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SEARCH ENGINE OPTIMIZATION: A STUDY OF RANKING ALGORITHM

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Abstract

All over the world millions of people use search engines to search their information. They use search engines for most of their queries and they are interested only in top few result pages. So promoting a website in search engine result is important development of websites. Search engine optimization (SEO) is to complete this work. But sometimes some SEO techniques are used in an unethical manner which break the search engine's rule and regulation and place undeserving site on top list. Our research objective is to design and implement a ranking algorithm by tracking IP address of who is clicking, so that the owner can't click hundreds of times to increase its ranking position in search result.

Keywords: Search Engine Optimization (SEO) Process, on- site optimization technique, off-site optimization techniques, page rank algorithm.

Introduction

Due to increase in popularity of web, huge amount of content are available on the internet and sometimes it become difficult to find relevant information on a subject. There are various methods used to retrieve information, so search engine become an important part of life to search information we depend on search engines to provide us right information. To satisfy users need and requirement search engine use different strategies to gather information from internet [12]. It organize and process the searched information and display the search results to the users in a systematic way. Efficient search engines find the target information quickly and accurately. At present the major internet search engines are yahoo, Ask, Bing etc rank web pages based on certain factors that affect its ranking. Users use search engines for most of their queries but they only prefer the results available on first page and 2-3% of users go on further pages. Most of the visitors think that companies found on the top results are the best brand in their product services and category. These clues make it very clear that if an organisation wants to go on top in their sales than they should concentrate in getting their pages widely available in the search engines.[13] search engine optimization is the process of improving a website position, so that the WebPages comes up higher in the search results of major search engines. Ranking is an important component used to measure the quality of page. [14] Higher page rank value indicates website is very popular. To promote website in search engine natural listing, various SEO optimization techniques are used called white hat techniques. Some time to promote a website in a search engine result list, Search engine optimizers use search engine optimization techniques in an

unethical manners called black hat techniques which breaks search engine rules and regulations and place the undeserving site on top list. These techniques lower the quality of search engine and increase traffic. Also these techniques will not have any benefit to users. This paper discusses Search engine process, onsite and offsite optimization techniques, page rank algorithm. [13]

Search engine optimization

SEO concept: Search engine optimization is the way of improving the visibility of a page by natural mean i.e. unpaid search result. It fulfils user need and improves rank position in search engine result list. It helps in building a website so that it can easily found to search engine crawler with relevant keywords. SEO help to get top ranking position in search result list improve marketing capability of site and attract online visitor. [13]

Search engine process

Search engine perform several functions to deliver search results, these are crawling, indexing, processing, calculating relevancy, retrieving.

- A. Crawling:-First, search engine crawl the web by a software called crawler or a spider. Spider follow link from one page to another and index everything they find on their way.
- B. Indexing:-After a page is crawled, the next step is to index its content. The indexed page is stored in a giant database, from where it can later be retrieved. It is a process of identifying the words and expressions that best describe the page and assign the page to a particular keyword.
- C. Processing:-When search request comes, the search engine processes it, i.e. it

compares the search string in the search request with the indexed page in the database. If more than one page contains the search string, the search engine calculates the relevancy of each of the page. There are various algorithms to calculate relevancy.

- D. Retrieving:-The last step in search engines activity is retrieving the result. It is simply displaying the search result in the browser.

Search Engine Optimization Techniques

SEO include on-site optimization and off-site optimization techniques.

On-site optimization techniques: On-site optimization is optimizing your website in a way that it can rank better in search engines and improve visitor satisfaction. On-site optimization includes website design elements such as keyword formatting, keyword in title tag, position of keyword, keyword density, keyword in meta tag etc.[12]

- Title tag:-Title is an important ranking factor. It is used by many search engine as main factor for listing sites in search engine result pages.
- Keyword in URL:-The website will be found more easily by search engine crawlers if the keywords are included in URL. URL with shorter length are preferred by search engine optimization.
- Title length:-Title length within limit return good result. The use of keyword in title tag is an important on-site optimization factor. Title length should be 65 characters or less in length.
- Location of keyword:-search engine check the keywords appear in<title>tag, <head>tag, <alt >tag <meta >tag etc.
- Keyword density:-It is a strong optimization factor. It means the frequency of keyword present on web page compare to the total number of words on the page.
- URL (uniform resource locator) length:- Short lengths URL are preferable by search engine. It represents the address of a website on internet. URL included the search keywords which are easily find by the crawler.
- Outgoing link:-These are the links which are going to another site from our site. These are also called outbound links. More number of outbound link improves ranking of website.
- Off-site Optimization Techniques: off-site optimization includes links that point to the site from other site from other web

pages. It improves ranking of websites. [13]

