Interactive Graphical Reading Aids for Functional Illiterate Web Users

Marcel Goetze, Thomas Strothotte

Department of Simulation and Graphics, University of Magdeburg

The IGAR-Browser

The poster introduces the prototypical system IGAR-Browser (IGAR - Interactive Graphically Aided Reading) see Figure 1 for an overview.

Figure 1: The prototypical implemention of the IGAR-Browser. Beside the document the browsing tools (left), and the tools to activate reading aids(right) are placed. Within the document all forms of graphical reading aids are shown: including pictures overlaying the text; together with the referring word; inserted into a sentence and the picture line at the bottom of the document.

Due to the assumption that functional illiterate users have at least some basic experiences with pen and paper and functional illiterate users have never used a computer before the system is based on a paper document metaphor and differs from the standard windows interface. The prototypical IGAR-Browser runs on a personal computer connected to a pen-based, flat-panel tablet display. The display can be used like a sheet of paper; this includes the possibility to use the pen to move along a line of text or point directly on an unknown word and so to identify the user's location within the text. For users with computer experience the mouse is still usable. For interaction with the system we defined a set of tools based on pen-based direct manipulation which can be divided into those for interaction with the document and those serving as reading aids.

The tools for interaction with the document consist of tools for browsing and tools for navigation in the document or for controlling it.

Browsing tools

Based on the assumption that functional illiterate people are able to find a web page of interest and on the fact that functional illiterate users are not able to write a URL, the system starts with a homepage which can be regarded as a directory or table of contents. To come back to this page the user can point at the home symbol in the upper left-hand corner of the screen. Webpages can be linked together and users can follow the link by pointing on it. After having followed a link the user can move back to the previous page by pointing on the back-symbol (see Figure 1).

Document navigation

Pages can occupy more space than it is available on the screen split. In this case the webpage is cut into multiple pages and 'dog-ears' appear at the bottom of the document. The dog-ears give a visual cue that the document is separated into multiple pages and by pointing on it the user can navigate through the whole document, page by page.

Tools serving as reading aids

Each web page is analyzed and parsed for known words stored in a database of word-picture combinations. Furthermore, the web page is parsed for 'Graphical Alternate Tags' (GATs). Each word which has a graphical reading aid underneath is underlined as shown in Figure 1. The system provides different types of reading aids which can be activated by pointing on the desired symbol on the right hand side of the screen space. The system switches between the following modes:

Phonetic mode: By clicking on the microphone symbol the user activates the speech output. The user now can point on a single word and get a speech output.

Pictogram mode: This is the focal point of our work. The user should be able to include different forms of graphical reading aids. Depending on the user's knowledge of the part of the text he/she has currently read we implemented three different steps of giving reading aids. The user/reader can choose between (see Figure 1):

1. Picture-Tip: The user reads a word which he/she has seen before but can not just decipher the meaning (the user only needs this little 'aha-experience'). The user can move the pointer over the part of the text or point directly on this part the picture is shown dynamically, overlaying the text.
2. Primer + Text: The user has no idea about the part of the text and therefore needs permanent shown reference between text and picture. The reader now can point on the desired part of the text using the button on the pen (the same as the right mouse-button) and the picture is included within an sentence together with the text.
3. Primer-Principle: In this case the user knows the meaning of the word but still wants to have the picture included within the text (e.g. for learning purposes). The reader can let the system include the picture within the line of text.

Picture sequence mode: This mode is activated in addition to both previously described techniques. The function displays a complete line of pictures representing the line of text which the user currently interacts with, at the bottom of the document. The special word the user reads (points to) is dynamically highlighted (see Figure 1 for details).

All three steps (Point 1-3) follow each other by pointing on the desired part of the text/picture and pressing the button on the pen or the right mouse-button. In every step the user should have the possibility to see both the text and the picture at least dynamically displayed.

Adressen der Autoren

Marcel Goetze / Prof. Dr. Thomas Strothotte
Otto-von-Guericke-Universität Magdeburg
Fakultät für Informatik
Institut für Simulation und Graphik
Universitätsplatz 2
39106 Magdeburg
tstr@isg.cs.uni-magdeburg.de
goetze@isg.cs.uni-magdeburg.de