



Search Engine Optimization Techniques- The Analysis

Sandhya Dahake

G. H. Raisonni Institute of Information Technology,
Nagpur
Sandhya.dahake@raisonni.net

V. M Thakre

HOD Dept. of Computer Science & Engg. SGB Amravati
University, Amravati,
vilthakare@yahoo.co.in

Abstract- In this paper, Search engine optimization (SEO) involves designing, writing, and coding a website in a way that helps to improve the volume and quality of traffic to your website from people using search engines. The SEO technique is used to increase the number of inbound links, which also helps to promote a website. In order to improve their website visit quantity, SEO techniques can make a better ranking in the search result using the keyword selection and deployment, high quality back links, rational website constitution, and rich content, etc. SEO Techniques includes website optimization, keyword optimization, link optimization, website submission etc. in which keyword optimization accounted for about 35% of all the factors. Crawler technology is adopted to reverse search engine's relative search results in order to expand keywords.

Keywords- SEO, PR Value, link popularity, SEO-tools, Keyword Selection, Crawler Technology

I. INTRODUCTION

According to Wikipedia, "Search engine optimization (SEO) is a set of methods aimed at improving the ranking of a Web site in search engine listings..."

With the rapid development of information technology, search engine optimization (SEO) technology has attracted more and more attentions. In order to improve their website visit quantity, SEO techniques can make a better ranking in the search result using the keyword selection and deployment, high quality back links, rational website constitution, and rich content, etc.

Search engine optimization, called SEO for short, is important to websites, which will improve the rank for search engines and get more page views. Search engine optimization (SEO) is a process of improving the prominence of a website [1,2,3].

Search engines use automated programs called 'bots' or 'spiders' to travel the internet which collect data and web pages and then begin the process of categorizing them, so they can be returned for relevant searches. Search Engine Optimization is a process that encompasses every aspect of a website and its construction; on its most basic level it involves 'keywords' and 'key data' being included in specific places and the website being built in a specific way, which allow the search engines to easily and accurately categorize website.

Search engine optimization (SEO) involves designing, writing, and coding a website in a way that helps to improve the volume and quality of traffic of website from people using search engines.

A. How Do Search Engines Work?:

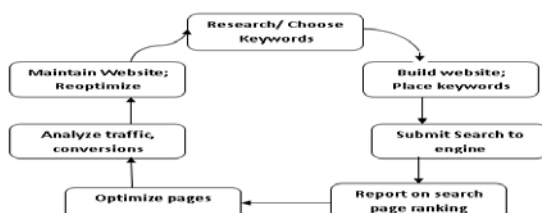


Figure: 1 The SEO Cycle

II. SEO APPROACHES

There are basically two types of search engines [2] that collect information in different ways.

- A. Crawler-Based Search Engines
- B. Human-Powered Directories

A. Crawler-Based Search Engines (e.g. Google and AltaVista) :

Search engines are complex software applications that are automated to survey ("crawl" or "spider") the Internet to find websites. A Search Engine crawler is also referred to as "robot" or "bot".

These search engine 'bots' generally index sites based on their content and links (i.e. how many websites link to your website). Therefore, quality and organization of content and link popularity are critical to optimizing your website.

Crawler-based search[2] engines consider many factors when indexing websites. Search engines are designed to try to find and rank the best websites (i.e. most usable, most informative, most credible). One of the most important ways for a search engine to rank the site is to consider the number and quality of websites that link to the website. In addition, a search engine might also consider the credibility of the website that is linked to the website.

The exact methods used by crawler-based search engines on how they rate content for rankings is not public knowledge. In addition, these rules change over time. However, There are some common techniques that can help to optimize a website to increase traffic .

B. Human-Powered Directories (Yahoo Directories and Business.com):

Human-powered directories are directories[3] that are compiled by human reviewers, who review, examine and evaluate short descriptions of websites provided by people who would like their websites listed online. Reviewers rate the content of submissions using criteria that are generally not known to the public.

