
Search Engine Optimization Factors and its Evaluating Techniques

Varsha¹, Laxmi Ahuja², P.S. Grover³

¹ Amity Institute of Information Technology, Amity University, Noida, UP, India
varsha24@student.amity.edu

² Amity Institute of Information Technology, Amity University, Noida, UP, India
lahuja@amity.edu

³ University of Delhi, New Delhi
groverps@rediffmail.com

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Abstract

WWW has become an integral part of our lives. It has a huge number of websites that leads to billions of searches on search engines every single day as it is the most convenient way of getting required information. But people click only the first few results only on "Search Engine Result Page" (SERP) because the credibility of a search engine lies in the fact that the top links provide the most relevant information. As a consequence, businesses are becoming more capable of ranking their websites highly in search results. Therefore, understanding the elements that go into placing a website at the forefront is equally crucial. We also need certain quantitative techniques to evaluate these factors. This paper aims to identify those factors and evaluating techniques used by most famous search engines to rank a website on the top of the search results.

Keywords— Search Engine, SEO, Search Engine Optimization, MCDM techniques.

I. Introduction

Today we are living in an era where even a small piece of information can be seen lying on the internet. From finding a research paper to studying an online course, from searching a recipe to finding a nearby restaurant, all of it is just a click away. While the referrals and positive reviews play an important role to reach out a website but today, they are not sufficient to keep people away from a coveted place "the first page of a search result". There are a number of search engines available these days that includes Google, Yahoo, Bing etc. Each of them makes sure that the first few results on SERP provides the most productive results. These days internet is flooded with trillions of websites and this makes the job of every search engine difficult to bring the most relevant website on the top. Hence, they evaluate the websites on the basis of certain factors and metrics using different complex methods. This research paper aims to answer these two general questions:

RQ1: Which factors contribute to rank a website on the top of search results in search engines?

RQ2: What are the different quantitative techniques including MCDM techniques to evaluate these factors?

1. ii. Background

With the development of the Internet and its quick global spread, enormous amounts of data were stored, shared, and made accessible to everyone with a connection to internet. Consequently, billions of domains were created, making it difficult for the average user to efficiently extract relevant content for a given query from the internet. To overcome this problem, Search engines were created as a result of the demand for a simpler, more effective method of information searching. Search engines gradually started to evaluate each website in their indexes in relation to the user queries that were submitted to them. They used sophisticated algorithms to determine each website's value after taking into account a variety of indicators and website attributes. These attributes were very soon called as strategy to enhance the visibility of websites in search engine and was termed as Search Engine Optimization. It is also worth mentioning here that bringing a website on the high ranking is completely cost free. They are called as organic or natural results listed on the SERP containing for each a hyperlink to the webpage's title, a "snippet" of

text that is frequently taken from the page and the web address of the website. There is a similar term Search Engine Marketing (SEM) that deals with paid results. But these are the sponsored advertisements that is limited to a surrounding space around the list natural [1]. Every search engine limits the number of results shown on one page of. For instance Google displays 10 results and provides a user preference to change it to maximum of 100 results. Similarly Yahoo and Bing have their own limit to display the number of results per page. Now it is a major challenge for the companies and originations to bring their results on the top most position of the of search results. Even if that's not possible atleast they should come on the first few pages of the results. A Research says, 70% of the searchers don't even visit the next page. Even on the first page itself only 30% click the first record, 16% click the 2nd result and only 10% click the 3rd result [2]. In order to rank the highest in on the search page, it has become very important for the website developers to incorporate SEO factors.

III. SEARCH ENGINES *and* THE SEO GUIDELINES

There are many search engine companies used to search results over the web. Few of them are Google, Bing, Yandex and the most popular among the all is Google as it handles 90% of the data. For any search engine the most valuable asset is their ranking algorithms and hence are not disclosed to the general public. Even though the precise algorithms for determining search engine rankings are not made public, Google, Bing, and Yahoo offer web content developers general recommendations for search engine optimization. These recommendations include creating high-quality content that is relevant to users, directing content towards the intended audience, ensuring proper link architecture, using appropriate keywords, and incorporating social media components. Every search engine publishes the guidelines for the webmasters to help them build a website that can rank on the top. Few important parameters of these search engines have been identified through their official website.

