

# INVESTIGATION OF TECHNIQUES TO IMPROVE WEBSITE RANK ON GOOGLE SEARCH ENGINE

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## ABSTRACT

Nowadays Internet become one of the huge information resource, to search quality information is required for end user and due to exponential growth of Internet it become difficult to search qualitative information from Web. Search engine is a kind of online software/tool which search your keywords on Web, enlists of web sites as search result. Usually, web users searched information on the first page of search engines results. Through some techniques and optimization rules, it is possible to move a web page to the first page of a SER. In order to accomplish, the search engine optimization concepts must be used by developers. There are many imposing factors that enable a website to move up as top results. So, SEO must use an increasingly sophisticated technique which uses updated web pages with high factor, instead of outdated page rank algorithms. In this research paper, authors explain PageRank algorithm, a method for rating Web pages and describes how to efficiently compute PageRank for large numbers of pages.

**Keywords:** Google Search, Pagerank, SEO, SEO-Tools, Web-traffic

## I. INTRODUCTION

Search engine is a kind of software / tool which analyze pages of websites and collects important data about web sites i.e. factors. The collected data includes the web site URL or some keywords or keyword groups that define the content of the web site, the code structure which forms the web page and also links provided on the site. The related collected data is indexed and stored on a database. [1]

All of these operations are calculated by the search engine software (crawler, spider, and robot). [1] Search engines use special programs which are named as spider or robot. These programs move by using hyperlink structure of the Web. It navigates through web pages periodically and capture changes that have been made since last navigation (Spiders / Crawlers). [1]

Data obtained by the related programs are stored in a very wide database system. This database is said as the index of the search engine. Hence, the performed operation is called as "indexing". When users perform a query in order to get some data or information, the related query is transferred to the search engine index and results are shown to users (query). [2]

Essential competition factor among search engines is appeared during "relevant result showing, sorting" process. After calculating the related pages with the performed query, they must be shown to users in a sorted list structure. At this time search engine algorithms take an important role and they try to show the most relevant

results for users. Briefly, searching robots collect data about each URL and store the collected data in a database. When a user joins to the search engine for a search session, references in the related database are evaluated and obtained results are returned back to user. [1]

Search Engines (SEs) are the tools used to find this content, and they can be classified into three groups:

**General:** e.g. Google, Yahoo, Bing (formerly Windows Live Search, Live Search and MSN Search), and ask (formerly AskJeeves.com)

**Vertical Search:** specialist SEs that focus on specific resources reducing the number of irrelevant hits, e.g. Travelocity and Expedia.

**Location Based SEs:** these use geographical information (such as zip codes or IP addresses) about the users to provide more relevant results.

Most of today's SEs search for Web pages utilizes a user supplied text sample (a keyword or phrase). The SE returns a list of "hits" or Web references that match the sample; these are displayed on the Search Engine Results Page (SERP), listed and sorted by relevance. Gathered information is not limited to the text, and can include images, PDF files and other types of content. [2]

### 1.1 SEO

Data or information about an unknown subject is usually searched on the first page of search engines. After examining first 3-4 result pages, other remaining pages are not appraised by users. Because of this, it is important to move a web page to top lists of search engines in order to introduce it better. To achieve this, the search engine optimization must be used by web site developers. [2] Because it is possible to move a web page to the first page of a search engine by using only some necessary optimization rules. It is important to have a well-structured, effective and good-looking web page to introduce the related company, services or products better. [1]

But it is also too important for customers to search and find the related web page on a search engine easily. Furthermore 78 percent of Internet users also search for products or services by using search engines mostly. It is an easy and effective way to introduce and market a company by using a web page. To achieve this knowledge related to the company is obtained by using search engines. [1]

So, search engine optimization (SEO) is the process of improving the visibility of a website or a web page in a search engines results page. Businesses operating in an online environment typically strive to promote their products and services on search engines. To gain more lead generation and ultimately customer's ongoing effort to improve a domain name, page rank and search engine performance is required. The key aim of a company's SEO effort is to increase traffic to their website. [5]

### 1.2 Fundamental of SEO

- Search engines must be taken into consideration while designing a web site. Some questions that must be answered for the same as below:
  - Is there any essential method or approach used on search engines to take users' attention to the related web site?
  - Which search engine is the related web site wanted to appear on?

