**SEA: Search Engine Analysis**

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***Abstract*— The research talks about progress and improvements; these are in technical SEO and marketing activities. The paper collates data from the research that treats the search engines' capacity as the benchmark examines how the SEO strategies have been undergoing continuous changes suggests new ideas on how the user search data can be rendered effective and finally examines how the SEO integrates well with knowledge graphs. The main purpose of this paper is to add to the continuous discourse about how the content can be optimized to make it highly visible and relevant, online, by use of a methodological approach that brings the research trends in search engine marketing into focus and the relationship between SEO and technologies like knowledge graphs.**

***Keywords*—Search Engine Optimization(SEO), Search Engine Analysis(SEA), External Links, Search Engine Result Page(SERP), Keyword Selection Strategies, Keyword Research, Keyword Relevance, Strategic Approach to SEO, Market Mechanisms, Search Engine Marketing(SEM), Long-term strategy of keyword choice, Relevance in keyword selection, Search Volume, Optimizing Research Articles for SEO, Keywords in Title, Keywords in Abstract, Keywords in Headings and Keywords in Keyword Fields.**

# Introduction

Artificial intelligence has transformed many areas of modern life, including healthcare, education, investment, law, marketing, cyber security, domestic life, and transportation. It is now a necessary component of modern existence. From being viewed as a threat to mankind, artificial intelligence has developed into a personal assistant that helps individuals with daily issues. AI is used in internet searches to maximize search engine traffic while delivering accurate and relevant content. Nevertheless, concerns have been raised about the application of AI in SEO, including the potential for it to detect offensive human traits like racism, ageism, and sexism.

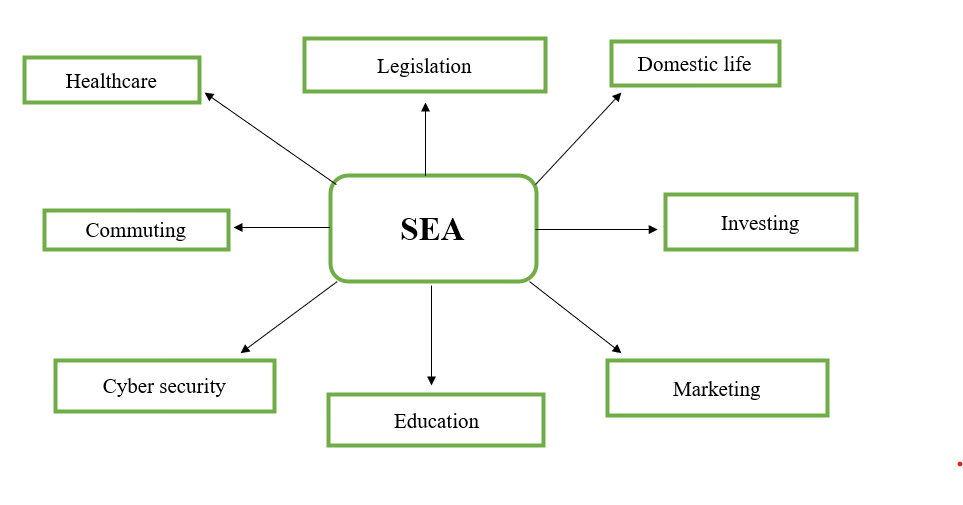
New technologies such as machine learning, natural language processing, and computer vision have significantly modernized the various sectors of our life such as healthcare, education, investment, law, marketing, security field, domestic life, and transportation. In the beginning, it seemed to be quite impossible but now it becomes a vital attribute of everyday life. The progress of AI from a noticeable danger to humanity into an assistant that helps people with everyday issues could be an example of a partial answer to the given question. AI is applied in internet searches to maximize the number of people who use search engines as well as provide accurate and relevant information. But, worries have been expressed about the AI implementation to SEO, and it is gray whether it has the ability to detect the offensive characteristics of human nature like racism, sexism, and ageism.

Fig. 1. Applications of AI in SEA

Opposed to all the hindrances, AI can be applied to maximize website traffic. According to an SEO Produce (Proficiency of Marketing) Survey feat. In 2017, the vast majority of SEO Formalists, namely 96%, stressed that AI can contribute to the development of greater SEO plans. AI can be more productive than its competitors, whereas competitor is capable of spotting anomalies to sift data for search engine optimization. Artificial intelligence “seems” to be one of the SEO domain leaders as the tried-and-tested methods fail to deliver results and a number of SEO firms are fighting to stay in business. In this part of the article, artificial intelligence applications to search engine optimization is discussed.