Google: Ranking a website on the top of google search results is completely free. Google lists few key practices to improve the SEO of your website [3].

- ❖ Content - The content should be helpful, reliable and it should target the audience rather than the search engines.
- ❖ Keyword - Use of appropriate and attractive keywords at prominent places in a webpage such as heading, title, links or alt text.
- ❖ Crawlable links - It helps google to find the page via given link.
- ❖ Social Media - Mention about the website on various platforms or advertise to the groups of like-minded people.
- ❖ Use the best SEO tactics while using the content such as images, videos, structured data and javaScript.
- ❖ Use the enhanced features that make sense to the entire content such as title, keyword, snippets etc.
- ❖ Control the content that needs to be shown or hidden on the Google.
- ❖ Stay Updated - Keep the content updated on your website so that it doesn't lose the relevance.

Microsoft Bing: Same as google, Microsoft Bing also provides a list of guidelines that are intended to help webmasters to rank their website on the top. They are as undermentioned [4]:

- ❖ Sitemaps - Sitemaps are crucial for helping Bing find the URLs and content on your website. It is a file that contains details on the URLs of other files and material on your website, including photos and videos. The sitemap provides the crawler with information about the files and pages you consider to be crucial to your website. It also offers further details, such the date the website was most last updated. To assist Bing in finding all the pertinent URLs and material on your website, we highly advise using an XML sitemap file.
- ❖ Relevance - It refers to the degree to which the content on the landing page corresponds to the search query's intent is referred to as relevance.
- ❖ Creditability and Quality - A website's usability, presentation, and clarity of purpose are all taken into consideration when determining its quality and credibility. Pages that encourage violence, name-calling, insulting statements, or the use of pejorative language are typically seen as low quality; articles that explain and identify their data sources are generally thought to be of higher quality than those that do not.
- ❖ User Interaction - You may learn more about how visitors interact with your websites by using the Bing Webmaster Dashboard.
- ❖ Updated - The updated web pages have more chances to rank higher that are outdated.

- ❖ Location - Bing takes into account a user's location (city and country), the location of the page's host server, the language used on the page, and the locations of other users who have visited the page.
- ❖ Load Time - Although faster page loads are generally preferable, webmasters should strike a balance between speed and a satisfying, helpful user experience.

Other search engines also have nearly the same guidelines but still none of them assure that only these parameters will be responsible for ranking a website on the top. There are other numerous factors also that work well or worse with different permutations and combinations. But still, it is always a good practice to incorporate the given points into the website.

The goal of search engine optimization is to make a websites technical and content components better so that search engine crawlers can find and access the information more easily. The majority of SEO techniques make websites more appealing to Bing, but they do not ensure that ranks will rise or that sites will see a rise in traffic from Bing. Additionally, some SEO techniques can be misused to the point that search engines penalise websites. There are more than 200 SEO features and they can be broadly divided into two categories:

“On-Page Optimization”: “On-Page Optimization” pertains to all the elements present on a web page that developers have direct control over. This SEO technique is widely used and holds significant importance.

