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Study on the improvement of Search Engine Optimization

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Abstract

As the Internet is used as a major channel for marketing and sales, the top ranking of search engine results is becoming a key competitor among websites. Various methods exist to maintain the top ranking of websites in search engines, typically investing heavily in organic coding or search engine optimization. The purpose of this paper, we present the ranking by recognizing factors that should be removed as negative factors when designing a web page in consideration of website visibility (SEO) because if website visibility is not met, the ranking may fall behind or be completely removed from the search engine index. The experiments that recognized and ranked the negative factors of website visibility proposed in this paper were provided through theory and experiments based on the existing website visibility analysis model. The models analyzed in this paper, we expressed or quantified as scores based on the methodology of each model, and 10 items were selected as negative factors through experiments and ranked as high scores. Therefore, when designing a website, it should be considered that the website is not removed from the search engine index as it is designed by excluding high-ranking items, which are negative factors.

Keywords: Search Engine, Optimization, Visibility, Website

1. INTRODUCTION

In modern society, the Internet has an important influence that cannot be left out of companies or our daily lives. The most commonly used area of the Internet is e-mail and search, and it is argued that more than 80% of Internet users are traffic generated from search. Also, the use of search engines to find information related to online communication is remarkable in the ways we use the Internet. According to analysts, an average of 90% of the searcher engine users do not refer to the third Search Engine Result Page (SERP) [1]. As the use of search processes and search results plays an important role in online purchase decisions, it is most important to create a website to secure the top of SERP when building a website. Website designers must choose a structured design method in designing web pages or bear the cost of maintaining the top ranking of search engine results pages. Until now, guidelines for essential factors or factors to be removed to maintain the top ranking for search results of search engine have been provided, the ranking system through experiments based on the academic research model is weak. The purpose of this paper is to generate rankings through experiments based on the research methodology of the web visibility model for factors that can be removed from the search engine. In addition, high-ranking negative factors generated through experiments can be noted as items that should be removed first when designing a website.

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2. RELATED RESEARCH ANALYSIS

2.1 Background

Search engine optimization (SEO) is a process of coordinating the increase in the number of top-ranked visitors or visitors by imaginary visitors, and is the core of online marketing to maximize corporate profits, and there are various methods to diagnose and evaluate SEO performance as a basic work. More than 50% of SEO had unnecessary traffic on operating profit before applying SEO, but the detailed application of SEO increases the visit rate of meaningful search engines such as Naver or Google, which can directly affect operating profit shows in Table 1 [2-4].

Table 1. Comparison for SEO process

Source	before SEO	1 Month after SEO	3 Month After SEO
Direct Traffic	5.9	4.85	11.74
Daum	8.4	11.64	47.09
Google	6.4	40.84	34.2
Naver	16.02	30.34	42.2
Yahoo	10.68	8.09	7.56

From a corporate perspective, improving the visit rate of search engines popular with Internet users means an increase in purchase rate or operating profit rate, indicating a focused interest in methodologies to maintain the top ranking of search engine results in website visibility. Therefore, search engine optimization should be made by accurately analyzing website visibility factors so that the search ranking of the website is not determined by actual content but by spam or negative items.

2.2 Analysis of Relevant Models

Various related studies are currently underway on factors affecting website visibility. The Binnedell model is an early analysis model related to website visibility, and it is simply divided into positive and negative factors without giving any ranking [5]. The Chambers model is a concept of the Binnedell model, which includes the same properties but ranks them through experiments [6]. In addition, the Visser model measured the ranking in more depth by integrating more detailed experiments with academic research and interviews with practical experts based on the Chambers model [7].

In the Binnedell model shown in Figure 1, the factors that appeared as positive signs appear on the website, and the negative signs are classified as factors that have a negative effect. The disadvantage is that no experimental experience is made and the ranking is not determined by arranging positive or negative factors equally, but it is also considered suitable as a web visibility analysis model [8]. In this model, six items were classified as negative factors at the same level without hierarchical distinction [5].