Search engine analysis which corresponds to SEO (search engine optimization) is in analyzing websites and Identifying means by which sites can be more visible in search engine results. It helps website owners to see their website through search engines' eyes and to achieve better positions with their content. One of the main things that make web analysis different is keyword analysis which says that over text we have taken more than just broad keyword summaries for each search engine we give numbers about how much traffic a particular keyword was able to give to our website from each source.

# Literature Review

# The literature on search engine analysis provides valuable insights into various aspects of search engine optimization (SEO) and marketing strategies. Here is a detailed review of the literature based on the provided sources:

# The study by UK Essays explores the concept of search engine optimization, emphasizing the natural means of probing capacity through algorithmic and organic searching processes. This highlights the importance of understanding how search engines operate and the strategies involved in optimizing content for better visibility.

# ResearchGate presents an analysis of literature on search engine optimization techniques from 2005 to 2016, offering a comprehensive review of the evolution of SEO practices over this period. This review sheds light on the advancements and changes in SEO strategies over time, providing a historical perspective on the development of search engine optimization.

# In another study by GV Press, a novel technique for enhancing user search data efficiency is proposed, establishing a relationship between searches to improve the effectiveness of SEO strategies. This innovative approach contributes to enhancing the efficiency and relevance of search results for users, emphasizing the importance of user-centric optimization techniques.

# Additionally, DergiPark conducts a systematic literature review to detect emerging research trends in search engine marketing, aiming to extend understanding about this field through an overview of existing literature. This systematic approach helps identify key research directions and areas for further exploration in search engine marketing.

# Furthermore, the study on the connection between search engine optimization and knowledge graphs explores how SEO practices interact with knowledge graphs to enhance online visibility and information retrieval. This research highlights the evolving landscape of SEO strategies and their integration with advanced technologies like knowledge graphs for improved search performance.

# Collectively, these literature sources provide valuable insights into the evolution, techniques, trends, and innovations in search engine optimization and marketing. By synthesizing information from these studies, researchers can gain a comprehensive understanding of SEO practices and identify opportunities for further research and advancements in this dynamic field

# .Methodology

## Identify Your Target Keywords

The stage of the keyword identification is an important aspect of any SEO strategy. The keywords play a very significant role in SEO as they are the ones that represent inquiries of the users. They are phrases or words that they type into SEO engines when they are looking for information. Here's an elaboration on the point of identifying keywords. Here's an elaboration on the point of identifying keywords:

* **Relevance:** Your keywords need to match your business and if possible, highlight it best. They should discuss how people find your website in search requests the same time as other content on your website.
* **Search Volume:** Means of keywords research - conclusion is determined by how many times they are searched on search engines. High search volumes will bring you more visitors, it is also the fact that these keywords are attractive to a monopoly. Preventing targeting high and low search volume keywords homogeneity, you can achieve a balanced SEO strategy.
* **Long-Tail Keywords:** Long-tail keywords are longer, extra-precise phrases that usually have fewer queries, but more high novel rate. Incorporating long-tail keywords in your strategy can aid to customize your target towards a niche audience and users who may be about to do their purchase.
* **Competitor Analysis:** Analyzing competitors' keyword strategies can give you a clue which keywords are targeting to attract their sites traffic. This strategy can reveal gaps between yours and competitors keyword strategies by displaying you keywords opportunities they may have overlooked.
* **Keyword Research Tools:** To extend your keyword list, apply keyword research tools such as Google Keyword Planner, SEMrush or Ahrefs and find other keyword ideas, analyze search traffic volume, competitiveness level and trends. Those tools make it possible to spot the suitable phrases, that in their turn have the high potential to attract the traffic to your website.
* **User Intent:** If the keywords are metaphorical or can be confused with meanings other than the context, add a definition in advance which clarifies what you mean. Are users searching for information, products and services or they need the websites to make an order? Understanding user intent can help you tailor your content and optimize your website for specific keyword searches.

## Use Google Trends

Talking about Google Trends use in SEO, it points out the data which can be highly helpful in bettering your search engine optimization strategy undefined such as :

* **Keyword Research:** Google Trends can be used to search out trending key words and phrases. With running down popularity of specific keywords through time, you can discover new keyword opportunities, understand seasonal trends, and modify your content to match search interests and nowadays topics.
* **Seasonal Peaks Analysis:** Seasonal fluctuations in consumer demand for products is a useful application of Google Trends in SEO where search engine optimizers predict and analyze the trends. Analyzing historical records on the keyword popularity, the companies can predict which of those keywords will be most searched for now and make adjustments to SEO strategies when it’s needed.
* **Niche Content Planning:** Google Trends can realizes SEO implementation through provision of the niche content. Clicks on certain keywords shows the audience interest. This process can help identify content gaps or give some content opportunities in a particular niche.
* **User Search Behavior Insights:** Google Trends reveals a profound profile of how users look for data on the Internet. Through this analysis, businesses will be able to comprehend user search patterns, preferences, and trends, which will help them create more appealing and relevant content that will speak directly to its audience.
* **Advanced Methods:** Apart from basic keyword research, Google Trends contains not only functions but also advanced methods for utilization by SEO and content marketing purposes. These approaches comprise studying regional audience, associated queries and comparing various keywords in order to detect trending locations and acquisition opportunities.