There are many current search engines present both crawler-based results and human-powered listings. For example, Yahoo! provides both a crawler-based search

engine and a directory service (searchable separately from the crawler-based search engine).

a. Search Engine Optimization Approaches:

SEO involves a wide range of techniques. [4] But basically, there are two SEO approaches for optimization Techniques includes:

- On Page Optimization Techniques
- Off Page Optimization Techniques

On Page Optimization Techniques	Off Page Optimization Techniques
As the term suggests, on page optimization includes those techniques that can be done on the pages of a website. On page optimization relate to those things that are within your control – i.e. the content of your website. On page optimization techniques help the search engine crawlers read the website content. A readable site helps to show quality and will result in higher ranked web pages.	Off-site SEO, is the search engine technology that separate from your own site. The name originates from other sites' influence on your site's ranking, and these external factors are out of control of your site. Inbound links (other sites linking to your website, also known as back links) are the most important factor among these external factors. Off page optimization includes those techniques that can be done off the pages to increase traffic to your website such as link swaps, directory listings, blogging, and forum postings.

On page optimization techniques (i.e. a website that contains high quality content) is not sufficient to increase traffic to the website. The combine effect of both on and off page techniques will give best results.

The SEO technique is used to increase the number of inbound links, [5] which also helps to promote a website. In order to improve their website visit quantity, SEO techniques can make a better ranking in the search result using the keyword selection and deployment, high quality back links, rational website constitution, and rich content, etc. In this, detail the technical process of website search engine optimization in terms of the search engine work principle, factors affecting search ranking, and website search engine optimization method.

b. Page Rank (PR) Value:

Crawler-based search engines consider many factors when indexing websites. Search engines are designed to try to find and rank the best websites (i.e. most usable, most informative, most credible). One of the most important ways for a search engine to rank website is to consider the number and quality of websites that link to it.

Page Rank (Page Rank value, PR value for short) is one of Google's measurements of a page's worth based on the quantity and quality of both incoming and outgoing links. The concept behind PR value is that each link to a page constitutes a vote. Google awards PR value on a scale of 0 to 10; a PR value of 10 is the most desirable and extremely rare.

c. Link Popularity:

Link Popularity [6] is the most important key factor to increase page ranking. Link popularity refers to the number and quality of links that point to the website. Increasing the website's link popularity is critical. A Web page that has links from many pages that have a high Google Page Rank receives a higher rank itself. The absence of links means that

there is no support for that page and it will not get a high page ranking.

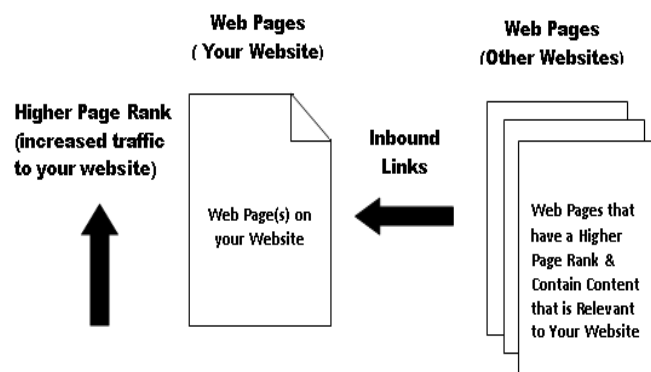


Figure: 2

The above diagram shows the importance of increasing the number of links to the website, and also inbound links are from good quality web pages (i.e. web pages that are highly ranked and contain content that is appropriate to the website).

d. Search Engine Optimization Techniques:

SEO techniques include website optimization [7], keyword optimization, link optimization, etc. in which keyword optimization accounted for about 35% of all the factors. Crawler technology is adopted to reverse search engine's relative search results in order to expand keywords.

- Keyword Optimization
- Website Content Optimization
- Website Structure Optimization
- Webpage Optimization
- Link Optimization
- Website Submission

e. Keyword Optimization:

In Keyword Optimization, the Keywords are the words which users input into search engine when they want to look up some information.

