Search Engine Marketing Using Search Engine Optimisation.

Amit Birajdar
Computer Engineering
MPSTME,NMIMS
Mumbai,India
amitbirajdar7@gmail.com

Harsh Agarwal
Computer Engineering
MPSTME,NMIMS
Mumbai,India
harsh30199@gmail.com

Manan Bolia
Computer Engineering
MPSTME,NMIMS
Mumbai,India
mananbolia14@gmail.com

Abstract—**Today, E-commerce is booming, so is the number of sales on online market as compared to the offline market which is almost constant and also saturated. There are two types of websites in today's market, first, the genuine websites trying to make their mark in market and second, company websites with good brand name who already have a head start because of their brand value. These websites are always competing against each other in the market, but the website with a large customer base is obviously the one which is making large profits. So this narrows down the whole discussion to one point, customers! When a regular customer with no prejudice about the online websites makes a search on the search engine that is where it all starts, the results showing numerous of websites but in a specific order and the customer tends to select his website from the first few options. This is what we are going to discuss in the paper that how does your website get in those first few results. Also, this huge increase in the number of websites has led to creation of a new industry, 'Search Engine Marketing' about which we will be discussing in the paper. Now, as of today, the goal is to increase website ranking to display the website in top search results.**

Keywords—*Search Engine Marketing (SEM), Search Engine Optimization (SEO), Black hat techniques and White hat techniques, Paid Placements, Search Engine Algorithms*

I. INTRODUCTION

In the last two decades the number of internet users around the word has increased from 147 million (3.6% of the world population in 1998) to approximately 4,156 million (54.4% of the world population in 2009), this makes it clear that the number of users is continuously increasing. Along with it, the number of businesses who have started their online retailing also increased. Let us take online shopping websites in the picture, as of today there are many online shopping websites who are competing with each other to sell the exact same products, so this takes us to the question that which website should one use to buy a product? Basically, what makes a website better than the other? Majorly there is the user interface which should be user friendly, the website should be reliable, responsive, updated whit the new products, it should have a proper payment gateway and many other factors which are development and design related. Today, we have thousands of good developers and designers who design websites almost as good as any other and these are the ones hired by the businesses to design their websites so they can go online, so we may conclude that almost every online website which is even a little popular has a good UI, is reliable, responsive and all the other factors we discussed about, so this leads to our main question that what actually makes a customer go on a specific website if there are many similar websites selling the same products? This is where Search Engine Optimization comes into play and using SEO, Search Engine Marketing is done. Search engine marketing generally consist of two techniques, SEO and PPC.

II. SEARCH ENGINE OPTIMISATION

What is SEO? It is the way of increasing the visibility of a page by natural means i.e., unpaid search results. It is basically a process to develop or re-develop a website so that the keywords which are entered by the user in the search bar matches the ones on the website, this helps our keywords to effectively communicate with major search engines.The contents and codes of the webpage are edited and manipulated keeping in mind of the indexing pattern of the search engines which is done by a crawler named Googlebot in Google.

Non Sponsored Listing: This listing is done by Website crawlers according to the page ranking algorithms, the pages are ranked according to the keyword match and the quality (e.g. Number of pages linked to them).

Sponsored Listing/PAID PLACEMENTS: These listing are present at the topmost right corner and we need to pay Google for these. Paid Placements are explained further in the paper. The following are examples of sponsored search when "WATCHES" and "CAMERA" were searched on Google.

III. SEARCH ENGINE ALGORITHMS

A. Hilltop algorithm is one the major algorithm for search engine query result generation in the industry which forms a major part of the complex algorithm used by huge search engines like Google and Bing. In this algorithm, when a search query is inputted in the search bar , the engine compiles a list of independent experts on the search topic and follows outbound links on them to Webpages and compiles a rank list of Webpages based on number of independent experts leading to that page and then shows these pages on basis of their ranks on search result page. There is a possibility that algorithm may find no expert on topic and therefore produce no result.

B. Page Rank algorithm is one of many algorithm that forms the part of algorithm used by popular search engines like Google for search query result generation. In this algorithm based upon the incoming link information of the webpage, it is assigned an importance rank on the topic to its relation of all pages on the web. It also takes into consideration the amount and quality of outbound link on page and also the rank of pages from which inbound links to page under ranking are coming from.

