Predicting the Potential Impact of Backlink Analysis on Webpage Ranking by using Machine Learning Techniques

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Abstract

Automating the manual method of finding indexed backlinks of websites can significantly reduce the cost and time associated with performance improvement. Automating the process of finding indexed backlinks offers several benefits. It reduces the time required to perform backlink analysis, lowers operational costs, and enhances accuracy. The automation of backlink analysis involves various technologies, including web crawlers, data mining algorithms, and machine learning models. Web crawlers systematically browse the web to find backlinks, while data mining algorithms analyze the collected data to assess the quality and relevance of each backlink. Machine learning techniques further refine this process by identifying patterns and predicting the potential impact of backlinks on website performance. With faster and more accurate backlink analysis, businesses can make informed decisions that enhance website performance. Automation tools provide detailed insights into the quality and impact of backlinks, allowing for precise adjustments to SEO strategies. This leads to improved search engine rankings, increased organic traffic, and better overall performance metrics.

I. INTRODUCTION

It looks at the many ways that backlinks can be useful for promoting and branding websites, explaining how these digital tools provide the foundation for getting organic web traffic and promoting a brand in a way that lasts. Backlinks are basically links from one webpage to another. Backlinks, fundamentally, are hyperlinks from one webpage to another, and their strategic deployment can significantly bolster a website's visibility and authority in search engine results. This organic traffic generation is a vital aspect of digital marketing, as it draws visitors through unpaid search results, distinguishing itself from the transient benefits of paid advertising. The increasing competition in product branding underscores the critical role of backlinks. In digital marketing, backlinks are akin to endorsements, signaling to search engines that the content is valuable and trustworthy. This perception boosts the site's ranking, making it more likely to be discovered by potential customers. Thus, effective backlink strategies are indispensable in the competitive branding race, offering long-term benefits that extend beyond immediate traffic spikes. Central to the efficacy of backlinks is the connection of keywords and search efficiency. Keywords are the linchpins of search engine optimization (SEO), dictating how easily content can be found by users. The chapter emphasizes the importance of creating a robust network of keywords, which enhances the overall searchability and relevance of the website. Optimal keyword selection and placement in backlinks ensure that the site appears in relevant search queries, thereby improving its visibility and attracting targeted traffic. In this context, the chapter introduces an innovative approach to backlinks generation and optimization through machine learning. Machine learning algorithms can analyze vast datasets to identify patterns and predict the most effective backlink strategies. This data-driven approach surpasses traditional methods, providing more precise and actionable insights. The proposed methodology employs the Particle Swarm Optimization (PSO) algorithm, a sophisticated technique inspired by the social behaviors of birds flocking or fish schooling. PSO optimizes solutions by iteratively improving candidate solutions with respect to a given measure of quality, known as the fitness function. In the context of backlinks, the fitness function could evaluate the quality of backlinks based on factors such as relevance, traffic potential, and keyword effectiveness. The implementation of PSO in backlinks optimization involves several steps. Initially, data collection is paramount. This involves gathering data on existing backlinks, web traffic, and

