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A Comparison Study on Mobile Accessibility of Mobile Websites with High Traffic in Korea and the United States

Eunju Park, Yangwon Lim, Hankyu Lim[1]

Department of Multimedia Engineering, Andong National University,
1375 Kyungdong-ro, Andong-si, Kyungpook 760-749 Republic of Korea
E-mail: eunju8921@naver.com, limyw@anu.ac.kr, hklim@anu.ac.kr

Abstract

Following the increased use of mobile devices, guaranteeing mobile accessibility is becoming more and more important. However, mobile accessibility has been promoted focused on native mobile applications by public institutes in Korea. The policy on mobile accessibility should focus on the mobile websites that actually have high traffic from the users. This study conducted mobile accessibility evaluation on 30 Korean and 30 American mobile websites that have largest traffic and compared the relative level of mobile accessibility in Korea.

Keywords: Web Accessibility, Mobile Accessibility, Web Standard

1 Introduction

According to the '2013 Fact-finding Survey on the Information Discrimination of the Disabled' conducted by the National Information Society Agency by the end of 2013, possession ratio of Smartphone among the disabled was 39.9%. This is considerably lower than the nationwide average of Smartphone possession ratio at 74.3%. As for the reasons of not using Smartphone, the reasons related to mobile accessibility turned

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[1]*Corresponding Author : Hankyu Lim, hklim@anu.ac.kr*

out to occupy 29.2% of the total respondents such as ‘difficult method of using’ and ‘difficulty due to physical disability’[1].

Accessibility means possibility of making products, service, contents, etc. usable for the aged and the disabled. Securing the accessibility is the fundamental requirement for using product and service for those who are physically weak[2]. Hence, compliance with mobile accessibility of the mobile service whose usage is ever increasing following the penetration of Smartphone is very important.

For improvement of mobile accessibility, Korean government enacted ‘Mobile Application Accessibility Guideline’ in 2011 and has been conducting annual survey investigating the current situation of mobile accessibility. However, it turned out that the compliance rate is very low[3][4]. The mobile accessibility survey is mainly focused on native applications. As for the mobile webs that the mobile users are actually using a lot when using the mobile Internet, enactment of domestic standardization guideline is delayed and no survey on accessibility situation of such mobile webs has been conducted as of now[3][5].

In case of the United States, The 21 Century Communications and Video Accessibility Act(CVAA), which was announced by the President Obama in August 2010, made accessibility mandatory for the purpose of securing the accessibility of the disabled such that inconvenience for the hearing- and visual-impaired coming from the lack of accessibility in Smart devices and TV can be diminished [3].

This study examined the current situation of mobile accessibility of the mobile websites that are out of focus in accessibility in Korea. For this purpose, the study conducted mobile accessibility evaluation on 30 mobile websites with a lot of visitors. Moreover, the study conducted accessibility evaluation on 30 American mobile websites and compared it with that in Korea to investigate the relative level of mobile accessibility in Korea compared to the global level.

According to the mobile accessibility evaluation results, although the mobile accessibility compliance rate of Korean mobile website was higher than that of the US, both of Korea and the US turned out to have very low level of mobile accessibility. Improvement of accessibility can be possible only when there are developer’s efforts and interest combined with government policy. It is believed that active debates and improvement are urgent for securing the information accessibility for the disabled.

2Comparison the Mobile Accessibility of Mobile Websites with High Traffic in Korea and the United States

This study evaluated the mobile accessibility of 30 Korean mobile websites and 30 American mobile websites with large number of visitors and compared the compliance rate of the mobile accessibility between Korea and the US. Moreover, the paper also compared the evaluation results with the previously conducted evaluation results regarding mobile accessibility of public institutes mobile website in Korea and the US[6].

As for the selection of websites with large number of visitors, 30 websites with largest number of visitors according to the data provided by ‘www.rankey.com’ as of the last week in March 2015 were chosen in case of Korea[7]. In case of the US, 30 websites with largest number of visitors according to the data provided by 'www.quantcast.com' as of April 3rd in 2015 were chosen[8]. As for the evaluation method of the mobile accessibility, automatic evaluation method was used using 'mobileOKChecker' provided by W3C[9].

Table 1 below presents the evaluation results of the mobile accessibility. Out of the five accessibility evaluations, there were one Korean website and four American websites that could not be evaluated. Despite the active use of the websites both in case of Korea and the US, mobile accessibility evaluation turned out to be very low. The number of websites with zero compliance rate was 16 in case of Korea and 23 in case of the US.