IV. WORKING OF SEARCH ENGINE

It is essential to know the working of a Search Engine to use SEM. A search engine does not search the web to find a match, rather it looks into its own database of information about web pages that it has collected, indexed, and stored. All Search Engines comprise of three major pieces: a) Crawl, b) Index, c) Query Processor. The process of searching begins with the Crawler. A crawler is basically a software program that jumps from one link to another, on the Web, combining pages found and sending them to be indexed. The Query processor refers to the visual user interface seen on the website. These three important pieces combine to provide growth to the Web.

To prove the magnanimity of the task: Google itself has about 180,000 computers solely dedicated to serve this purpose. The very basic task of a Search Engine is to provide reference to numerous pages in response to a word or a phrase given by the user as input.

The most relevant matches of references for the word or phrase entered by the user are known as Organic or Natural results.

Along with all these references displayed on the website there also are Paid Placement Listings. These are generally displayed on the top or on the sides of the search engine. They are placed so as to attract user attention as he browses through the webpage.

Paid Placement Listings can be described as a service provided by the search engine to the highest bidder for that space to display links to a particular website.

V.   SEO TECHNIQUES

White Hat SEO Techniques: These techniques are used by web developers to improve ranking of their webpages using genuine and ethical methods without hampering the quality of content of webpages and does help search engine a good and efficient search result to the user and does not take any adverse action on websites for using this technique. These techniques are of two types on-site SEO and off-site SEO techniques.

Black Hat SEO Techniques: These are SEO techniques that are being used by web developers to increase their website ranking by dealing in unfair and unethical techniques which are called spamming in industry. Use of these techniques degrades the quality of search results as search engine displays webpage with no link to the search query. Nowadays to crack down the number of these websites, search engines have started taking adverse steps like blocking the WebPages to discourage these techniques.

Invisible text: To increase the keyword density of web page, web developers add unrelated keywords that are popular and frequently searched. These keywords are added such that they are invisible to the user but visible to search engine so these websites get listed in search results to which they have no connection at all.

Link Farm: Groups of heavily interconnected pages referred to as link farms. This is a new spamming technique used by web developers, in which they form a large group of developers who wish to use black hat techniques. They add links to each other websites in their own websites , thereby increasing backlinks of each other's website and also when their website gets displayed on query , there is a chance due to links present , others unrelated website may also get listed.

URL Redirection: URL redirection means URL forwarding. Spammers hide the spam pages by redirecting the browser to another URL as soon as page is loaded. So in search engine index spam page is return but through redirection the target page is return to user[4].

Doorway pages: Doorway pages are primarily designed for search engines and not for human beings4. When a user clicks on the links of these doorway pages. These page perform a series of redirection of browser to various spam web pages like fake contests, video streaming pages and etc.
These pages may also be used to implant various malwares into users' device to steal his personal and confidential data for reselling or criminal purposes. Before user reach the target

page, series of redirection takes place which hide the actual URLs

Cloaking: This is one of the most used technique by web developers with impure intention to fool user and search engines. In this web developer makes two sets of webpages, one to be displayed to user and other for search engine. So when search engine accesses a web page to rank it for a search query, it analyses different web page with content to misdirect the crawler while something else is shown to user. The web page set for user is invisible to crawler and web page set for search engine is hidden from the user. Spammers implement cloaking with scripts that are not read by search engines[4].

On-site Optimization techniques: These techniques deal with the webpage whose ranking has to improved and involve the content of the webpage being improved upon.

- Keyword Density: For good webpage ranking, the density of keyword should be placed in a range of about 3%-10% of total content of the webpage. It should also be tried to optimize the number of keywords that are placed in prominent tags of the webpage like its Meta, body and title tag should be prioritized and play a very important role in webpage ranking.

- URL (Uniform Resource Locator) Length: URL represents the address of site on internet. For better webpage ranking, webpages should have short URL address which gives it an edge over website with longer URL address. Also including some popular and short keyword in URL addresses can also increase chances of webpage being listed in top results of a query.

- Outgoing Link: Webpage contain links to other related websites. Related outgoing links provide useful information to user. More number of unique outbound links improves ranking of website.

- Meta-tags optimization: Meta tags are used to provide information about the website to the search engine. The most useful tag amongst all the tags is the description tag as it is a past of search results and if proper keywords are listed here then the search results in a very nice search result.