Off-Page Optimization, on the other hand, focuses on techniques not specifically connected to the webpage. Its primary strategy is link building, which refers to backlinks pointing to a website from other web pages. Similar to a citation, a website's backlink count indicates how many other websites connect to it. Because backlinks indicate the quality and authority of a website's content, search engines favour sites with more of them. The table below highlights a few critical parameters of SEO [5][6][7]

TABLE I. FACTORS AFFECTING SEO

SEO Type	Factors	
On-Page Optimization	Web Page	
	<i>Web Page Structure</i>	A well structured web page is always a good SEO strategy that includes an attractive title, proper navigation, bold headings, links and appropriate keywords.
	<i>Web Page Size</i>	One of the most important optimizing elements is a web page's size. It is defined as the total number of files, including HTML files, graphics, and embedded objects, that make up a web page. An ideal web page should not be larger than 150 KB because pages of this size may be quickly downloaded by users and easily stored in the database of search engines.
	<i>Page Load Time</i>	Everyone wants a page that downloads fast and hence this feature is an important factor to rank a web page on the top. An increase in load time is caused by the overuse of graphics. Therefore, website developers should balance a site's load time.
	Title	
	<i>Page Title</i>	If chosen appropriately a page title can define the entire content in the web page. An effective title should convey the precise meaning of the commodity or service described on the page.

	<i>Title Length</i>	As advised by Google, a web page's title should not be more than 70 words. To give the title more weight, website developers should concentrate on using powerful and relevant keywords. Just by reading the title, readers should be able to infer anything about the information inside.
	Keyword	
	<i>Keyword Location</i>	The positioning of the keyword affects how well a website performs. The presence of the keyword in the title, URL, meta tag, anchor text, or alt text ensures its top ranking in the SERP.
	<i>Keyword Density</i>	Selecting a list of related keywords for their website's industry is a need for website owners. These keywords are used by search engines to group the website into a particular category. A characteristic called keyword density, which is defined as the percentage of keywords relative to the total number of words on a web page, restricts the choice of the keyword. Between 2% and 8% is the ideal range for keyword density.
	<i>Keyword in URL</i>	The likelihood that a website will be found and appear highly in search results increases with the number of targeted keywords in a URL. For the URL to obtain the most traffic, it should be concise and complete.
	<i>Keyword in Meta Tag</i>	The Meta Tag is a brief description of the website that website owners attach. It can be found directly below a website link in the list of search results. This brief summary's usage of effective keywords improves the search results. Additionally, search engines learn which keywords should be indexed for this specific website's search.
	<i>Keyword in Alt Text</i>	An image or video's alt text provides a succinct description for use on web pages. For search engine optimization, a concise transcript of photos and videos with relevant keywords is crucial. This is because a search engine must properly index all the objects of a web page.
	<i>Keyword in Anchor Text</i>	It is a text that appears in a website's hyperlink and connects to another document. In order to improve the page ranking, webmasters must employ keywords in the anchor text.
	URL	Websites with concise and clear URLs do better in searches. Crawlers can more easily follow a website that has a targeted URL.
	<i>URL Length</i>	URL needs to be short, crisp and easy to understand in order to be even more SEO-friendly.
	Links	Any website's top position is greatly influenced by both the quality and quantity of its links. A webpage with more distinct outgoing links that point to other websites typically appears higher in search results. They decide how a web page will be organised and built.
Off-Page Optimization	Link Popularity	By counting the amount of other websites linked to a given website, it may be shown how popular it is. The Ingwersen-developed Web Impact factor (WIF) calculates the value of Link Popularity by assessing the impact of the Web domain through the volume of inbound links.
	Link Reputation	Quality content and keywords that are related to the search queries should be used in backlinks.
	Social Network	Links on social media platforms like Facebook, Twitter, and Instagram increase website traffic.
	Groups	You can post links to your website on communities like Reddit. This not only boosts traffic to our website but also helps us establish a solid online reputation.

Apart from the factors that can be categorized under these two techniques, there are many other factors as well such as [5], Customizing 404 page that helps users keep on the page, Secure Socket Layer (SSL) certificate that ensures the security of a webpage, Sitemap, domain name, responsive layout, bounce rate, World Wide Web Consortium (W3C) validation, click through rate and time spent on a site.