Table 1.Result from evaluation about accessibility of mobile websites with high traffic

	Korea	America
The number of websites that are not being evaluated	1	4
The number of mobile websites with zero compliance rate	16	23
The number of mobile websites withcompliance rate bigger than zero	13	3

Table 2 below presents the comparison results of average value of the mobile accessibility evaluation between Korea and the US in their mobile website with large number of visitors. As is shown in Table 2, both had low average compliance rate of 19.1% and 4.0% for Korea and the US, respectively, implying very low compliance with the mobile accessibility. The number of compliance rate over 80% such that the disabled who visit website do not feel discomfort was two for Korea and zero for the US.

Table 2.Results about average value of mobile accessibility evaluation (Korea and America)

Divide	Compliance Rate (%)	Page Size (KB)	Page Size			Network Usage (piece)	Network Usage			Failures Per Severity			
			docu-ment	style-sheet	image		docu-ment	style-sheet	image	criti cal	severe	medi-um	low
Korea	19.1	1007.8	63.5	55.9	889.8	31.1	1.8	2.6	38.8	1.8	2.2	1.1	3.7
America	4.0	1467.4	100.3	108.7	1260.6	43.7	1.0	3.8	41.0	2.4	3.1	1.3	4.5

Figure 1 below shows the extracted factors that have strongest influence on the mobile accessibility evaluation. Due to small screen size and slow network speed, the size of page and number of network use are limited. 'MobileOKChecker' by W3C and 'MWBP' recommend the mobile page size of 20KB and the number of network use of 20 [9][10]. However, the average page size of Korean mobile website was 1007.8KB and that of the US was 1467.4KB, both of which exceed the recommended size. Moreover, number of network use was 31.1 and 43.7 for Korea and the US, respectively, significantly higher than the recommended number.

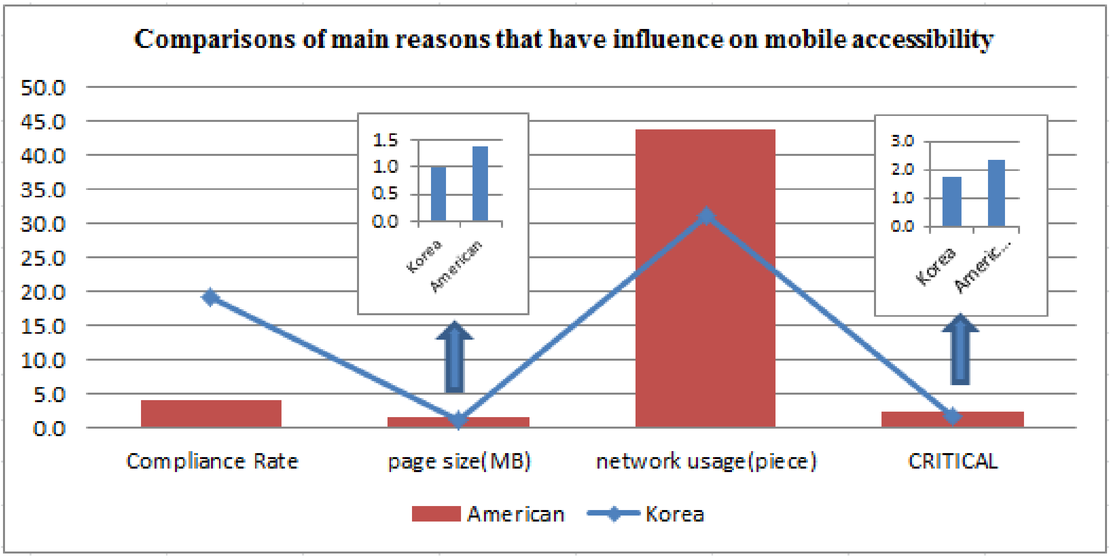

Fig 1.Comparisons of main reasons that have influence on mobile accessibility

Table 3 below is a table that compares the average value of mobile accessibility evaluation between the mobile websites of the public institutes and the mobile websites with many visitors in Korea. It was revealed that the mobile users use websites that provide 'search/portal', 'blog/SNS', 'news/broadcasting', etc., rather than the public institutes websites. However, while the average mobile accessibility compliance rate of the public institutes mobile website was as high as 50.67%, mobile websites with many visitors had very low average accessibility compliance rate at 19.1%. This can be attributed to the government's accessibility policy that has been focused on the public institutes.