- Which row on the results pages is satisfactory?
- Optimization of a search engine can be performed in two separate groups. One of them is external web site optimization. The other one is internal web site optimization. Internal optimization of web site includes meta tags, web site design, keywords that are necessary for the web site, pictures, page names, links, content texts in each page and styles that used for the site map, related texts, RSS feeds, pages in different languages etc. [1]
- Though, external web site optimization includes adding web site to the site guide, using social media factors, using links from other optimized web sites to the related web page...etc.
- First, the keyword analysis must be done for the site, which the optimization operation will be carried out for. Keyword analysis of a web site must be done according to the following rules or tasks.
- A strong list, which includes latent keywords, must be formed via keyword analysis.
  - By performing some search, web sites in top 5 list must be found out.
  - Links must be counted and their target keywords must be found.
  - Words, which were not tested in the keyword analysis must be discovered and listed.
- In keywords, products or services must be defined in their both short and long word usage structures. Here, definitions are made with some words rather than using a short and single word. [2] Accordingly statistical research studies, Internet users prefer using 2 - 3 words to perform a search on a SE. [1]
- Some different keyword using approaches can also be used to prevent from usual typing errors. Putting in place keywords to the top part, image names and section titles is an important task for the optimization. [5] A keyword density with 5-8 % (5-8 keywords in 100 words) is suggested to use in the page content. Preferable keywords located at top part enable the robot to evaluate the web site as the most suitable site for the searched word. [2] Using same keywords or definitions repeatedly in the page content, HTML area or Meta tags may be evaluated as spamming by the robot. [1]
- Briefly, the related keywords can be used in the following fields in order to move web site on top results of search engines:
  - In the page title-tag, -In meta description tags, -In heading tags, In keyword description tags
  - In lower description tags, -In link texts, -In graphics, -In plain texts, -In domain fields (if it is possible)
- It is important to use some important techniques in the search engine optimization. E.g. unnecessary keywords that aim search engines but have nonsense on users is a negative approach to use. [1]
- Though, original contents that supply new, useful service that other web sites don't have is also an important point. Using readable and intelligible language is also important. Images (animation, flash) are indispensable elements of a web site but image using must be optimized to enable robots to index them.
- To achieve this, intelligible file name and "alt" value can be used. For links, it is also suitable to use "alt" label. Documents, cards and posters that are used in the web site should also include the URL of the web site. Using social media also enables the web site to become more popular. [1]
- Users' reaching methods to the web site and their behaviors can be examined.

- The most interesting content can be determined.
- Effects of the changes, which have been done on the web site, can be examined (i.e., has the Incoming user traffic from search engines increased after changing the title and definition Meta tags?)

## II. PAGERANK AND BACKLINKS

### 2.1 Importance of Page Rank and Back Links

Back Linking can be an effective method for gaining Page Rank. Google Panda allowed the quality optimized sites with suitable Back Links, to top the search engine rankings and lower the less significant websites. Back Links have become extremely important to SEO and have furthermore developed into the main building blocks to high-quality SEO. [8]

Back Links can be described as links that are directed towards a website. The amount of Back Links is a signal of the popularity/importance of that website. Search Engines such as Google, offers extra credit to websites that have a high number of quality Back Links and consider those websites more relevant than others in the Page Ranks.

“The more back links your website will have, the more frequently it will be visited by search engines robots, which means that new content will be indexed much faster”. [5]

Therefore, Back Links are very significant to SEO and determining a Page Rank. Popularity in Google is calculated by Page Rank, a value scaled from 0 to 10 that signify the total figure and the quality of links directed to a website as shown in table 2.1. Google updates a website Page Rank, whenever it locates a new Back Link. [10] Relevancy is defined per keyword, and doesn't contain any publicly accessible indicators. Contrasting to popularity, relevancy is a measure resulting from natural language processing techniques. These specify how much the anchor text and the nearby content of the Back Link, relates to a web page. Both popularity and relevancy are calculated per page.

