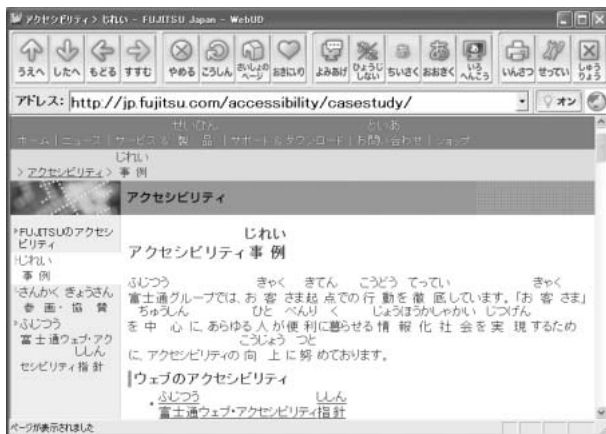


Figure 4
Kanji readings in kana.

3.2 Showing kanji readings in kana

For users who have difficulty reading kanji characters on Web pages, WebUD automatically displays kana characters to indicate kanji readings for the kanji characters (**Figure 4**). The user can select the level of kanji translation into kana from “All Kanji in Hiragana,” “Elementary school: lower grades,” “Elementary school: middle grades,” “Elementary school: higher grades,” and “Junior high school.” The user can also select the display format from “Hiragana alone,” “With space between words,” “In parentheses after word,” “Agate on Kanji,” and “Tool tip.”

3.3 Enlarging and reducing characters and images

For users who have difficulty viewing small characters and images on Web pages, WebUD

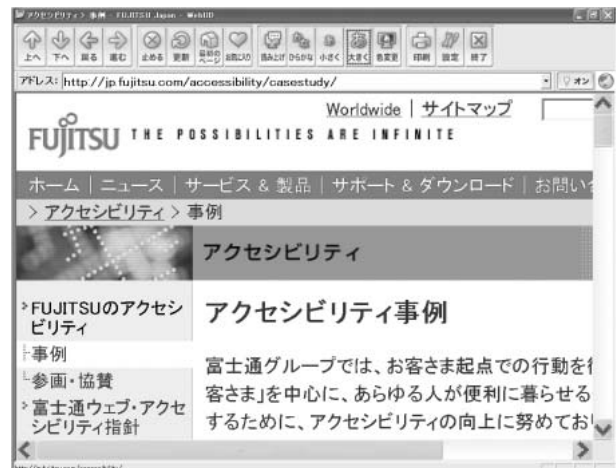


Figure 5
Enlarged display.

changes the sizes of characters and images when “Enlarge” or “Reduce” is selected (**Figure 5**). The size of character or image display can be changed in steps of 10%, and enlarged up to 300%.

3.4 Changing text and background colors

For users who have difficulty determining the colors of text and background on Web pages, WebUD enables the users to change the patterns of text and background colors on Web pages when they select “Change colors.” A total of five color patterns are available with consideration given to the difference in brightness between text and background colors. Moreover, the user can select text, background, and link indication colors from 24 colors.

3.5 Input assistance

1) Software keyboard

For users who have difficulty entering characters from a standard mechanical keyboard, WebUD displays a software keyboard to help the users enter characters for the input of URLs and words to be searched (**Figure 6**).

2) Operation with key input only

For users who have difficulty operating the mouse or who use an alternate input keyboard or



Figure 6
Software keyboard.

external input switch^{note)} for operation, WebUD supports keyboard navigation⁴⁾ using the Tab and Enter keys, and the assignment of short-cut keys.

3) Automatic clicking of mouse button

For users who can move the mouse cursor but have difficulty clicking, WebUD automatically generates a click event when the mouse cursor is not used for a specified number of seconds.

3.6 Other functions

WebUD also supports additional functions to enhance a user-friendly environment for Web users. These functions include always displaying the maximum screen size, disabling the opening of a new window for a linked page, and disabling the function to display a window by right-clicking the mouse.

4. WebUD installation procedure, use method, and operating environment

This section describes the procedure for installing WebUD on a Web server, how to use

note) The external input switch is an input device intended for disabled persons. A user operates the input device by using a body part that he or she can move voluntarily. The input device is available in various types, including push, grip, breath, and blink switches.

WebUD, and the WebUD operating environment.