(a) Keyword Selection:

Only a website contains right keywords, it can meet the goal of user specific web search. Therefore the selection of the keywords should consider the requirement of internet customers.

Choosing the proper keywords is one of the most skillful steps in SEO. There are some principles of the keyword selection includes Related Contents, Large Quantity of Searches with Less Competition, Keywords should not be too broad, Keywords should not be too special.

(b) Keyword Density:

The keyword density refers to the proportion of the total number of keywords on a webpage to other text and usually is expressed as a percentage. In general, the search engine would consider the higher the keyword density in a page, the more related between the webpage and keywords.

(c) Keyword Distribution:

It is also an important method to improve results of search engine optimization if keyword is inserted into an appropriate location of a webpage. Several important places

to put the keywords are webpage title, Meta keywords section, Meta Description section, page header tags (H1,-H6), and links texts of internal and external link.

f. Website Content Optimization:

Search engines believe in unique and high-quality original content. If the content of website [8] is only the web pages copied from other websites, most likely it will not be indexed by search engines. In addition, the website content being continually updated is most basic condition for survival and development of a website. The crawl cycle of website with search engine spiders will change with the information update frequency of the website. If the website content is frequently updated, then search engine spiders will often visit this site and grab more pages.

a) Website Structure Optimization:

The website should have clear navigation system[9]. Some web pages use frames and the navigation buttons in Java and Flash which looks very nice and beautiful, but the search engine cannot find them. The remedy is to make another navigation bar using regular Html links at the bottom of the webpage to ensure every webpage can be found through this navigation bar. The section with plain text website navigation system can reflect more information than the picture format in the search engine.

The website structure should also be clear in hierarchy to minimize the directory depth. The depth of the general directory should be no more than four layers. The following methods can be used to reduce the link depth: placing important webpage and section links to the home page as much as possible and moving the second and third tier section title to the homepage.

b) Webpage Optimization:

Generally speaking, search engine only reads text and ignores image, Flash, and JavaScript, so in the entire website design, Html code and the text should take the major part.

Most images can be used in the form of the background image in order to ensure the nice appearance of the website and fewer images should be directly embedded in webpage. In this case, the text description that can be seen by search engine should be added (e.g., embed the keyword in the image Alt attribute; add the description text or links with embedded keyword next to the image).

JavaScript can realize special effects on webpage, but a lot of JavaScript will increase the crawling difficulty for a search engine and will interrupt the search spiders to analyze the webpage content. As under the current condition that the search engine is not completely suitable to JS, it is generally not recommended to use JS in navigation and links.

The search engine thinks that a file generated by the dynamic page has more variable factors [10] and a lot of uncertainty in content. Therefore, the static web pages have a higher priority when indexing and ranking web pages, so it is better to use the static webpage in developing SEO.

c) Link Optimization:

In SEO, Three most important links are Incoming links outgoing links and Internal Links.

(a). Incoming Links (External Links): It is essential to website ranking to have as much high quality external links [11](also known as incoming links) as possible.

Therefore, a link analysis tool can be used to analyze the situation of how the website is linked. When the source website links the target website, web spider can see the target website address when checking the source website and will quickly grab the content of the target website.

Thus, it will be more effective for a new website to receive high quality links to other websites the submitting itself to the search engine.

(b). Outgoing Links: Outgoing link means link to other websites. The search engine not only analyzes incoming links[12] but also analyzes outgoing links to other websites. If the content of outgoing linked website is associated with original website, it is also good for search engine rankings. This is also why exchanging links need to select the website with relevant subject. Attention is in order in making outgoing links to controlling the quantity and quality of the outgoing links. If the linked website has a low PR value or cheat, it will affect the current website's ranking in search engines, so be careful to use the outgoing links.