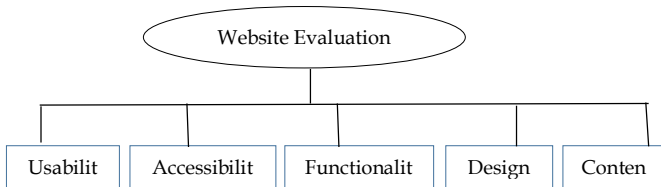
However, the above-mentioned attributes do contribute to the successful ranking of a website but their average contribution varies to an extent. Overall, the top most factors for a better ranking of a website are almost same for all the websites but one cannot say that they are the only elements that make websites on top of the search results. However, the Google starter guide was the only source to refer the quality parameters of a website but now there are other sources too such as “Moz, Seotesteronline, Seositecheckup, Woorank, Seoptimer and Siteanalyzer to list the SEO criteria” [8]. Hence, website administrators should always have a deep understanding of search engine optimization.

Now a days, every organization needs a website, that are designed to not only appear good but also function well. Now, one of the prominent questions that comes with all the available SEO factors that “How to assess these websites to ensure that the quality parameters are validated.” Techniques and strategies have been put forth, and there is now a greater focus on modelling website quality in studies review of usability from the perspective of decision-makers

which the current techniques cannot manage. Hence there came a great demand to analyze these factors with some robust and quantitative techniques. These techniques are useful to give a comparative analysis of SEO that which factors are better than others.

IV. EVALUATION OF WEBSITES

Website evaluation is an essential process for assessing the quality of websites and ensuring that they meet the required standards. The evaluation process involves a systematic assessment of the different dimensions of website quality, such as [9][10][11]:



Usability Evaluation:

Usability evaluation is one of the most critical aspects of website evaluation. It refers to the extent to which a website is user-friendly and meets the needs of its users. Several usability evaluation methods are available, such as user testing, heuristic evaluation, and expert evaluation. “User testing involves observing users as they interact with the website and collecting feedback on their experience.” Heuristic evaluation involves experts assessing the website against a set of heuristics or guidelines. Expert evaluation involves experts evaluating the website based on their expertise and experience.

Accessibility Evaluation:

Accessibility evaluation is concerned with ensuring that websites are accessible to users with disabilities. This includes ensuring that websites are compatible with assistive technologies and meet “accessibility guidelines such as the Web Content Accessibility Guidelines (WCAG). Accessibility” evaluation methods include automated testing, manual testing, and user testing with people with disabilities.

Functionality Evaluation:

Functionality evaluation is concerned with ensuring that the website functions as intended. This includes assessing the website's performance, reliability, and security. Functionality evaluation methods include code review, testing, and security testing.

Content Evaluation:

Content evaluation is concerned with ensuring that the website's content is relevant, accurate, and up-to-date. This includes assessing the quality of the text, images, audio, and video content. Content evaluation methods include expert review, user testing, and automated testing.

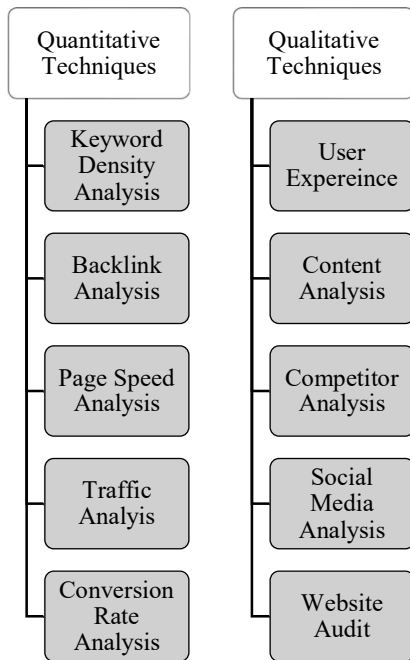
Design Evaluation:

Design evaluation is concerned with assessing the aesthetics and visual appeal of the website. This includes assessing the website's layout, color scheme, typography, and graphics. Design evaluation methods include expert review and user testing.