keyword performance using web analytics tools. These data points form the foundation for training the machine learning model, enabling it to understand the intricate relationships between backlinks and web traffic. Once the model is trained, PSO is employed to optimize the placement of backlinks. This involves defining a fitness function that accurately reflects the objectives, such as maximizing traffic or improving search engine ranking. The algorithm then simulates the behavior of particles exploring the solution space, each representing a potential backlink configuration. Through iterative adjustments, the particles converge on the optimal solution, thus identifying the best backlink strategies. Continuous monitoring and refinement are crucial for sustaining the benefits of the optimized backlinks. The dynamic nature of digital marketing necessitates ongoing evaluation and adjustment of strategies. Feedback from the PSO algorithm helps in fine-tuning the approach, ensuring that the backlink profile remains effective and aligned with the evolving digital landscape. The benefits of integrating machine learning and PSO into backlink strategies are manifold. Firstly, this approach significantly enhances web traffic by ensuring that backlinks are not only numerous but also highly relevant and strategically placed. This relevance translates into improved search engine rankings, making the website more visible to potential customers. Secondly, efficient keyword utilization is a direct outcome of this optimization process. By leveraging machine learning, the selection and placement of keywords become more precise, ensuring that the content is discoverable by users searching for related terms. This precision boosts search efficiency, leading to higher conversion rates as the traffic attracted is more likely to be interested in the content. Thirdly, this machine learning-based approach to backlinks generation and optimization offers sustainable brand promotion. Unlike paid advertising, which provides temporary visibility, a robust backlink profile builds long-term credibility and authority. High-quality backlinks from reputable sites enhance the brand's reputation, fostering trust and loyalty among users. Furthermore, the chapter highlights the adaptability of the proposed methodology. The digital landscape is ever-changing, with new trends and technologies constantly emerging. The flexibility of machine learning algorithms, particularly PSO, allows for quick adaptation to these changes, ensuring that the backlink strategies remain effective and relevant. Another significant advantage of this approach is the scalability. As businesses grow and their digital presence expands, the need for an effective and scalable backlink strategy becomes more pressing. Machine learning algorithms can handle large datasets and complex networks, making them ideal for scaling up backlink efforts without compromising on quality or efficiency. The chapter also underscores the importance of a holistic approach to digital marketing. While backlinks are crucial, they are just one part of a broader SEO strategy. Effective digital marketing requires a comprehensive approach that includes content quality, user experience, social media engagement, and more. By integrating machine learning into backlinks optimization, businesses can ensure that this critical component aligns seamlessly with other marketing efforts.

II. LITERATURE REVIEW

This field has been the subject of numerous investigations, and there are still numerous tasks that require completion. The following section discusses some of the most significant works that have been suggested by a variety of researchers in this domain.

In [1]; the authors propose that the post-truth age has increased the significance of critically assessing online scientific content. Despite these challenges, this era has also raised awareness of the importance of thoroughly evaluating online information related to scientific issues. Advances in epistemic cognition have led to the development of evaluation approaches that may make online users of scientific knowledge more aware and reflective. The authors suggest that examining the links between information sources and knowledge claims may require explicit plausibility assessments.

In [2], the authors examined affiliation disparities across Microsoft Academic, Web of Science (WoS), Dimensions, and Scopus for 18 Arab universities. In each database, a large percentage of the items attributed to the selected institutions were not assigned to the same

university in another. Larger datasets have a greater discrepancy share. There was a higher level of agreement between affiliations in the smaller, more selective databases and those in the other databases. A manual investigation of the affiliation differences found that the underlying cause was a combination of missing affiliations, inconsistencies in unification, and improper institution assignment. In this work, it is discovered that variations in unified variants often the source of WoS disparities, and in some cases, it was clear that ambiguity resulted in data being assigned to the wrong institution.

In [3]; the authors demonstrated that news media companies produce their own content and receive compensation via advertising and subscriptions. Consequently, search engines that curate and provide content they did not originate may be exempt from copyright costs. They looked studied how the two linking methods affect the technical efficiency of media companies, with a focus on search engines that use them to give users news. This study focused on the significant discord between search engines and news media corporations, stemming from the competition between emerging and existing technological firms.

In [4]; the authors demonstrated an innovative approach to the evaluation of the websites of global library associations using webometric metrics and web content evaluation. They have conducted an analysis of numerous library websites. Conversely, no such endeavour has been undertaken in relation to the library organization's global website. The American Library Association's website was used to index international library associations, which comprised the sample. The data was collected using a link analysis application from https://moz.com/, which helped assess domain authority, page authority, in links, and out links. Google was used to create the linkages. A comprehensive assessment comprising 19 criteria was implemented to evaluate the websites of the official library associations. The International Association of Law Libraries was found to have the most external and straightforward web impact factors. Conversely, the internal web impact factor of the Association of Jewish Libraries is the highest. The.org domain is the domain of all websites that were examined for this investigation.

