

# ADDRESSING USER NEEDS: ADAPTING INFORMATION ACCESS FOR THE ELDERLY

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## ABSTRACT

This paper offers one possible means of addressing the issue of poor web accessibility affecting elderly people. The approach presented is to adapt the order in which web pages are presented to the user according to specific web page elements that affect accessibility and the user's experience. This technique could reduce the time taken to filter out inaccessible pages and would be particularly beneficial to novice users and those with impairments.

## Keywords

Elderly users, web accessibility, inclusion, disability

## 1. INTRODUCTION

### 1.1 Including the elderly

Current reports indicate that there is a definite need to 'bridge the gap' between elderly users and the Internet [2,10] and with almost a fifth of the UK population aged over 65, it is a significant market to exclude [6]. The concern at the growing 'digital divide' in the UK has led to a number of initiatives being employed to encourage web usage for the older generations and to ensure they are not excluded from the digital world [1]. In spite of these concerns, reports indicate that the UK has one of the highest percentages of Internet users over the age of 55 in Europe [2]. Many of these people make use of the Internet in controlling their finances, keeping up to date with current affairs and staying in contact with family and friends. The Internet can then be said to be a valuable tool in reducing the risk of social exclusion, a concern that many of the elderly face. In considering that the elderly are very likely to develop age related impairments such as visual and/or mobility related disabilities [12], web accessibility then becomes an important consideration. The initiatives may be in place to encourage the elderly to get online but poor web accessibility is likely to affect not only the user's ability to access information but also create a favourable web experience.

### 1.2 Individualised Support

The goal of universal accessibility has been the driving force behind new techniques of information adaptation to cater for elderly people's diverse needs. This concept of selecting information according to user needs was initially employed within Intelligent Tutoring Systems (ITS) because it was purported that individualised teaching provided the best learning [3,11]. Specific information about the user is stored within the user model of an adaptive system and enables individualised support. Information is presented to the user based upon the requirements specified within this user model. This process was later utilised in the subsequent development of Hypermedia Systems (HMS) and Adaptive Information Navigational Systems, which were designed to improve accessibility. One example is 'Hyperbooks' [5], which uses adaptive navigational support techniques to enable a wider source of information to be available to the user. Another example is the Avanti Project [7], a distributed system that provides adaptability to the more specific needs of the disabled and elderly users by adapting both presentation and layout of web based information. This process of adapting the order in which information is *presented* rather than the content is the approach that will now be reviewed..

## 2. ADDRESSING USER NEEDS

The Computer Aided Internet Navigation (CAIN) system [8] is an investigative tool that aims to increase the effectiveness of the web by using a process that selects then presents information according to individual needs. These needs are stored as heuristics within the user model. Earlier developments of CAIN have focused upon selecting information according to user's expertise and goal. CAIN *reacts* as opposed to altering content and hence offers possibilities in the selection of information according to the more specific needs of elderly persons. Age related disabilities, such as impaired vision and mobility could be grouped with those of the disabled. However, it is also important to recognize that even within user groups such as the visually impaired, some variation of needs should be supported and that each user has individual requirements.

These needs may also extend to user preferences where an individual preference supports the user's web experience.

### 3. SELECTING INFORMATION

Work is currently underway investigating user-defined ratings of elements that affect the accessibility of web pages according to categories of impairments such as visual, mobility and cognitive/language [4]. This will be particularly useful in determining the specific selection of web pages for elderly persons with age related disabilities. There are however two approaches.

#### 3.1 Selection based upon user categorisation

The first approach involves placing users within a specific category and basing the selection of web pages according to pre-determined constraints. For example, a visually impaired person can use CAIN to provide an assisted search to filter web pages that affect accessibility due to its reduced font size and poor colour contrast between background and font. A person with restricted mobility such as chronic arthritis may wish to filter out web pages with elements that are known to affect accessibility for that particular group, for example small input boxes and navigational buttons that require precise mouse movements.

#### 3.2 Individualised Selection

The second approach recognises the user as an individual and provides a more customisable search. This search enables the user to identify individual elements that might affect not only accessibility but also affect the user's experience is necessary. These can be elements relating to layout and colour as well as more complex ones such as tables and advertisements. This would be particularly useful where a user has a combination of impairments such as visual and restricted mobility and wishes to make an individual choice as to which affecting elements should be given precedence. For example, an elderly person with impaired vision and arthritis in their fingers may find that precise mouse movements are more problematic than the issue of a grey font upon a black background. This user can then assign a rating of significance to individual elements that CAIN will adhere to within a search. This process can also be applied for users with a particular preference or disregard for certain elements. A user may for example be put off by web pages with patterned backgrounds or a lack of pictures. Web pages can then be selected according to users' individual preference, which would enhance the user's web experience.

### 4. SUMMARY

CAIN offers possibilities in improving web accessibility for the elderly by adapting the order in which web pages are presented to the user according to user needs and preferences. This in turn should also improve the user's experience of using the web.

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