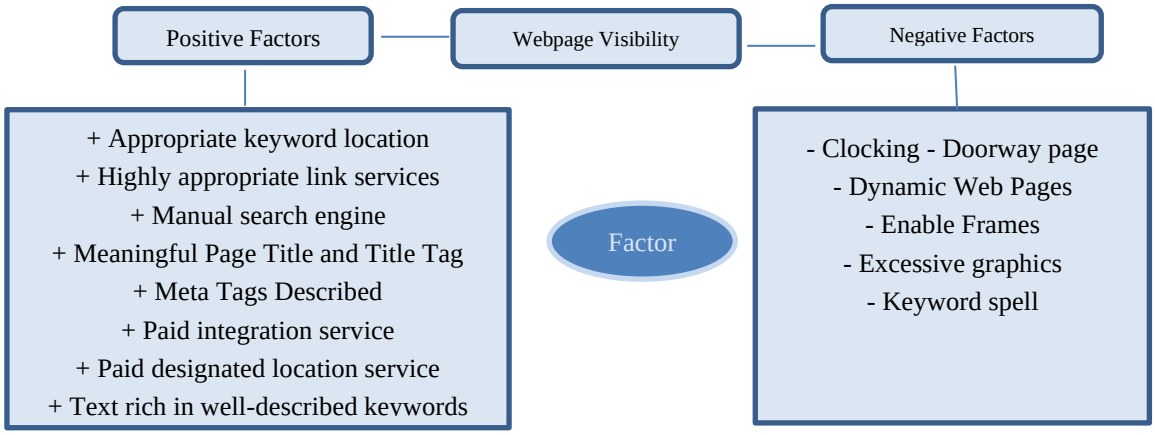

Figure 1. Binnedell model

Chambers Modell experimented with 1244 websites using 6 search engines with 48 keywords, and through this, the model was completed by ranking them through expert screening in the same field along with academic research results show in Figure 2 [6, 8]. Unlike the Binnedell model, which is divided into positive and negative factors, Chambers Modell is characterized by being completed by dividing positive and negative factors in a gradual stage.

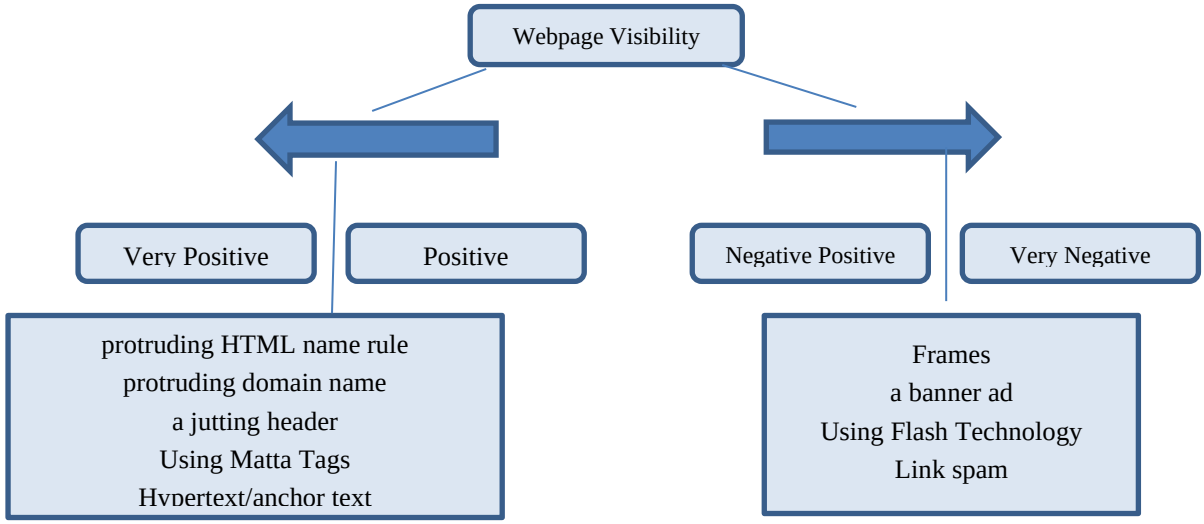

Figure 2. Chamebers model

In the same way as the Chambers model, the Viser model was experimented in parallel with academic research, and the experimental results were analyzed in-depth to create subcategories of essential, imposition, warning, and risk factors to complete the model shown in Figure 3 [7, 8].