The primary purpose of [5] is to offer suggestions for these schools so that they may improve their standing in the 2021 Nigerian Universities Rankings, which are prepared by the League of Directors of Academic Planning. Researchers at three different universities in Nigeria compared academics usage of Google Scholar to draw conclusions about their online visibility. The three universities' Google Scholar profiles revealed a striking lack of online activity. The low number of Google Scholar profiles among the faculty at these three schools hurts their rankings. Organisations in underdeveloped countries and the three schools in Nigeria can both benefit from the study's findings since, if implemented, they will increase the university's ranking, which will make it more attractive to potential students. Findings from this study will add to our understanding of why professors need to establish an online presence, which can affect their university's standing.

The authors of [6] demonstrated that the web-based operations of these repositories are to evaluate the quantity and quality of content available on the websites of the North American digital repositories for health and medical sciences. From Open ROAR and DOAR, a total of 72 open-access digital repositories were detected. Google was the search engine used to obtain data. The College of Physicians of Philadelphia Digital Library ranks first with a SWIF of 10.40%. With a wiser index value of 19.88371, Mouseion at the JAX Library retains the top slot, followed by the bioRxiv. This analysis provides a thorough overview of the websites of the qualitative and informational repositories in this subject in North America. It suggests that, in order to boost their internet presence and international visibility, they should use specific approaches. This research focuses on measuring the web presence and the linked structure of repository websites. This study presents a thorough analysis and data regarding the websites of all 72 health and medical science repositories in the United States.

In [7]; the authors published a research study on competitive dynamics that mostly investigated indirect elements such as the nature of the acts themselves, the firms involved, or

the competitive environment to assess, if competitors are capable of and likely to engage in competitive activities. They observed into the reasons for rivals first competitive behaviour at a certain time and circumstance.

In [8]; the authors utilised Wikipedia as a computational biology educational resource and identified it as a prominent venue for the public dissemination of research. In recent years, the International Society for Computational Biology (ISCB) and the Computational Biology taskforce of WikiProject Molecular Biology have worked together to make Wikipedia's coverage of computational biology much better. However, there is an urgent need for further quality enhancement, especially in relation to related scientific fields such as genetics and medicine. Getting ISCB Communities of Special Interest (COSIs) to take part would improve an important open education resource in computational biology and give COSIs the chance to provide a high-quality educational resource that is very specific to their field of research study.

In [9]; the authors reanalysed 27 previously published cases of platform overthrow attempts employing an inductive technique. The findings indicate that both players exhibit functional expansion and technological genericity when attempting to overthrow the platform. Consequently, they formulate theories that elucidate the strategies employed during an effort to usurp a platform. Conversely, functional expansion and technical genericity may disclose wholly different facts.

In [10]; the authors used a mixed-method approach to investigate whether race and gender bias exist in the portrayal of artificial intelligence in image search results from six major search engines. According to this research findings, search engines prefer anthropomorphic portrayals of AI that depict it as white, with non-western search engines being the only ones that include non-white images of AI. In contrast, as people become more aware of gender bias in search results, gender representation in AI has become more diverse and less skewed toward any one gender. Their findings emphasise the importance of creating unique ways for detecting bias in information retrieval systems, as well as the need and opportunity for resolving prejudice in the depiction of socially relevant themes like technological advancement.

In [11]; the authors conducted an experiment on the Facebook fan page of a Polish online retailer inside a real-world economic context. They employed many linear regressions and measures from the literature were made just for this experiment to look at the data. The results show that putting a web link in the comments of a Facebook post is more profitable than putting it in the post's caption. These analytics can also show you the best time to post and how long to wait between posts, based on the goals of the campaign. This would enable practitioners and academics to evaluate a product's quality, which was presumed to be uniform in this study. This idea is based on the observation that the reach of each of the 96 posts started very low and steadily expanded throughout the first few hours.