Toolbar PageRank (log base 10)	Real PageRank
0	0 – 10
1	10 – 100
2	100 – 1,000
3	1,000 – 10,000
4	10,000 – 100,000
5	And so on...

In theory, if one page on a website has a lot of extremely relevant back links, it will be ranked high in the search engines, whereas the remainder of the pages will be ranked low. “In reality, the whole website will be ranked high, because very often, each page will have a plenty of internal back links to the main page and vice versa”. [5]

In short Page Rank is a "vote" •, by all the other pages of site on the Web, about how important a page is. [4] A link to a page counts as a vote of support. [4] If there's no link there's no support (but it's only an abstention from voting rather than a vote against the page). Page Rank is defined like this:

We assume page A has pages  $T_1 \dots T_n$  which point to it (i.e., are citations). The parameter  $d$  is a damping factor which can be set in between 0 & 1. We usually set  $d$  to 0.85. There are more details about  $d$  in the next section. And also  $C(A)$  is defined as the number of links going out of page A. The Page Rank of the page A is given as follows: [4]

$$PR(A) = (1-d) + d (PR(T_1)/C(T_1) + \dots + PR(T_n)/C(T_n))$$

Page Ranks form a probability distribution over web pages, so the sum of all web pages Page Ranks will be one. PageRank or  $PR(A)$  can be calculated using the simple iterative algorithm, and corresponds to the principal eigenvector of the normalized link matrix of the web.

Social media websites and spammers were affecting the Page Ranks, by submitting linked blog comments. Google's solution to this irritating problem was creating a tag to block it. [10] This attribute ensures that spammers obtain no benefit from abusing public areas (such as: blog comments, trackbacks, and referrer lists).

## 2.2 What are the latest SEO techniques in 2012?

The best SEO techniques have only changed minimally, as the most significant ranking factors practically remained unchanged. Though, there are many entrepreneurs and business owners who stay curious about the latest SEO techniques.

1) *Content remains Emperor:* In 2012, businesses are ought to have a balance of 'human friendly' content and 'search engine' friendly content. The potential customers/current contacts are purchasing these products or services, therefore if the business's desire is to become noticed in the search engines, having quality content will be the key to their online success in 2012. Webpage titles are the backbone of the entire website traffic. A webpage title is the primary item that appears on Search results page, followed by post URL and finally a snippet from the webpage. The choice of keywords, word limit and use of characters is vital to becoming noticed.

2) *Page Speed/Load Time:* Readers often become irritated with a slow load time of websites. Search engines aim to provide its users with a great search experience. To achieve this outcome, Google values load time and directs its users to websites that load faster. Organizations need to be aware that not all browsers use a fast broadband connection. Internet speed on smart phones is also moderately slower, so it is vital businesses try to maximize page speed as much as possible. Several actions to achieve this technique include: Save all images in GIF or PNG format, Give proper dimensions to images, Use limited advertisements, Summarize your posts using the Read More link, Show only four-five posts at home page.

3) *Original Photos & Videos:* To make a website further interactive, businesses are required to consider adding original photos and appealing videos to the website. While search engines such as Google 'crawls' web pages, it searches for content that is varied. Optimizing the videos and photos for SEO purposes is additionally important. Following the introduction of image search technology, traffic through images cannot simply be avoided. Each image on a website is a great source for quality traffic, if they are tagged correctly. With tags, images have no value unless it is declared by adding its description inside the alt text attribute.

4) *Web Content for Mobile Users:* In 2012, a high percentage of web users will be browsing from their iPads and mobile devices. If the websites posted content that takes too long to satisfy needs, users will lose patience and move onto the next competitor's website. It is important that businesses include a clear 'Call to Action' on each page of their website. It is strongly recommended to consider hiring a superior SEO copywriter to produce fresh content for the website/blog/social media sites. This assists the business in converting browsers into paying clients.

5) *Sharing Web Content:* One affective solution to generate more traffic in 2012, is to share business content with social media networks such as Facebook, Twitter & Google+. Optimizing the web pages for social sharing will assist to draw additional traffic. For example, Facebook allows the ability to create pages extra social media friendly. This is achieved by optimizing the titles and Meta tags by using Facebook Open Graph. When users start sharing one of the web pages, it will automatically improve the conversion rate of the website. Finally, when sharing content throughout social media, it is significant that businesses comprise a back link to their website. Social media offers an outstanding opportunity to connect with people who 'like' or 'follow' the business online.