**Pytrends** is an unofficial API for Google Trends. It enables to pull the data and inspect search patterns from Google Trends using the programmatic approaches like

* **Extract Search Interest Over Time:** Pytrends is a module that can be used such that you are able to retrieve the historical data of how many particular keywords or topics have been searched for on Google by the past years. These are same figures Google trends interface gives to you, when you search for a keyword there.
* **Automate Data Collection:** Automation in data collection is done using pytrends. Thus, this feature allows you to maintain records and investigate trends for a number of keywords as the time passes by or if you need to include the search volume data in a bigger project.
* **Analyze Search Trends at Scale**: The pytrends library providing you all features to manipulate the search trend data collected with its help. This is meant to reveal to you the trends associated with your audience.
* **Unofficial API:** However it should be mentioned that pytrends is not the official api from Google. This is saying that Google may revise its search algorithm in a way that makes it problematic for pytrends in the future.
* **Requires a Google Account:** Please remember that passing an account with Google will make you be able to avoid rate limits on Google.
* **Focuses on Downloading Reports:** Pytrends functions as a tool for fetching data. The dominant aspect is downloading reports from Google Trends. It may not give you the same advantages as Google Trends API (full API).

## Analyse the Data

Study of Google Trends data stands as the key when it comes to making the most effective use of this tool in the SEO field some of them are as follows

* **Identifying Patterns:** While reviewing the Google Trends data, it is important that the search data is analyzed in regard to the patterns and the trends. It covers such aspects as sighting periodical peaks and valleys in search demand, researching seasonal changes and getting aware of any long-term trends in search popularity of certain keywords.
* **Comparing Multiple Keywords:** The Google Trends feature enables users to compare the search engines popularity of multiple keywords at the same there. Compared different keywords reflecting your business or sector, you can see the difference in the popularity of some keywords, and also their changes in the interest of people over the time and find out the priorities of your SEO efforts accordingly.
* **Geographic Insights:** The geographical insights displayed by Google Trends highlight the local keywords that are frequently searched within a particular area. Exploring regional interest so as to reveal to businesses where in particular they can craft their SEO strategy and reach target markets from specific locations or regions that attracts most activity from their target audience through effective marketing campaigns.
* **Identifying Rising Trends:** The fact that Google Trends could equally show increase in search trends is another benefit of this service. Tracking the "Breakout" quarts in Google Trends can help the companies see the trending issues and keywords that are swiftly gaining attention. The latest trends can be exploited in order to create right on-trend content, which has a much better chance to be found by users based on what they are actually searching for.
* **Seasonal Adjustments:** Using data analysis from Google Trends helps organizations in changing the approaches to their SEO tactics for the seasons. Businesses will be able to grasp the times when there are surges in search query for the chosen keywords, and this will lead to them establishing a means of optimizing the content and campaigns so that it will coincide with the seasonal trend thereby realizing maximum visibility and engagement during the peak periods.

## Find Related Trend

Keyword relatedness is one of the main components of SEO keyword research where keywords are found. Here's an elaboration on how to effectively find related keywords using various tools and techniques: Here’s an elaboration on how to effectively find related keywords using various tools and techniques:

* **Google Keyword Planner:** Google Keyword Planner can be an effective platform for you to learning the keywords that exist. Entering your key phrases into search planner has an option for you to need a list of related words, their search volumes, competition and suggested bids. This type of information can help you to research more extensively your keyword list and section off numerous ways in which your website can be approached by people from various search queries.
* **LSI Keywords:** Latent Semantic Indexing (LSI) keywords are the terms related to your primary keyword not only grammatically but also as your topic, idea and so on. Using LSI keywords with your content not only increases its relevance, but, as well, helps search engines to better capture the intended message in the context of your content. The LSI Graph can be the tool for generating LSI keywords Which you enter your basic keywords or phrases.
* **Competitor Analysis:** The research of keywords used by your competitors can prove to be extremely fruitful and practical in identifying the other key phrases which are fueling the influx of traffic on their websites. The SEMrush and Ahrefs can help you do such analysis via competitor keyword analysis, then find the keywords that you would have not thought about.
* **Google Autocomplete and Related Searches:** When a user inputs a term in Google search bar typically one sees the suggested search query at the bottom of the page to follow that search term. This will be an integral part of your keyword strategy as you can create a list, or group, of the related keywords that users often search for, which are associated with your primary term. Firstly, searching for “Related Searches” at the bottom of the search results page should reveal other keyword variations.
* **Content Optimization Tools:** Features such as Surfer SEO or Clear scope inevitably crawl the key phrases and their related vocabulary that are used in top-ranking pages and show you what keywords to include in your piece. Whenever you use the related keywords in a natural way in your content you are more likely to make it more relevant to a search engine and hence in some instances to increase its search engine rankings.