(c). Internal Links: The web pages within a website should also be linked to each other, like the "related articles" list [12] at the end of a regular article, which links all other articles under the same subject in this website. In this way it will not only facilitates the visitors, and increases traffic, but also is conducive to search engine to index web pages and links multiple web pages to the same internal webpage, as well as helps to improve ranking for that internal page. From the perspective of website optimization, complete internal links should be established to ensure that each page will have a link to return to home page. It is also important to check the internal links often to prevent broken links.

d) Website Submission:

Even though a website can be recognized by the majority of web spiders through the establishment of external links[13], but it is still needed to submit the URL to each search engine, the ODP directory, and to links to other valuable websites.

(a). Submit to Search Engine: At the beginning of a newly established website, the website address should be first submitted to search engines[14]. Even though search engine processes a new website in a long cycle, but it is still the easiest way to be found by search engine compared with establishing links to other external websites.

(b). Submit to the Open Directory Library: ODP (Open Directory Project) [15] is a directory search engine with the website addresses reviewed and edited by volunteers. Before submission, it is important to ensure the integrity of the completion of website link and the content itself with some value. At the same time when filling in the website introduction, the subjects are described by the concise statement without too many adjectives.

III. SEO OPTIMISATION

A. Tools of Search Engine Optimization:

The tools which optimized the Search Engine function are the SEO tools. The most effective way is of testing search engine optimization status directly with search engine. Because the retrieval result can bring people a large number of valuable information. The analysis of search engine retrieval result is one of the effective methods of researching site search engine optimization status. Therefore search engine optimization tools is designed to test that a website may obtain search engine ranking effect to search engine optimization degree machine. The SEO tools include mainly keyword tool, link tool, usability tool and other tools.

a. Keyword Tool:

Keyword tool includes keyword research tool, keyword density analysis tools and competitor analysis tools, etc. The study of keyword research tool can prepare for Website classification and regulate keyword deployment columns. The exiting tools include Keyword Research Tool, Keyword External Tool, and Keyword Selector Tool etc.

b. Link Tool:

Link Tool in practical applications mainly contains Link popularity, Grade C IP Address Inspection and spider simulator. One important role of adding link popularity is increasing ranking advantage in search engine. Grade C IP Address Inspection checks the link pattern on IP address, and should not be punished by link of same kind IP address. Through spider simulator can learn the difference between the look of your web page and the search engine spider's index.

c. Usability Tool:

The Browser resolution test is a very practical tool. It tests pages' display effect in different resolution, different operating systems, and different browsers. Usability tool includes HTML and CSS validation, Fire Fox extension and page speed test also. SEO tool in fact are varied. In addition with above tools, it also include checking tools such as Link Popularity check, Search Engine Spider Simulator, similar page checker etc. and other such as Page rank prediction, what can view a specific URL Page Rank, Search engine Saturation what can detect the search engine detect number of web site.

d. Keyword Strategy:

Keyword Strategy is the core of search engine optimization. When choosing keywords, some points must be noted, firstly select the often used when the people searching. In addition to this, the keyword must be related with the focus on the promotion of the products, services and information by the same website. Secondly keyword cannot be too many, at the same time to comply with the requirement of the search tool. Avoid popular keywords. Third, use keyword analysis tool and finally must be avoided the broad general term as the mainly keywords, to select the definite word as much as possible. Do not use keyword in the same line more than two times continuously.

e. High-quality Incoming Link:

Submit the website to search engine directories, find the website to exchange links, the website is linked or

reproduced actively, published professional articles in important website[16]. Export links are added some resources of the search industry the keyword related to on the website. Engine optimization is the focus of the link strategy, SEO link strategies are mainly consists of three parts: import links, outbound links, and internal links. Import links refers to website ranking crucial factor is the high quality get as much as external links. Internal links through linking the articles in the same theme in website make visitors convenient, mutual beneficial to search engine.

IV. ANALYSIS AND DISCUSSION

Search engine optimization, refers to such behaviors to improve the structure and content of website according to the rules and standards of search engines, and make it more suitable for search engines; as a result, it will be collected and the rank for search engine will be higher. Search engine optimization is characterized by effectiveness, timeliness and convenience. Compared with other patterns of website marketing, search engine optimization has the advantage of good cost performance, which is likely to get better performance with lower cost; in addition, it can also bring other values to website operation.