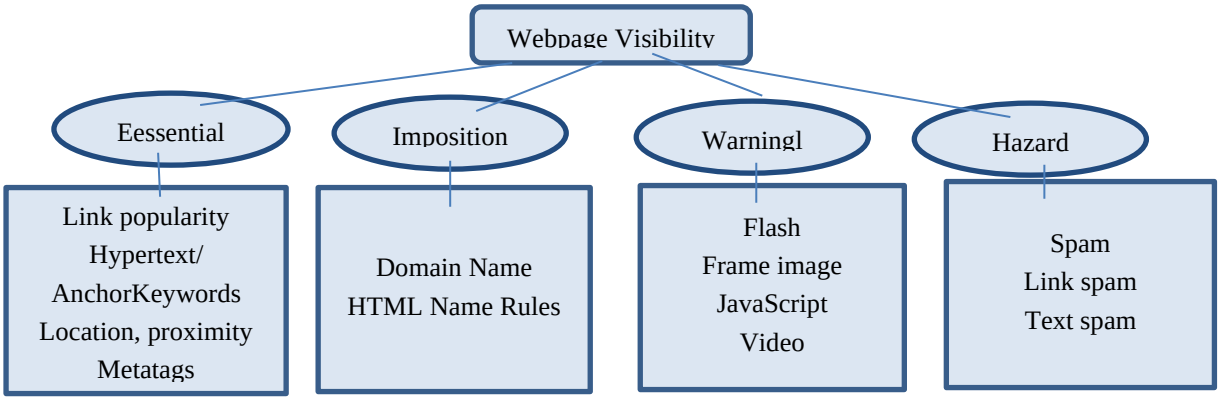

Figure 3. Visser model

2.3 Analysis Results

Table 2 shows the result of analyzing negative factors among the three models analyzed in the previous chapter by collecting similar items or the same items.

Table 2. Negative elements of adaptive models

Model	Binnedell	Chambers	Visser
Banner Ad		O	
Cloaking	O		
Doorway page	O		
Dynamic Web Pages	O		
Flash		O	O
Frames	O	O	O
Graphics	O		
Java Scripts			O
Keyword Spam	O		O
Link Spam		O	O

As a result of analyzing the negative factors of the Binnedell, Chambers, and Visser models by integrating similar items or the same items, four negative factors were found in more than two models: frame, link spam, keyword (text) spam, and frame and flash.

In addition, a comprehensive analysis of the research results of the items shown in Table 2 analyzed that frames are used to create websites for a certain navigation deployment, but web pages composed of general frames are not indexed by search engine visitors or linked by continuous links [9]. Framing-free web pages often ignore or exclude frames when designing websites because they increase the visit rate of search indexes [10]. In addition, some experts have suggested that typical web pages should limit frames for vertical screens because users avoid scrolling [11]. In the case of keyword spam indexes, most of them appear when keywords or keyword sentences are used repeatedly, even though text can be read appropriately. If keywords are used to introduce the website and to convince visitors to maintain search engine rankings, text can be solved by focusing invisible to avoid being removed from the search engine index when designing the website.

When using a search engine algorithm, the use of link analysis is common to increase the number of visited links on a given web page, but most of them consist of links in content that have no meaning [12].

Therefore, there may be various methodologies to design a website that considers more effective website visibility, but in this paper, a method of ranking was selected by weighing the factors determined in each model analyzed earlier.

3. WEB VISIBILITY RANKING EXPERIMENT

The experiment to determine the ranking in this paper was decided by assigning scores to each model analyzed in the previous chapter. Although there are the same negative factors in the overlapping model, the methods of determining the negative factors in each model are different, so a method of using different weights based on the experimental results of these models was selected. According to the evolution of technologies in the SEO field, the Chambers model was assigned a random score, 10 points were deducted from the Binnedell model, which was simply divided into positive and negative factors, and 10 points were allocated to the Visser model. The weights applied to the models proposed in this paper were based on the Weideman method [8] and the weights of the most negative items were adopted as 1. In addition, in order to quantify negative factors, the weights were different according to the negative differences in levels present in each model [8].