## Refine Your Search

The use of filters in Google Search could increase the accuracy and relevance of the search results. Here's an elaboration on how to effectively use filters to refine your search results:

* **Refine by Content Type:** Through the use of filters, people can select their preferred type of content, be it videos or news, images or shopping results. When choosing specific content types, users concentrate search only on the media formats or sources that appeal to them.
* **Advanced Search Tools:** Google offers search options that let users add film filters based on quality, length, publish date, and source. These devices allow users to cut down on search results and thus, find the most pertinent and recent information.
* **Site-Specific Filtering:** The "site:" operator of Google Search allows users to focus on the results within a certain website. By including "site:example.com"; this will help users in finding information specifically within the site that is under the domain name.
* **Customization on Mobile:** Those using their mobiles get filters from Google Search that enhance their ability to customize the search results. Users can filter results basing on certain criteria, for example, sites updated lately or during particular period of time.
* **Topic Filters:** Google has recently introduced an overhaul of the topic filters that significantly simplifies the process of narrowing and broadening the search results. These filters allow users to distinguish and narrow down the search results between different types like videos, news, images or shopping, making it easier for finding what they need.

## Monitor Trends

It is worth monitoring the trends on Google Trends as part of your ongoing effort to have an idea of the recent search queries and patterns. undefined

* **Real-Time Insights:** By means of Google Trends, users can acquire current search information which is collected in real time. Such information enables them to be aware of their contemporaries’ current interests or what is trending at the moment. The researches on such trends will enable organizations to adjust their content and marketing approaches so they fit with the mostly used search questions.
* **Measuring Search Interest:** Google Trends is another tool that individual users can tap into to track the number of searches performed for particular topics or keywords over time. Businesses through search interest graph can identify inquiries with variations, seasonality, and unknown content that might affect their SEO strategy.
* **Keyword Research:** SEO specialists employ Google Trends to get insight into keyword research for selecting the most likely keywords and queries. Through tracking trending keywords and search volumes, businesses can find those new areas where they could write appealing content, modify it to be search-friendly and help reach the target audience.
* **Seasonal Analysis:** One of the wide applications opportunities of Google Trends is measuring and predicting season peaks in search demand. Historical data of search trends are analyzable by businesses to foresee the times when particular keywords will see the higher interest in demand. They can consequently make an adjustment to SEO strategies.
* **Data-Driven Decisions:** Through Google Trends, business gets a chance to use up-to-date data, and, subsequently, to make consistent and informed decisions concerning their SEO initiatives. The trend monitoring is key to the business success because it allows to spot new areas of influence, to create content around the trending topics and to be one step forward in the dynamic online searches.

A screenshot of a computer screen

Description automatically generated

Fig. 2. Flowchart of methodology

# Results

A graph showing a graph of data

Description automatically generated with medium confidence

Fig. 3. Graph for total google searches for the keyword Machine Learning

A graph of blue vertical bars

Description automatically generated with medium confidence

Fig. 4. Graph for total google searches for the keyword Machine Learning across countries

# Conclusion

The research paper has focused on the importance of search engine optimization (SEO) in the realization of more visibility, impact, and discoverability of academic research papers. The investigation of the coverability between SEO practices and citations permits to see that the optimization of content for search engines is a very important factor accounting for the rising online visits and the subsequent referencing of scholarly articles. By introducing SEO methods to scientific publications, they are becoming more visible and their reach is being extended. Eventually, this contributes to the dissemination of the academic research. Moreover, the role of SEO in keeping the engagement and user interaction with online content reveals its significance in user favor and improving the accessibility of the scholarly information. Through a comprehensive literature review on search engine optimization–related issues, innovations, and strategies, this paper has brought forth the developing scenery of SEO methods and their effect on research visibility. In conclusion, the conclusions are indicative of the relevance of applying SEO standards to academic publishing for more coverage and influence of research works in the current digital era.

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