4.1 Procedure for installing WebUD on Web server

1) Listing URLs

List the URLs of Web pages that should incorporate WebUD functions (i.e., reading text aloud, showing kanji readings in kana, enlarging and reducing characters and images, changing text and background colors). The range of URLs to be listed should basically be the domain of each WebUD purchaser (e.g., a municipality, government office, business enterprise) in which the WebUD purchaser holds the copyright on Web pages.

2) Verifying WebUD operation

In the domain of URLs listed in step 1), confirm the operation of the accessibility functions of WebUD on actual Web pages.

3) Creating and verifying user dictionaries

Compile a dictionary of personal, geographic, and other proper names for text reading and the display of kanji readings in kana. Then verify the dictionary to determine whether WebUD can correctly read proper names and show readings of kanji in kana on actual Websites.

4) Customizing HTML files for downloading

Customize the HTML files of WebUD for downloading to adjust URLs, links, and other necessary items to a Website that incorporates WebUD.

5) Setting up WebUD on the Web server and releasing it to the public

Set up a set of necessary WebUD modules on the Web server, then release WebUD to the public.

Table 2 lists the operating environment required for the Web server.

4.2 Method of using WebUD

An elderly or disabled person who intends to use WebUD must first access a Website where WebUD has been introduced, then consent to the license agreement on the Website. After that,

Table 2
Operating environment required for Web server with WebUD.

Main unit	HTTP server operates. Appropriate responses are returned to HTTP request header (e.g., If-Modified-Since).
OS	No limitations
Hard disk	Free space of at least 50 MB required. WebUD folder can be located on the path of the HTTP server.
Others	CD-ROM installed (required at installation).

WebUD load modules (about 9.8 MB) are downloaded to the person's personal computer, and WebUD is installed and activated. Downloading WebUD is free of charge. The user must download WebUD only once, then can subsequently start it up from the desktop of the user's personal computer.

Table 3 lists the operating environment required for the Web client.

5. Continuous use of accessibility functions over Websites incorporating WebUD

This section describes how WebUD differs from conventional similar products. WebUD has a mechanism that continuously enables WebUD accessibility functions over different Websites that have incorporated WebUD. For an example of the difference between WebUD and a conventional similar product, assume that the conventional product has been introduced to both Websites operated by prefectures A and B. When a user visiting a Web page on prefecture A's Website moves to prefecture B's Website, the conventional product displays a message to inform the user that its functions are being stopped. When using WebUD, a list of URLs of the Web pages (where accessibility functions are enabled) is saved on the local disk and loaded into memory on the server for each WebUD-introduced Website. Assume that prefectures A and B have introduced WebUD on their Websites. When a user visiting prefecture

Table 3
Operating environment required for WebUD client.

Main unit	PC/AT compatible
OS	Windows 98SE/Me/2000Professional/XP Japanese version (with Internet Explorer 5.5 SP2 or later required).
CPU	Pentium II (266 MHz) or higher (with CPU accommodating the OS operating environment).
Memory	128 MB or more
Hard disk	Free space of 50 MB or more
Display	At least 1024 × 768 dots recommended.
Sound card	Voice must be replayed on Windows.
Network	Broadband connection recommended (e.g., ADSL, CATV).
Options	Printers, general-purpose switch interfaces, external input switches

A's Web page moves to prefecture B's Website, the URL of prefecture B's Website is compared with URLs on the URL list in memory of prefecture A's Web server. Thus, WebUD can keep accessibility function buttons in effective status when the user moves from prefecture A's Website to prefecture B's Website. However, accessibility function buttons cannot be kept in effective status when the user moves to a Website that does not incorporate WebUD. Even in such case, the user can continue to access other Websites and use input assistance.

6. Conclusion

This paper chiefly illustrated the accessibility functions of WebUD (a Web accessibility assist tool), described the requirements set for WebUD development, and the WebUD installation procedure. The introduction of WebUD can encourage elderly and disabled persons to use the Internet and Websites as an essential social infrastructure, and accordingly add weight to Web accessibility.

We will continue to improve the functions and usability of WebUD in response to user requests and in line with the steps taken to implement Web accessibility in order to help secure and enhance Web accessibility for all members of society.

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Tomoyuki Ito received the M.E. degree in Science Education from Shizuoka University in 1990. He joined Fujitsu Ltd., where he has been engaged in system development and consultation for persons with disabilities.



Masahiko Suzaki received the B.E. degree in Electronic Engineering from Kumamoto University in 1979. He joined Fujitsu Ltd., where he has been engaged in system development, implementation of government projects, and computer accessibility for persons with disabilities.