V. TECHNIQUES TO ANALYSE SEO FACTORS

SEO is important for businesses and website owners because it may assist in increasing organic traffic to their website, which may result in higher revenue and conversion rates. Evaluating SEO involves analyzing various factors, including keyword rankings, website traffic, backlinks, user engagement, and conversion rates. Owners of websites may create more effective SEO strategies that will increase their website's exposure and position in search engine results pages (SERPs) by evaluating the success of their current SEO tactics and pinpointing areas for development. On doing an extensive study of SEO and its factors, we came across many techniques that help in finding out the relation between the SEO factors and website ranking. This study simplified our hunt for the factors that play most

vital role in bringing a website on the beginning of search engine result page. These tactics provide “a robust model” for analyzing the trustworthiness of Search Engine Optimization factors. Here we tried to identify the quantitative and qualitative methods to evaluate SEO.



Quantitative techniques: There are several quantitative techniques that can measure the effectiveness of their SEO strategy and identify areas for improvement to achieve better search engine rankings. These quantitative techniques include [12][13]:

- ❖ **Keyword density analysis:** This technique involves calculating the percentage of times a target keyword appears on a web page in relation to the total number of words on the page. It helps to ensure that the page's content is optimized for the target keyword without overusing it.
- ❖ **Backlink analysis:** This technique involves analyzing the number of backlinks a website has, the quality of these links, and the anchor text used in them. In search engine optimisation, backlinks are crucial because they may tell search engines that a website is a reliable and authoritative source.
- ❖ **Page speed analysis:** This technique involves measuring the time it takes for a web page to load fully. A faster page speed can lead to better search engine rankings, as search engines prefer websites that provide a better user experience.
- ❖ **Traffic analysis:** This approach entails examining website traffic statistics, including visitor count, bounce rate, and duration of stay. This information may be used to determine the website's strong points and potential areas for development.
- ❖ **Conversion rate analysis:** This method is examining the frequency with which website visitors complete a desired activity, such as buying something or completing a form. Website owners may determine where their SEO strategy is working well and where it needs to be improved by looking at conversion rates.

Qualitative techniques: There are many qualitative techniques as well that helps in identifying the most effective factors contributing to the quality of a website and its content, enhance the user experience, and develop effective SEO strategies that can improve search engine rankings. These techniques are as mentioned below [14][15]:

- ❖ **User experience analysis:** This technique involves analyzing the usability and user experience of a website, including its layout, design, and navigation. By ensuring that the website is easy to use and navigate, website owners can improve their SEO by reducing bounce rates and increasing engagement.

- ❖ **Content Analysis:** This technique involves analyzing the quality, relevance, and value of the content on a website. By ensuring that the content is well-written, informative, and engaging, website owners can improve their SEO by attracting more visitors and increasing engagement.
- ❖ **Competitor analysis:** This technique involves analyzing the SEO strategies of competitors in the same industry or niche. By analyzing what is working for competitors, website owners can identify areas where they can improve their own SEO strategies.
- ❖ **Social media analysis:** This technique involves analyzing the social media profiles of a website to ensure they are optimized for SEO. By ensuring that social media profiles are up-to-date, active, and engaging, website owners can improve their SEO by driving more traffic to their website.
- ❖ **Website audit:** This technique involves conducting a comprehensive audit of a website to identify technical issues, broken links, and other factors that may be affecting its SEO. By identifying and fixing these issues, website owners can improve their SEO by ensuring that their website is properly optimized for search engines.