In [12]; the authors recommended employing a sock puppet audit to characterise how algorithmic curation affects subject and source diversity in Twitter timelines. Eight sock puppet accounts were created to mimic typical real-world users, which were picked after extensive network analysis. Then, in early 2020, we gathered the puppets' timelines twice a day for one month. Overall, our data show that, while algorithmic curation reduces the number of external links in the timeline, it increases source variety for external domains and Twitter accounts. Algorithmic curation had a mixed effect on topic diversity, lowering clusters of tweets regarding health and COVID-19 deaths while somewhat boosting a cluster of tweets with a political bent.

In [13]; the authors demonstrated how ecological interactions that are typically independent can become interconnected, resulting in the modification of the interactions between large mammals and their predators as a result of the effects of an insect infestation on the composition and structure of forests. In particular, they illustrate how spruce budworm irruptions, a common and cyclical insect pest of the boreal forest, influenced an indirect

trophic interaction by enabling moose (Alces alces) to benefit from a surge in deciduous vegetation. This, in turn, exacerbated the apparent competition between moose and imperilled boreal caribou (Rangifer tarandus caribou) as a result of wolf (Canis lupus) predation. Significantly, salvage harvesting by humans exacerbated caribou predation subsequent to the outbreak. Our observations of consumer-producer-consumer interactions that are highly consequential and occur on a large scale indicate that they are likely prevalent in the natural world. This research demonstrates that the mortality rate of an endangered ungulate may ultimately increase due to the cascading effects of SBW in boreal ecosystems, particularly when human activities exacerbate the system-wide issue.

III. SEARCH ENGINE OPTIMIZATION

Search Engine Optimization (SEO) is a vital digital marketing strategy focused on enhancing a website's visibility in search engine results pages (SERPs). By optimizing various elements of a website, businesses can improve their search rankings, drive organic traffic, and ultimately achieve better online presence and engagement. SEO is crucial because it ensures that a website can be found in search engines when users search for relevant keywords. High visibility in search results leads to increased traffic, which can result in higher conversion rates and revenue for businesses. SEO can be broadly classified into three main categories: on-page SEO, off-page SEO, and technical SEO. Each type addresses different aspects of website optimization, collectively working to improve search engine rankings and user experience. On-page SEO refers to the optimization of individual web pages to rank higher and earn more relevant traffic. It involves optimizing content, HTML code, and other on-page elements to make a website more search-engine-friendly. Off-page SEO focuses on activities outside the website that impact its ranking within SERPs. This primarily involves building high-quality backlinks from other reputable websites, social media engagement, and influencer outreach. Technical SEO involves optimizing the technical aspects of a website to ensure that search engines can crawl and index it effectively. This includes improving site speed, mobile-friendliness, secure connections (HTTPS), and proper use of structured data. Keyword research is the process of identifying and targeting specific words and phrases that potential customers are searching for. Effective keyword research helps in creating content that meets user intent and drives organic traffic. High-quality content is at the heart of SEO. Content optimization involves creating and refining content that is relevant, engaging, and valuable to the target audience, while also incorporating targeted keywords naturally. Title tags and meta descriptions are crucial on-page elements that help search engines understand the content of a webpage. They also influence click-through rates by providing concise and compelling summaries of the page's content. Using proper heading tags (H1, H2, H3, etc.) helps structure the content and makes it easier for search engines to understand the hierarchy and importance of different sections. This also improves readability for users. A clean and descriptive URL structure enhances SEO by making it easier for search engines to crawl and index pages. Including keywords in URLs can also improve search rankings. Internal linking involves linking to other relevant pages within the same website. This helps distribute page authority, improves navigation, and increases the likelihood of search engines indexing more pages. Optimizing images involves using descriptive file names, alt text, and compressing images to reduce load times. This improves accessibility, user experience, and can positively impact search rankings. With the increasing use of mobile devices, ensuring that a website is mobile-friendly is essential. Responsive design and fast mobile load times are critical components of mobile optimization. Site speed is a key ranking factor for search engines. Faster websites provide a better user experience and are more likely to rank higher in search results. Techniques like caching, image compression, and minimizing code can help improve site speed. Using HTTPS to secure a website is important for protecting user data and building trust. Search engines prioritize secure websites, making HTTPS a critical aspect of technical SEO. XML sitemaps help search engines understand the structure of a website and find all its pages. Submitting an XML sitemap to search engines can improve the crawling