Off-site Optimization Techniques: Off-site optimization techniques are techniques which deal with webpages which have a link to the page whose ranking is being improved. These techniques are very important part of SEO as they can be huge deal breakers in website ranking on search engine queries. These links back to the site are called back links. Some popular industry used techniques are listed below

- **Link Reputation:** Websites and web pages with backlinks to websites and web pages with high rank and reputation have better search engine ranking. Also quantity of backlinks matter in the ranking

- **Inbound Link:** External links linking to a website are called inbound links. Good and high ranking inbound links play a huge role in improving ranking of the website. Total number of inbound links is called as link popularity

- **Click Popularity:** The more the number of clicks on a websites link in the search query result page greater are it chances of moving up in ranking of results for that topic query. The number of clicks on the link is known as click popularity.

- **Backlinks Generation:** In this method we create as many backlinks from other websites to our website as much as possible because more number of backlinks means that there is something related in this page since so many websites are providing a link to it.

- **Blog posting and Social Networking:** today brand value plays a very important role for your website whether it's a content providing website or a online shopping website, brand value is everything and social media websites generate free website traffic for your site once they see your website on the social media which also boosts up your brand visibility. It also help in increasing your 'page rank' by creating many inbound links to your website.

VI.   TOOLS USED FOR SEO

Here are some of tools which website developers use for developing a good search engine optimized website.

Google Webmaster Tool: Google Webmaster Tools is a no-charge web service by Google for webmasters. It allows the developers to check indexing of their websites and optimize their visibility. It has tools that let the webmasters:

- Check and set the crawl rate, and view statistics abouthow the crawler accesses a their site
- List internal and external pages that link to the site
- See what keywords which were searched on google lead to the sites listed in the results page.
- View how Google indexes the site

Meta Tag Analyzer Tool:

- They tell you how crawlers analyse other websites.
- Find keyword density universally
- Check website load time
- Check URLs and links found on the page
- Check website file size

Keyword Suggestion Tool: This tool suggests keyword which can be used along with our keyword for Search Engine optimization.

SEO dictionary: It is the list of SEO related keywords with their definitions.

Page rank checker: this is used to check a page's rank.

Link Counter: It keeps a count of the number of outgoing links form your website.

Reciprocal Link Counter: It makes sure that the link from other websites, basically incoming links are still there on other websites and function.

VII.   SEARCH ENGINE MARKETING

SEM takes the concepts found within SEO and integrates them with marketing processes and help a website to come on top of the search results, this can be done by two methods, either by using SEO and creating a well Search Engine Optimized Website or we can improve the position by **Pay Per Click** method. PPC, as the name suggests, is a marketing approach that one have to pay advertising costs to the search engine after the consumer clicks on sponsored link provided on the top of the results page, this might be a costly method and the amount which is decided to be paid depends on the keyword the developer selects for PPM, if it's a high density keyword then the cost will obviously be more than other keywords which have low densities. While on the other end SEO is not expensive but is very time consuming as one might need to redevelop their whole website for SEO or even if the website is not developed, then also the developers have to take care of many criteria(s) while developing the website which maybe is a cumbersome process but give good organic results for website, also the SEO one should use is white hat SEO, google has banned many websites because of the usage of black hat SEO.

Now when we talk about marketing, "the aim of marketing is to make salessuperfluous" (Kotler and Keller, 2009), the main purpose of marketing is to improve sales from a large amount and that is simply depends of the need of buyer because if the seller offers them the right product at the right time, with the right price using the right promotion. This is can be done in a

very efficient way using online markets and SEO and PPC by having the link to their websites at the top of the page.

VIII. SEARCH ENGINE MARKETING (SEM) STRATEGIES

Strategic Option 1:Do Nothing (DN): This strategy does not cost the seller. A seller who has adopted the Do-Nothing strategy is assumed to have paid for paid-inclusion and paid-updates and nothing else. When no SEM strategy is used, the probability of seller A or Seller B to rank higher in the editorial section of the search results of a web-page is denoted by α. A takes the value in the range of 0 to 1.The algorithms or strategies used by the search engine to rank the search results generated by the keywords input by the user, influences the value of α. Also, the intensity of searching of the online buyers and if the seller has used any Search Engine Optimization Strategy, influences the value of α.All of this is taken care by the search engine. There is absolutely no involvement of the online seller in the search engines ranking algorithms.