3.1 Binnedell Model

In the case of the Binnedell model in Table 3, the same weight was given because the six negative factors were treated the same [8].

$$\textit{Binnedell model} = \frac{\textit{Binnedell model allocation score}}{\textit{Evaluation score}} \quad \textit{Binnedell model negative factors}$$

Table 3. Binnedell model points

Factor	Level	Weight Value	Evaluation Score
Excessive Graphic	Negative	1	3.33
Clocking	Negative	1	3.33
Doorway page	Negative	1	3.33
Dynamic Web Pages	Negative	1	3.33
Frames	Negative	1	3.33
Keyword Spam	Negative	1	3.33
Total		6	20

3.2 Chambers Model

In the case of the Chambers model, negative factors were classified into four gradual levels, so the weight was assigned by increasing by 1 for each level shown in Table 4 [8].

$$\textbf{C}hambers\ model\ Evaluation\ score = \frac{Chambers\ weight \times Chambers\ allocation\ score}{Chambers\ model\ weights\ total}$$

Table 4. Chambers model points

Factor	Level	Weight Value	Evaluation Score
Visible Link Spam	Very Negative	4	12
Flash	Negative	3	9
Frames	Relatively Negative	2	6
Banner Ad.	Little Negative	1	3
Total		10	30

3.3 Visser Model

In the case of the Visser model, weights were assigned in consideration of the classification of seven negative factors into two subcategories shown in Table 5 [8].

$$Visser\ model\ Evaluation\ score = \frac{Visser\ model\ weight \times Visser\ model\ allocation\ score}{Visser\ model\ weight\ total}$$

Table 5. Visser model points

Factor	Level	Weight Value	Evaluation Score
Link Spam	Warning	3	10.9
Text Spam	Warning	3	10.9
Flash	Hazard	1	3.6
Frames	Hazard	1	3.6
Image	Hazard	1	3.6
JavaScript	Hazard	1	3.6
Video	Hazard	1	3.6
Total		11	40

3.4 Application of Evaluation

In order to determine the ranking to exclude negative factors from the above analysis results, the evaluation scores of negative factors calculated in each model in Table 4 were added and rearranged to a high ranking shown in Table 6. In other words, in the case of link spam, 12points of visible link spam in the Chambers model and 10.9points of link spam in the Visser model are classified into the same item, and the total evaluation score of link spam in Table 6 is 21.9. Table 6 shows the result of the analysis in which the evaluation scores of similar items or the same items of each model shown in <Table 4> are added in this way and rearranged to a high ranking of the total evaluation scores.

Table 6. Negative element point list for website visibility

Model	Binnedell	Chambers	Visser	Total
Link Spam		O	O	21.9
Keyword Spam	O		O	14.2
Frames	O	O	O	12.9
Flash	O		O	12.6
Graphics	O		O	6.9
JavaScript			O	3.6
Doorway page	O			3.33
Dynamic Web Page	O			3.33
Cloaking	O			3.33
Banner Ad		O		3.33

In Table 6, link spam and keyword (text) spam were classified into upper ranks, and they were found to be the most negative factors to be excluded from website visibility. Therefore, it can be considered as a factor that should be excluded first when designing a website for search engine optimization to maximize an entity's profit margin.

4. CONCLUSION

The purpose of this paper, we present the ranking by recognizing factors that should be removed as negative factors when designing a web page in consideration of SEO because if website visibility is not met, the ranking may fall behind or be completely removed from the search engine index. The experiments that recognized and ranked the negative factors of website visibility proposed in this paper were provided through theory and experiments based on the existing website visibility analysis model. Experiments to improve website visibility for search engine optimization proposed in this paper showed that spam indexes should be removed from the website first. Experimental results proposed in this paper, we provided as a guide for website designers to improve web visibility for search engine optimization when designing websites. Rresearch should be expanded to not only expand and apply factors from a more practical perspective, but also analyze positive factors to prepare guidelines that can be actively applied when designing websites.

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