The identification of qualitative and quantitative techniques has given a significant direction to research about the methods required for evaluating these factors. On reading around 30 articles related to SEO and their evaluating methods. There have been number of techniques available to analyse the factors contributing to the ranking of the websites. Many papers are had focused on a specific genre of a website such as Healthcare, education, e commerce or tourism. Each paper has discussed about one or more mathematical techniques to identify which factor contributes the most to the website ranking. Generally, the most commonly used techniques are MCDM approaches, decision trees, clustering analysis, machine learning, regression analysis, and correlation analysis. One statistical technique for determining the link between two variables is correlation analysis. The elements that have the most effects on SEO may be found by examining the relationship between various criteria and rankings. Another statistical technique for examining the link between one or more independent variables (like on-page and off-page elements) and a dependent variable (like search engine rankings) is regression analysis. Machine learning algorithms can be used to analyze large amounts of data and identify patterns and trends. By training machine learning models on historical data, it is possible to predict which factors are likely to have the greatest impact on SEO in the future. Clustering analysis is a technique used to group data points based on their similarities. In the context of SEO, clustering analysis can be used to group web pages that have similar on-page and off-page factors. By analyzing the clusters, it is possible to identify which factors are most important for SEO. Decision trees are a machine learning technique that can be used to identify the most important features for a particular outcome. In the context of SEO, decision trees can be used to identify the most important on-page and off-page factors for search engine rankings. MCDM techniques are used to make decisions when there are multiple criteria to consider. These techniques help in evaluating alternatives based on different criteria that may have conflicting objectives. They allow decision-makers to consider multiple factors simultaneously and to balance the importance of each criterion based on their relative importance. All of these techniques have multiple methods that can be applied to identify the impact of website factors on SEO. Here we tried to collaborate these methods and specified them into the table given below:

TABLE II. Methods to evaluate SEO factors

Method	Technique	Dataset	SEO Factors Considered	Results
“Hybrid Modified MCDM Models”[16]	“A decision model is established using hybrid modified multiple criteria decision-making models (MCDM), including decision-making trial and evaluation laboratory(DEMATEL), DEMATEL-based analytic network process (DANP), and VlseKriterijumska Optimizacija I Kompromisno Resenje (VIKOR) and INRM.”	Data was collected as opinions from SEO professionals, experts of internet marketing and scholars of computer science through questionnaire	1. Website design 2. Meta Tags 3. Keywords 4. Site guide 5. Social media Linkage	“Based on the empirical results the most influential SEO factor is Meta tags in a website followed by keywords, website design, site guide, linkage, and social media.”
Reverse Engineering[17]	For 200 thousand web pages a content analysis was done including URL, HTML and PageRank analysis	200 thousand web pages	1. URL Layers 2. URL Length 3. Keyword in URL 4. Length of HTML text	Out of all the SEO factors taken into consideration 5 factors influence the page ranking the most. “URL length, Keyword in URL domain, Keyword density in H1, Keyword density in Title and URL

