Case Study of Improving Web Accessibility for Scientific and Technical Retrieval System

Su-Mi Shin*, Hye-Sun Kim**

*,**KISTI, Korea

E-mail : sumi@kisti.re.kr*, hskim@kisti.re.kr**

1. Introduction

Following the recent directive for web accessibility compliance of websites for public, more public organizations are responding to the policy. Web accessibility compliance means securing equal access and understanding of information on the web to those with difficulties accessing the information, such as people with disabilities and senior citizens, as other users without any discrimination, so that anyone can access web contents regardless of the situation or environment. This paper studies cases of evaluation and improvement of web accessibility of scientific and technical retrieval system in Korea, NDSL[1] operated by Korea institute of Science and Technology Information, KISTI, will be studied. The evaluation standard, which was established in December 2009, is Korea Web Content Accessibility Guidelines 2.0(KWCAG 2.0)[2], and Open WAX, an open source project evaluation tool, was used to evaluate. While NDSL showed the web accessibility compliance to be lower than 70% at a manual evaluation, it could be improved up to 100% by reflecting on 16 guidelines.

2. Background

NDSL is a scientific and technical retrieval system that provided by KISTI, and it offers various scientific and technological information including 50 million academic papers and 20 million patents domestic and abroad by connecting core scientific and technological information scattered in and out of Korea. Web accessibility is evaluated as a numeric score that indicates the level of compliance of directive by suggesting standard and technical guidelines. Korea is demanding web accessibility compliance through laws such as 'Assurance of Information Access and Use by the Disabled and Senior Citizens' by Basic National Information Act and 'Obligation to provide fair accommodation in information technology and communication' by Prohibition Act of Discrimination on the Disabled and Relief of Right. Web accessibility evaluation includes user evaluation and expert evaluation. User evaluation is made directly by users with disabilities in context of web accessibility, whereas expert evaluation is done by experts based on the principles of web accessibility. In expert evaluation, automatic evaluation using an evaluation tool is available, and items not available to automatic evaluation are evaluated manually. The automatic evaluation tool supports automatic checking to see if a given website complies with the guideline. Evaluation on web accessibility compliance helps web developers and content publishers make websites easily accessible for the disabled.

3. Web accessibility evaluation and improvement

Evaluation on web accessibility compliance helps web developers and content publishers make websites easily accessible for the disabled. In the present case, the evaluation was executed using an evaluation tool called 'Open WAX', which automatically checks the following 16 detailed guidelines according to KWCAG 2.0.

1) Adequate alternative text (img) 2) Adequate alternative text (bg) 3) Adequate alternative text (object) 4) Brightness contrast of text contents 5) Focus movement 6) skipping repeated areas 7) Title (<title>) 8) Title (frame) 9) Tile (<h1>~<h6>) 10) Adequate link text 11) Basic language display 12) Running according to the user's demand 13) Composition of table (caption, summary) 14) Composition of table (th) 15) Label provision 16) Mark-up error prevention

NDSL's guideline for the level of compliance at the first evaluation is shown in Table 1.

[Table 1] The first evaluation result

Compliance	Examination guidelines
Lower than 50%	Brightness contrast of text contents Focus movement Skipping repeated areas Adequate link text

The unsatisfactory parts are the brightness contrast of contents, focus movement, skipping repeated areas, and adequate link text provision. The NDSL web accessibility improvement plan was established

based on the result, and the items to be improved were 90 pages available for access to users including one page of Main screen and 24 pages of paper contents search and detailed views. Examples of pages improved by the web accessibility guidelines are shown in Figure 1. In detail, to comply with the guideline for brightness contrast of text contents, the brightness contrast requirement of the color on the main screen was changed to be more than 4.5.

Figure. 1 Examples of pages improvement - Brightness contrast of text contents

In detail, to comply with the guideline for brightness contrast of text contents, the brightness contrast requirement of the color on the main screen was changed to be more than 4.5. To comply with the guideline for focus movement, the blur() function is called to make a focus disappear or the case in which the outline property of CSS is set to 0 were improved in the cases, and the cases of improvement are shown in Figure 2. The link text was improved by indicating the text of the link element (<a>, <area>).
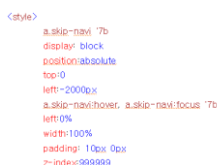

Figure. 2 Examples of pages improvement - Skipping repeated areas

In the result of the 2nd test performed after the improvement mentioned above, shown in Figure 3. It could be improved up to 100%.

Figure. 3 The result of the 2nd test

4. Conclusion

It is essential to evaluate how much scientific and technological information is accessible to the information poor. In this paper, we evaluated the level of web accessibility of NSDL, which was operated by KISTI, using an automated evaluation software. Web accessibility evaluation includes user evaluation and expert evaluation. The automatic evaluation tool supports automatic checking to see if a given website complies with the guideline. Evaluation on web accessibility compliance helps web developers and content publishers make websites easily accessible for the disabled. In the present case, the evaluation was executed using an evaluation tool called 'Open WAX', which automatically checks the following 16 detailed guidelines according to KWCAG 2.0. In addition, we presented a case in which the accessibility compliance is improved up to 100% by figuring out and improving weak areas such as brightness contrast, focus movement, and skipping repeated areas.

5. References

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