Table 3. Average value of mobile accessibility evaluation between the mobile websites of the public institutes and the mobile websites with many visitors (Korea)

Divide	Compliance Rate (%)	Page Size (KB)	Page Size			Network Usage (piece)	Network Usage			Failures Per Severity			
			document	style-sheet	image		document	style-sheet	image	critical	severe	medium	low
public institutes	50.67	191.16	9.66	11.43	166.98	12.04	1.30	1.30	9.44	0.74	1.44	2.11	2.37
many visitors	19.1	1007.8	63.5	55.9	889.8	31.1	1.8	2.6	38.8	1.8	2.2	1.1	3.7

Table 4 is a table that compares the average mobile accessibility compliance rate between the public institutes mobile websites and the mobile websites with many visitors among the US. In case of the US, the accessibility compliance rate of the public institutes mobile website also turned out to be higher than those with large number of visitors.

Table 4. Average value of mobile accessibility evaluation between the mobile websites of the public institutes and the mobile websites with many visitors (America)

Divide	Compliance Rate (%)	Page Size (KB)	Page Size			Network Usage (piece)	Network Usage			Failures Per Severity			
			docu-ment	style-sheet	image		docu-ment	style-sheet	image	criti-cal	seve-re	medi-um	low
public institutes	31.59	267.43	20.67	68.38	180.25	15.82	1.03	2.72	12.33	0.90	1.77	1.69	4.36
many visitors	4.0	1467.4	100.3	108.7	1260.6	43.7	1.0	3.8	41.0	2.4	3.1	1.3	4.5

Mobile devices have smaller screen and slower network speed compared to PC. Hence, for securing the compliance of mobile accessibility, it is necessary to incorporate the uniqueness of the device in addition to the basic requirement for accessibility compliances. Table 5 below shows representative reasons that diminish compliance rate in mobile accessibility evaluation along with suggested solutions.

Table 5.Main reasons that have influence on mobile accessibility and solution for them

Divide	**Description**	**Why**	**Best practice**
Critical	The total size of the page exceeds 20 kilobytes.	Big pages require a possibly high cost and a long waiting time in many mobile networks.	Ensure that the overall size of page is appropriate to the memory limitations of the device.
	The document contains a frame, frameset or iframe element.	Most mobile browsers simply don't support frames.	Remove frames, and use a CSS-based layout instead.
	The document is not an HTML document.	The markup of the document doesn't start with an <html> element.	Send content in a format that is known to be supported by the device.
	There are more than 20 embedded external resources.	Loading the page requires a mobile browser to make more than 20 separate HTTP requests.	Keep the number of externally linked resources to a minimum.

	The image does not match its supposed format.	The images are served as GIF or JPEG images.	Send content in a format that is known to be supported by the device.
	HTTP status code 404 (Not Found) or 5xx (Server Error) received for an embedded resource.	Embedded resources must be retrieved for the page to be correctly rendered.	Check and fix the following link(s).
	The size of the document's markup exceeds 10 kilobytes.	Mobile devices have limited screens.	Ensure that the overall size of page is appropriate to the memory limitations of the device.
Severe	A "javascript:" link is usedOBJECTS.	Javascript links provide no alternatives for mobile browsers that do not support scripting.	Do not rely on embedded objects or script.

3Conclusion

Following increased use of mobile device of the disabled, mobile accessibility is becoming more and more important. Hence, this study selected 30 mobile websites with the most visitors in Korea and conducted evaluation on their mobile accessibility to investigate the current situation regarding the mobile accessibility. Moreover, the paper also conducted evaluation on 30 mobile websites in the US that had the most visitors to compare their mobile accessibility evaluation results with the Korean case.

According to the mobile accessibility evaluation results, the average mobile accessibility compliance rate of the Korean mobile websites with large number of visitors was 19.1%, which is significantly lower than that of the public institutes at 50.67%. In case of the US, the average mobile accessibility compliance rate of the mobile websites with large number of visitors was 4.0%, which is significantly lower than that of the public institutes at 31.59%. Although the compliance rate turned out to be higher in case of Korea, its compliance rate is still low making it hard for the disabled to use the website. It is surmised that in case of the US, using most of the websites will be very difficult for the disabled.

Improvement of accessibility requires not only developers' efforts and interest, but also the political initiative of the government. Considering that the mobile accessibility has been focused on the native applications and the public institutes so far, it is believed that active debates and improvement on the accessibility of the website and mobile web that are actually used a lot by the users are urgent for enhancing the information accessibility of the disabled.

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