			<ol style="list-style-type: none"> 5. Keyword density in HTML 6. Length of Title Tag 7. Keyword density in title 8. H1 (Headings) 9. H2(Subheadings) tags 10. Count of Links Outbound links 	<p>layers.”</p> <p>Among these 5 factors the URL Length is the most important SEO factor.</p>
Hesitant FAHP and TOPSIS [11]	21 SEO criteria were determined using literature review and expert opinions and their importance was determined using hesitant FAHP & TOPSIS MCDM techniques	70 industrial Turkish websites	<p>21 SEO features have been divided into 6 categories:</p> <ol style="list-style-type: none"> 1. Performance Dimension 2. Design Dimension 3. Content Dimension 4. Meta Tag Dimension 5. Backlinks 6. Technical Dimensions 	“According to the importance reached with the comparison of the decision makers, the backlink dimension has the highest relevance among the primary criterion, and the trust flow has the highest importance among the sub-criteria.”
Six Sigma [18],	The approaches used in Six Sigma are Define, Measure, Analyze, Improve and Control (DMAIC)	Survey and interviews from 1000 interviewees who are active on internet.	<ol style="list-style-type: none"> 1. Number of paper indexed 2. Backward links 3. External links 4. Keywords in web page <p>Keyword in Title</p>	<ul style="list-style-type: none"> ❖ Keyword plays the most vital role in search ranking. One should wisely select the potential keyword and their application. ❖ External links, backward links and websites indexed are interdependent and contribute equally to search ranking. <p>Finally the flow or navigation of the website plays an important role in search results.</p>
Spearman Correlation [7]	A google search was conducted using 3 different phrases. Manual testing was done to examine the SEO factors obtained through academic paper and a Spearman correlation is established between these factors.	A collection of scientific research papers highlighting the top factors contributing to a website ranking.	24 characteristics of a website were analyzed including backlinks, keywords in URL and Title, social media, webpage size, structure etc.	The top factors that contribute to a better ranking is the SSL certificate of a website, Keyword in URL, count of backlinks, length of the text and age of the domain a website belongs to.
Regression Analysis[8]	The SEO factors were enquired using a third-party tool “Alexa”. A hypothesis was built for all the six attributes of SEO taken into consideration and Regression analysis is applied to obtain the relationship.	Dataset obtained from 116 websites. The data was captured from sales websites appearing in Baidu’s top 10 search results.	<ol style="list-style-type: none"> 1. Link Popularity 2. Customization of 404 Error Pages 3. Page Size 4. Title Length 5. Web Directory <p>Keyword Density</p>	The most effective factors playing an important role in website ranking are; Page Size, Customization of 404 Error Pages, and Link Popularity.
Quantitative Analysis – SPSS [9]	“Alexa”, a third party tool was used to list all the SEO characteristics that bring heavy traffic to a website and applied them in most popular Greece news websites. A correlation established between SEO factors and website ranking using SPSS approach.	30 Greece news websites of all categories (sports, blogs, newspapers), divided into 2 categories - 15 websites placed among top 50 sites in Greece, 15 websites placed past 100 th ranking.	<ol style="list-style-type: none"> 1. Varying Headlines 2. Meta description 3. Images optimization 4. URL 5. Backlinks 6. Links (article) exchange 7. Website Load Time 8. PageRank 9. Bounce Rate – User Engagement 10. Meta keywords tag <p>Domain/Website Age</p>	<ul style="list-style-type: none"> ❖ However, the website with maximum traffic best utilizes all the SEO factors but based on SPSS results, optimization of images, Meta description, and keywords in URL were the most widely utilised. ❖ Meta keywords tag doesn’t matter to major search engines <p>Apart from the mentioned factors, all websites used appropriate keywords in titles, page title, lead paragraphs and body content as well as keywords in H tags (h1, h2) or anchor texts.</p>

VI. CONCLUSION & FUTURE SCOPE

The last ten years have seen a dramatic increase in both the significance and popularity of SEO. This era demands retrieval of most significant information using SEO techniques. Our study has provided some quantitative techniques used by researchers to determine essential factors required for a better ranking of the website. The results are based on mathematical calculations that helped in building a deep knowledge of SEO. Identification of most influencing factors can enable the website owners to adhere to these factors for a successful business. The operation of search engines and SEO strategies are essential to guaranteeing a website's steady development and substantial traffic.

Technology is developing at a rapid pace, and techniques for SEO will need to adapt accordingly. Numerous elements that affect a website's search engine appearance have been covered. Even while search engine optimisation has seen a lot of study, it is still unclear how to precisely quantify how these elements affect search results. It will eventually be feasible to create a trustworthy model to evaluate how SEO elements affect the rankings of search engines.