There are different areas, field in which the SEO is applicable. The different areas are: Promotion of website, Website development, online advertising

V. CONCLUSION & FUTURE SCOPE

The aim of this paper is to study and analyze the factors and parameters affecting the SEO process, considering the web page design. Many factors of website design process affect the functioning of SEO but in this research work, focus will be given on the factors and parameters affecting for web page design only.

The paper emphasizes on use the specific SEO algorithms and techniques such as page rank algorithm and Hilltop algorithm. Some SEO people stresses upon certain tactics use for web development such as contents of website tactics, domain and hostname tactics, and links and keyword tactics.

VI. REFERENCES

- [1]. Antriksha Somani, Ugrasen Suman, "Counter Measures against Evolving Search Engine Spamming Techniques", IEEE Conference, pp. 214-217, 2011
- [2]. Constantinos Dimopoulos, Sergey Nepomnyachiy, Torsten Suel, "Optimizing Top-k Document Retrieval Strategies for Block-Max Indexes", IEEE Conference, ACM, pp. 113-122, 2013
- [3]. Meng Cui and Songyun Hu, "Search Engine Optimization Research for website Promotion," in IEEE Int. Conf .of Information Technology, Computer Engineering and Management Sciences), pp. 100-103, 2011.
- [4]. M. Li, X.J. Gu, Z.X. Yang, "Research of Vertical Search Engine in News Industry," in *Proc. IEEE ISMOT*, 2012, pp. 253-256, 2012.
- [5]. Cen Zhu and Guixing Wu in " Research and Analysis of Search Engine Optimization Factors Based on Reverse

- Engineering” in Third International Conference on Multimedia Information Networking and Security, pp. 225-228, 2011.
- [6]. Khalil ur Rehman and Muhammad Naeem Ahmed Khan “The Foremost Guidelines for Achieving Higher Ranking in Search Results through Search Engine Optimization” in International Journal of Advanced Science and Technology Vol. 52, pp. 101-110, March, 2013.
- [7]. Wu Oil, Luan Tianl, Bai Yanl, Wei Liyuanl, Li Yanhui2, in “Study on SEO Monitoring System Based on Keywords & Links”, IEEE Conference, pp.450-453, 2010.
- [8]. Zhou Hui, Qin Shigang, Liu Jinhua, Chen Jianli “ Study on website Search Engine optimization” in International conference on Computer Science and Service system, pp. 930-933, 2012.
- [9]. C. Dinesh, P.Rewatkar, K. Sweta, etc. “Search Engine Optimization,” Asian Journal of Computing Updates and Trends, vol. 2, Issue 1, pp. 38-47, 2011.
- [10]. Xinjuan Zhu, Zhiqiang Tan, “SEO Keyword Analysis and Its Application in Website Editing System”, IEEE conference, 2012.
- [11]. Lihong Zhang, Jianwei Zhang, Yanbin Ju, in ” The Research on Search Engine Optimization Based on Six Sigma Management”, in IEEE conference 2011, pp. 101-103, 2011.
- [12]. Jing Shi, Yan Cao, Xue-jing Zhao,” Research on SEO Strategies of University Journal Websites “,IEEE conference, 2010.
- [13]. Increasing Traffic to Your Website Through Search Engine Optimization (SEO) Techniques, pdf file
- [14]. Chengling Zhao, Jiaojiao Lu, Fengfeng Duan in “Application and Research of SEO in the Development of Web2.0 Site”, Second International Symposium on Knowledge Acquisition and Modeling, pp. 236-238, 2009.
- [15]. Jing-Guang Gao, Guoqiu Yu, Lei Tao, “A Method of Keywords Selection Evaluation Based on Search Volume”, 2010 International Conference on Educational and Network Technology (ICENT 2010), pp. 25-28, 2010