Strategic Option 2: Invest Only in Search Engine Optimization (SEO): Using techniques of Search Engine Optimization would require a certain amount of fixed investment. (Let's consider that amount to be equal to "c"). Invoking these techniques assures the seller of being listed in the top rankings of the editorial section of that particular web result page. This implies that a seller with a search-engine-optimized site is always in the potential buyer's consideration set, because all buyers browse through the top-ranked listings in the editorial section of the search results page.

Strategic Option 3: Invest Only in Paid Placement (PP): Using the strategy of Paid Placements also involves an investment of an amount. The Paid Placement Strategy assures a listing in the sponsored section of the search-results page. This strategic option assumes that once a seller pays for paid placement, it is listed in the sponsored section. There are chances that it could also show up with a high rank in the editorial section (with probability $0 < \alpha < 1$). However, a buyer would browse the paid-placement section only if a seller and its competitors, both are absent from the top-ranked links displayed in the editorial section of the search-results page. The probability of this happening is $(1 - \alpha)(1 - \alpha)$.

Strategic Option 4: Invest in Both SEO and PP: A seller adopting this strategy is assured of both a link in the sponsored section and a place among the top-ranked links displayed in the editorial section (i.e., $\alpha = 1$). This option has the benefit that the seller is always present in the consideration set of an on-line buyer. Since both, Strategy 2 and 3 are used together, therefore their individual costs add up to give a total cost of 2c. Given this definition of strategic option, it is easy to see that this strategy will always be dominated by Strategic Option 2, because for any seller the probability of being part of a buyer's consideration set remains the same with both

strategies (resulting in the same revenues), while the cost of implementing Strategic Option 4 (i.e., 2c) is more than the cost of implementing only SEO (i.e., c), resulting in higher profits when Strategic Option 2 is implemented.

IX. SPONSORED SEARCH

The concept of Sponsored search is evolving very rapidly. Continuous evolution means addition to the existing concepts hence making it more complex. This is primarily and majorly done to satisfy both, the web searchers' desire for appropriate and related content and information, and the content providers' desire for targeted traffic to their websites. There are certain elements of sponsored search:

• Provider: A provider is the one whose interest lies in generating user traffic to a specific website for some purpose. 'Provider' is used to highlight the fact that sponsored search can be viewed as a tool to provide relevant content to a searcher.

• Provider content. It is a set of keywords along with the associated URLs, titles, and descriptions, typically referred to as an advertisement or a sponsored link.

• Provider bids. Bids for specified keywords that are a monetary valuation of traffic to a particular website by a provider.

• Search engine review process. It is a method employed by a search engine to ensure that the provider's content is relevant to the targeted keyword on contextual material.

The process of sponsored search is as follows, there are three major participants involved in the process of sponsored search: a) providers, b) search engines, and c) searchers.
Search phrases and contexts are selected by the content providers on the basis of:
• Their likeliness to be submitted by searchers
• Applicability to their web content
• Relevance to the intent of the searcher.

These content providers are also responsible for the presentation of the search results according to the targeted searchers. This content is also known as a sponsored listing.
Search engines provide the mechanism for this sponsored search process to occur. The pay-per-click model is the most commonly implemented payment method. The content providers pay the search engines to present their web result whenever a searcher submits one of these terms and clicks on the link. The search engine determines when a match occurs between the searcher's query and a keyword bid upon by the provider.

The provider pays the search engine because of a bid placed on the keyword. A bid is basically a maximum price per

keyword. Competitive content providers bid to pay a search engine for the same keyword or phrase. When there are multiple bidders for the same keyword or phrase, an electronic auction determines the order of the advertisements.

Sponsored search is used to provide a mechanism for content providers to get searchers to visit their websites.

When a searcher submits a query and clicks on a sponsored link, the searcher's browser displays the provider's web page. The search engine tracks this click, along with all the other clicks within a given period. At the end of this period, the search engine bills the provider, providing various statistics concerning the outcome of the provider's campaign.

This accounting is one reason that sponsored search is so popular for businesses and organizations. In most models of offline advertising, there is little accountable with the cost being reach. Sponsored search is a huge revenue model for search engines, and it appears to provide relevant content to web searchers.