VII. REFERENCES

1. S. Jayaraman, M. Ramachandran, R. Patan, M. Daneshmand and A. H. Gandomi, "Fuzzy Deep Neural Learning Based on Goodman and Kruskal's Gamma for Search Engine Optimization," in *IEEE Transactions on Big Data*, vol. 8, no. 1, pp. 268-277, 1 Feb. 2022, doi: 10.1109/TBDATA.2020.2963982
2. Google Organic CTR History. Fresh CTR Averages Pulled Monthly from Millions of Keywords. 2018. Available online: <https://www.advancedwebranking.com/ctrstudy/> (accessed on 25 December 2018)
3. "Google Search Essentials" available at <https://developers.google.com/search/docs/essentials>
4. "How Bing ranks your content" available at <https://www.bing.com/webmasters/help/webmaster-guidelines-30fba23a>
5. Mittal, M. K., Kirar, N., & Meena, J. "Implementation of Search Engine Optimization : Through White Hat Techniques" International -Conference on Advances in Computing, Communication Control and Networking (ICACCCN), 2018
6. Patil Swati P.1, Pawar B.V.2 and Patil Ajay S., "Search Engine Optimization: A Study", *Research Journal of Computer and Information Technology Sciences*, Vol.1(1), 10-13, February 2013
7. Ziakis C, Valchopoulou M et. al, "Important Factors of Improving Google Search Rank", *Future Internet*, 11, 32; doi:10.3390/fi11020032, 2019
8. Özkan, B., Özceylan, E., Kabak, M., & Dağdeviren, M. (2019). Evaluating the websites of academic departments through SEO criteria: a hesitant fuzzy linguistic MCDM approach. *Artificial Intelligence Review*. doi:10.1007/s10462-019-09681-z.
9. Wang F, Li Y, Zhang Y, "An Empirical Study on the Search Engine Optimization Technique and Its Outcomes", 2nd International Conference on Artificial Intelligence, Management Science and Electronic Commerce (AIMSEC), doi:10.1109/AIMSEC.2011.6011361, August 2011
10. Sharma S, Verma S, "Optimizing Website effectiveness using various SEO Techniques", 7th International Conference on Signal Processing and Integral Networks (SPIN), 2020
11. Varsha, P. S. Grover and L. Ahuja, "An Overview of Search Engine Optimization," 2021 9th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO), 2021, pp. 1-6, doi: 10.1109/ICRITO51393.2021.9596287.
12. Giomelakis, Dimitrios; Veglis, Andreas (2015). Investigating Search Engine Optimization Factors in Media Websites. *Digital Journalism*, 1-22. doi:10.1080/21670811.2015.1046992
13. Agus Setiawan; Zulkifli Harahap; Dedy Syamsuar; Yesi Novaria Kunang; The Optimization of Website Visibility and Traffic by Implementing Search Engine Optimization (SEO) in Palembang Polytechnic of Tourism; *Commit (Communication And Information Technology)* VOL. 14 NO. 1 (2020) ; <https://doi.org/10.21512/commit.v14i1.5953>
14. Wahba, W. Z., & Barhoom, T. S. (2019). SEO: Improve website ranking based on competitors analysis. *International research journal of engineering and technology (IRJET)*, 6(8).
15. Özkan, B., Özceylan, E., Kabak, M., & Dağdeviren, M. (2019). Evaluating the websites of academic departments through SEO criteria: a hesitant fuzzy linguistic MCDM approach. *Artificial Intelligence Review*. doi:10.1007/s10462-019-09681-z.

16. Tsuei, H., Tsai, W., Pan, F. et al. "Improving search engine optimization (SEO) by using hybrid modified MCDM models", *Artificial Intelligence Rev* 53, 1-16. <https://doi.org/10.1007/s10462-018-9644-0>, 2020.
17. Zhu C. and Wu G., "Research and Analysis of Search Engine Optimization Factors Based on Reverse Engineering," *Third International Conference on Multimedia Information Networking and Security*, 2011, pp. 225-228, doi: 10.1109/MINES.2011.99.
18. Eswarawaka R. , Kudikala S. K.,Kuchi S. C. and Verma K V., "The analysis on search engine optimization supported by six sigma methodology," *International Conference on Innovative Mechanisms for Industry Applications (ICIMIA)*, 2017, pp. 653-658, doi: 10.1109/ICIMIA.2017.7975544.