- Click popularity:- It is an important factor to lift website top in ranking result. More number of clicks to a website is called click popularity. If visitor clicks websites, search engine provides certain value to that website.
- Inbound link:- To promote a site in top ranking list, the quantity and quality of inbound links are the major ranking factor.
- Link reputation:-websites with more number of back links improve ranking. The links must have good reputation and key phrases similar to search term.

Black hat Search engine optimization:- Some black hat SEO techniques used by search engine optimizers are:-

- Invisible text: To raise keyword density SEO optimizers insert text in website which is unrelated to that website content. Inserted text includes the words which are popular or frequently search.
- Keyword Stuffing: Spammers repeat the keywords in various HTML tags like title, meta, body, anchor etc. Also keywords are stuffed by spammers in URL.
- Link Farm: Groups of heavily interconnected pages referred to as link farms. Search engine optimizers dumps hundreds of links to different sites within different categories that are unrelated to site content. Using this they increase link popularity by including site into link exchange program.

Link Exchange: Spammers make a group in which their sites point to each other. In this way link count of each in a group increases and hence link popularity increases. One site contain link to other site and that other site have link to back to site. in this way link count is increased and so link popularity increases.[13]

Page Rank Algorithm

The page rank algorithm was described by Lawrence page and Sergey Brin. It is used by Google to rank websites in their search engine result. Page rank is a way to measure the importance of website. Page rank is an algorithm in which a numerical weight is assign to a web page. [13] It uses incoming link information to assign a rank to all pages on the web. Number of incoming links from quality sites improves the ranking of websites. It depend on quality and quantity of links. pages with higher rank are shown on the top in the search engine result list. [12]

It is given by

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

Where PR(A) is the page rank of page A

PR(T_i) is the page rank of page T_i which link to page A

C(T_i) is the number of outbound links on page Y_i and

D is a damping factor which can be set between 0 and 1

In our research, a ranking algorithm keeps track the IP address of every client system whenever it clicks on the web resource. This technique helps to increase the search engine efficiency for identifying the number of clicks on web site.

Google Panda and Google Penguin

In February 2011, Google announced the “panda” technique which penalizes websites containing content duplicated from other websites and sources. [15]

In April 2012, Google launched the Google penguin update the goal of which was to penalize websites that used manipulative techniques to improve their rankings on the search engine.[15]

In our research IP address is used as a security Factor by which the websites are ranked in a genuine way. No duplicate clicks are counted to increase the ranking of websites.

Proposed Page Rank Algorithm

Ranking is important to improve the visibility and scope of a website or a web page in a search result. Search engine optimizers help in building a website such that it can be found easily to search engine crawler with relevant keywords. Ranking algorithm is an algorithm which assigns rank to websites according to its relative importance. Following are the steps used to rank a website.

1. Start
2. Initially the ranking of all websites are set to 0.
3. When User clicks on any of the website its IP Address, Date of visit, time and No. of clicks are stored in the database and a particular rank is given to the website.
4. If user click on the same website again within 24 hours of time than algorithm check again the IP address, time, Date and No. of clicks which are already stored in the database If the IP address of user match than it increase only no. of clicks in the database and do not increase ranking of the website. If user click on the same website after 24 hours of time than its ranking increases.

5. If user clicks on different website, all process of ranking algorithm repeat and a different rank is given to the website.
6. The process repeated and according to its rank position of websites is given in the search result list.
7. Stop.

Conclusion

- i. This paper studies page ranking algorithm, search engine optimization concept its process and its techniques. white hat SEO techniques are ethical and follow search engine rules and policies whereas black hat techniques are unethical and, they provide quick result but for short time. If search engine find out the unethical activities of the site, then site can also penalized. The goal of paper is to provide knowledge about search engine optimization and stimulate further research in this area.

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