6) *Link Juice:* "Link Juice is very important aspect taken into consideration by Google for ranking a website. The more inbound links a site has, more it receives Link Juice. Strong inbound links help a website in getting on the top of a Search Engine Result Page (SERP). Only quality inbound links help in creating good quality Link Juice that is beneficial for your site and help in achieving high Page Rank" [11]. Articles and blogs are recommendations to increase good quality Link Juice to a website. Link Juice can be achieved in a short amount of time - it is suggested to obtain more links through content, and acquire quality Link Juice.

Content Is King! There really is no substitute for lots of good content. Make it worth other people's while to use your content or tools. If our give-away is good enough other site administrators' will gladly give you a link back. [4] Its probably better to get lots (perhaps thousands) of links from sites with small PR than to spend any time or money desperately trying to get just the one link from a high PR page.

### III. TOOLS FOR SEO

Implementing strong SEO tools will radically enhance the quality and quantity of traffic to a website. It will additionally boost a business's visibility and credibility on the web. SEO is tedious and time consuming and it is continually changing. Purchasing solid tools will assist in managing all the SEO particulars.

Web Analytic tools gather data for the intention of understanding and optimizing website usage. Analysts utilize this data to supply clients with the right information about their website to improve their business. The top 3 current tools in Web Analytics are: Adobe (Omniture) Site Catalyst, IBM Digital Analytics, and Google Analytics. [9] Users don't require one tool for analytics, a different for keyword optimization and a further for pay-per-click (PPC) management, ahead of the extra manual activities they perform. These top web optimization tools allow for a complete analysis. Users can purchase modules of diverse niche products, to manage certain SEO campaign fundamentals. "But the most complete SEO software provides:

- Tips and customized intelligence for optimizing your website for higher search rankings
- Keyword mining to help find the best keywords
- Linking optimization solutions

- Paid search management
- Visitor analysis
- Site maintenance tools to diagnose broken links, unresponsive pages and other issues.
- Comprehensive, detailed and customizable reporting” [9].

Users wish to identify measurable results, with increased leads and improved sales. Intended for the top SEO tools reviewed in the table, the criteria is based on the average SEO features, and essentials that make each one stand out from the others. The functionality of the ‘help and support’ for each tool, is furthermore assessed. [9]

### 3.1 Influencing Factors

1) *Web site design*: Flash animations and other effective elements like animated pictures are important to provide a good-looking web sites, they have to be used at a limited number to ensure better evaluation results for SEO. Actually flash animations lower the loading time of web page and texts included in flash animations cannot be indexed easily by robots. A useful, real web site must have simple structured content that can be indexed easily and preferably, web pages have to be provided in HTML format. [1]

**Frames**: Frames in a web page is not a suitable approach and design method for search engines. Here, `<noframes></noframes>` tags must be added to the related web pages. Because frames can cause some problems for indexing operations performed by spiders. [1]

**Pictures**: Texts provided on picture files cannot be read by search engines. So by this, using links in text forms is more effective than using picture files for the related links. Here, “alt” labels must be used to define these picture files in order to introduce them to search engines. [1]

**Cheating**: Some cheating methods like adding keywords to the background of a web page may be determined by search engines and also evaluated as “spam”. For instance, adding keyword in a white font color to a white color web page is evaluated as a spam by most of search engines. [5]

**Domain field**: While defining domain field of a web page, it is prominent to choose a suitable domain according to the related keywords. It is also prominent that the hosting company, that includes the chosen domain, have to provide a 24 hour - continuous service. Here, working with a qualified hosting company is important for SEO. The names of Web site must be short and suitable for objectives. Using special characters in the web site name lowers the page rank. [7]

**Title tag**: Title tag defines title of a web page for both users and SEs. In a HTML code structure, `<title>` label must be included in the `<head>` label. Hence, it is also prominent to choose unique title for every web page. A title with 50-80 characters is a suitable approach to be found easily by SEs. The title content means short abstract that defines the web page in the related SEs. Title content is usually displayed on the first row of the search result pages. [2]