X.   PAID PLACEMENTS

Along with all the references displayed on the website there also are Paid Placement Listings. These are generally displayed on the top or on the sides of the search engine. They are placed so as to attract user attention as he browses through the webpage.

Paid Placement Listings can be described as a service provided by the search engine to the highest bidder for that space to display links to a particular website.

Why Sellers Buy Paid Placements?

There are two ways to explain why a seller would invest in paid placement even when the probability of it being visited by the user is less than the top ranked links in the editorial section. One is that the total cost of paid placements is so low that even a small increase in the profits will justify the investment. The other is that even with a high α, it is still probable that none of the sellers will appear in the editorial section, in which case a potential buyer will browse the sponsored links. For example, if a seller A has opted for paid placements, it is a monopoly demand for him if his competitor, Seller B does not show up in the first few editorial listings. Because this is a symmetric game, both sellers think along the same lines and end up purchasing paid placement even when α is relatively high.

Paid placements on search engine results pages are unobtrusive, more effective than banner ads and pop-ups, and a cost-effective way to reach buyers. The main argument against paid placement is that most buyers do not trust paid placements and prefer to follow links displayed in the editorial section of the search-results pages. Given the bias toward editorial content in buyers' on-line search behavior, one could argue that, instead of investing in paid placements, on-line

sellers should undertake search engine optimizations (SEOs) to improve their rank in the search-result listings. This shows that even if the total cost of implementing SEO and implementing paid placement was the same, and SEO always resulted in a high ranking on the search-results page, Paid Placement would still prevail as the SEM strategy of choice for most on-line sellers.

XI.   CONCLUSION

This paper studies different Search Engine Optimization techniques like on-site and off-site techniques, White hat and Black hat Search Engine Optimization techniques. Use of Black hat Search Engine Optimization techniques leads to poor search query result generation and also banning in some extreme cases by search engine but using of White hat techniques is completely ethical and encouraged by search engines as they lead to good query result generation which is useful to the user and appreciated by him as he/she has time to look at only few links and if this links are poor then user may be unsatisfied and may not return again to solve his queries using same search engine   . We also discussed how these techniques are then integrated in web development industry in the form of Search Engine Marketing techniques to improve a website's ranking so that it appears in top results of search query related to it. Different strategic options now prevalent in industry regarding Search engine marketing was also discussed in paper and how paid placements is coming up as popular choice by huge companies that can afford this placements at very high costs.

XII.   REFERENCES

[1] Hung-Jia Tsuei,Wei-Ho Tsai,Fu-Te Pan,Gwo-Hshiung Tzeng (2018) Improving search engine optimization (SEO) by using hybrid modified MCDM models.

[2] Rakesh Agrawal ,Behzad Golshan ,Evangelos Papalexakis.A study of Distinctiveness in Web Results of Two Search Engines.

[3] Hengameh Banaei and Ali Reza Honarvar. Web page rank estimation in search engine based on SEO parameters

[4] Patil Swati P. , Pawar B.V. and Patil Ajay S. Search Engine Optimization: A Study

[5] Wenyu Dou, Kai H. Lim, Chenting Su , Nan Zhou, Nan Cui. Brand positioning Strategy Using Search Engine Marketing

[6] Heinze, A, Fletcher, G and Chadwick, C. From search engine optimisation to search engine marketing management: development of a new area for information systems research.

[7] Chen-Yuan Chen ,Bih-Yaw Shih, Zih-Siang Chen and Tsung-Hao Chen. The exploration of internet marketing strategy by search engine optimization: A critical review and comparison

[8] Vinit Kumar Gunjan , Pooja, Monika Kumari , Dr Amit Kumar , Dr (col.) Allam Appa Rao. Search engine optimization with Google.

[9] James B. Evans. How Can Search Engine Marketing Techniques Enhance a Nonprofit's Online Visibility?

[10] George S. Spais (2010). Search Engine Optimization (SEO) as a dynamic online promotion technique: The implications of activity theory for promotion manager.

[11] Bernard J. Jansen and Tracy Mullen. Sponsored search: an overview of the concept, history, and technology

[12] Ravi Sen. Optimal Search Engine Marketing Strategy.