**Keywords in page contents**: Using these keywords as in different styles (bold, italic, and underlined) from other texts may take attention of search engines and enable them to define the related texts as one of the determined keywords. Typing remarkable words in different styles is a true approach but editing all content in the related way is not true. It is more effective to use strong label rather than bold label in pages. It is a good to put keywords in close places to, paragraphs, page heads and page ends. The most preferable keyword density is between 5-7% and 7-8%. [1]

**Robots label**: The robot label defines the working mechanism of the robot. For example,

Index: Index and archive the page

No index: Do not index and archive the page

Image index: Index images

No image index: Do not index images

Image click: Index image links

No image click: Do not index image links

All: Archive all contents of the page.

The code: `<meta name="revisit-after" content="7 days">` is used to enable robots to visit the related page after each 7 days. Using “index, follow” with the robots label: Each page within the web site must have index and follow definitions. These definitions enable SE to index the related page and watch the links included in this page. With this good method, all pages of the web site are indexed. And spiders are some kind of programs that are used by search engines to analyze pages on the Internet environment. The related programs track carried out links and read all pages by passing from one page to another page. Finally, they evaluate the quality of the page and take a copy of the page to show it under the search results. [1]

The h1 label: h1 label is an important element that can be used to optimize web pages for specific keywords. [1]

Back link: Google evaluates each link given for a web site as a positive step for the related web site. So by this, it has become necessity to back link to the related web site or texts included in the web site. Though, it is not necessary to give link from the main web site to the related sites. Google uses values of link while performing page rank measurement of a page. And while performing this measurement, it also concentrates to contents of the pages. So by this, it is prominent for the web page to have similar content with the page where back link has been performed.

The site map: On the site map, every page included within the web site must be linked. If visitors of the site encounter with some difficulties while navigating on the web site, it can look at the site map. This page helps SEs to find all of the developed web site. It is a conscious step to send a XML file including the related links to SEs. The SEO can be required to design the web site in a foreign language. [6]

Web site pages within the root directory: For instance, using [www.seodeneme.com/index.html](http://www.seodeneme.com/index.html). SEs can't reach to web pages at high levels and evaluate them as insignificant pages. Here, including the most important pages under the third or fourth directories is an important disadvantage for SEO. [5]

Separate directory for images: By evaluating this task, foreign users are not allowed to use images displayed on the web site. For example, it is possible to prevent examining the image directory by using the robot.txt file or robots labels. [7]

Site navigation: Web sites with 1000 – 5000 links are evaluated as “average”, with 20 links are evaluated as “popular” and with links above 100 are evaluated as “hit/icon” web sites. On the related results page links given to the web page can be seen by using the button “View”. Web site page have to be checked regularly for broken links. [1]

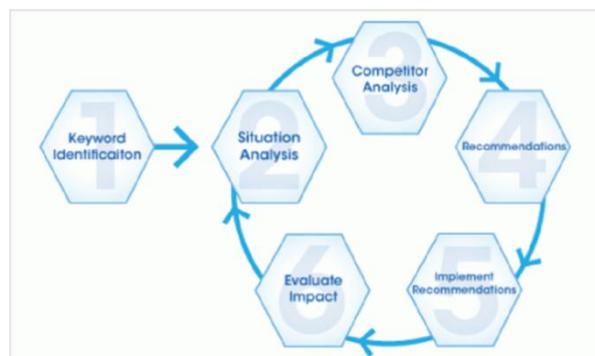
The social media: The social media can be defined as internet platforms that people use to communicate with other online users via text, images, videos and sound files. The social media is based on “communication” and “sharing”. For instance, answers for specific questions can be received by using the social media. Circumstances of the related questions may be changed from light questions like “Which color dress I can wear for this evening?” to large scaled questions like “My relative is a cancer patient. Which doctor I should go for the treatment?” Context of social media tools may be changed for different people but generally, these tools mainly contain blogs, micro blogs, RSS feeds, social bookmarking sites, social networks, forum and communication

environments and image and video sharing platforms. On the Internet environment, there are lots of blogs, millions of video and image contents and millions of user profiles created with real names and nick names. [1]

### 3.2 What process can you use to drive SEO improvement in 2012?

We can supply organizations with guidance throughout the entire SEO process, and is identified by the six stages explained below.

*Keyword Identification:* Defining the principal keywords is the preliminary stage of an SEO process. During this phase, SE aims to assess the popularity of the targeted keywords, and produce an assortment of variations that collects a large sum of traffic. Furthermore, SE will work with their client to recognize the initial keyword set.



- 1) *Situation Analysis:* Now that keywords have been determined, this phase involves an evaluation of the current website. SE assesses what features are presented and lacking, and what areas require development within their client's website. Crucial areas for considerations throughout this stage are: Search engine rankings of your website for your targeted keywords, keyword density of your site, number of inbound links, amount of page links throughout the website, website structure, in terms of a general analysis.
- 2) *Competitor Analysis:* During this process, SE utilizes a range of SEO tools to assess the SEO strength of the top 5 websites for the chosen keywords (which are selected in phase 1). Therefore, an evaluation is conducted on the main competitors for the targeted keywords. This phase permits clients to reflect on the significance of inbound links and additionally allows them to determine the likeliness of achieving high rankings for their website for targeted keywords.
- 3) *Recommendations Report:* This report merges the result of the first 3 phases and offers recommendations that reveal how the search engine rankings of the targeted keywords can be improved. Such recommendations guide the implementation decisions. Within this process, SE utilizes tools such as Google Webmaster Tools, Market Samurai and Google Analytics for assistance in SEO-related implementation decisions. Google Webmaster Tools in particular, submits a sitemap to the Google search engine via Webmaster Tools. Additionally Webmaster Tools define page priorities, accesses information relating to website links, obtains relevant statistics, views crawl and content errors, and furthermore allows modification of preferences.
- 4) *Implement Recommendations:* Following the release of the recommendations report, SE offers their clients implementation alternatives to guarantee that the suggested improvements are deployed appropriately.

Google Webmaster Tools, Google Analytics and further techniques are employed so content and metadata changes are accomplished.

- 5) *Evaluate Impact:* Once changes have been implemented, the search engine rankings will be re-evaluated after the next search engine robot crawl of your site. This process allows customers to evaluate the achievement of the SEO engagement. Since Google's search engine ranking algorithm is endlessly changing, SE suggests customers to frequently revisit phase 2 and repeat the procedure.

### 3.3 What are some New Techniques to Consider?

A variety your competitors could be implementing new SEO techniques. From this review, organizations should also consider White Hat, Sitemaps and Simple URL formations. In particular, "White Hat SEO refers to the usage of SEO strategies, techniques and tactics that focus on a human audience opposed to search engines and completely follows search engine rules and policies" [5]. Using keywords and keyword analysis, back linking, link building and writing content for human readers, are some of the White Hat SEO techniques which search engine recommends to progressive organizations.

## IV. CONCLUSION & PROPOSED WORK

SEO basically relies on user behavior, social engagements, visitors and other publishers. Page Rank is not simple part from one scary seeming formula, but when a simple calculation is applied on hundreds (or billions) of times over the results can seem complicated and time consuming. Time on site and other factors like your links seem more likely to be bigger factors in the ranking algorithms. The average Actual PR of all pages in the index is 1.0. So if you add pages to a site we are building the total PR will go up by 1.0 for each page but the average will remain the same. So we can conclude that if we want to concentrate the PR into one or a few pages then hierarchical linking will do that. If we want to average out the PR amongst the pages then "fully meshing" the site (lots of evenly distributed links) will do that. Getting inbound links to site is the only way to increase average PR of site. How that PR is distributed over the pages on our website that depends on the details of our internal linking and which of our pages are linked too. If we give outbound links to other sites then our site's average PR will decrease. Some other factors which are responsible for improving web site rank are to be considered in ranking algorithm as proposed work. Such factors are periodically web updates, frequency of updating of website and trust rank which differentiate good and bad sites. Trust rank guarantees that top scored sites are good ones.

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