and indexing process. The robots.txt file is used to control how search engines crawl a website. Proper configuration of this file can prevent search engines from indexing pages that are not meant to be public. Structured data, or schema markup, helps search engines understand the content of a website better. Implementing structured data can lead to enhanced search results, such as rich snippets, which can improve click-through rates.

Canonical tags are used to indicate the preferred version of a webpage when there are multiple versions with similar content. This helps prevent duplicate content issues and ensures the correct page is indexed. Building high-quality backlinks from authoritative websites is a critical off-page SEO strategy. Backlinks act as votes of confidence, signaling to search engines that the content is valuable and trustworthy. Engaging with audiences on social media platforms can drive traffic to a website and indirectly improve its SEO. Social signals, such as likes and shares, can contribute to a site's credibility and visibility. Guest blogging involves writing articles for other websites in exchange for backlinks. This strategy helps build relationships, increase exposure, and drive referral traffic to the website. Collaborating with influencers can amplify content reach and attract high-quality backlinks. Influencers can help promote content to a wider audience, enhancing brand visibility and authority. Local SEO focuses on optimizing a website to rank for local search queries. This includes creating and managing business listings on platforms like Google My Business, ensuring consistent NAP (Name, Address, Phone) information, and gathering positive reviews. Monitoring and analyzing website performance using tools like Google Analytics and Google Search Console is essential for understanding traffic patterns, user behavior, and the effectiveness of SEO strategies. Regular SEO audits help identify issues that could be affecting a website's performance. Audits involve reviewing technical aspects, on-page elements, and backlink profiles to ensure optimal SEO health. Analyzing competitors' SEO strategies provides insights into what works in a particular industry. This can inform and improve your own SEO efforts by identifying gaps and opportunities. A positive user experience is crucial for SEO. Websites that are easy to navigate, visually appealing, and provide valuable content tend to rank higher in search results and have lower bounce rates. Regularly updating and adding new content keeps a website relevant and can improve its search rankings. Fresh content signals to search engines that the site is active and providing up-to-date information. Google emphasizes the importance of E-A-T in its ranking algorithms. Websites that demonstrate expertise, authoritativeness, and trustworthiness are more likely to rank higher in search results. With the rise of voice-activated assistants, optimizing for voice search is becoming increasingly important. This involves focusing on natural language queries and long-tail keywords. Google's mobile-first indexing means that the mobile version of a website is considered the primary version. Ensuring that a website is fully optimized for mobile devices is essential for maintaining search rankings. Search engines use AI and machine learning to deliver more relevant search results. Understanding these technologies can help in creating content that meets user intent and improves SEO performance. Distributing content across multiple platforms, including social media, email newsletters, and content syndication sites, can increase its reach and attract more backlinks, improving SEO.

3.1 SEO Techniques:
Following types of techniques are used for ranking [14]:

• **White Hat SEO:** Use techniques which follow the rules and guidelines that are given by search engines. These methods may not harm the ranking of a website. These techniques are long lasting not easily sandboxed. These search engine optimization techniques may not suddenly increase the ranking of website or webpage but effect of this may appear slowly. This technique includes original content writing with high quality keywords [16], important html meta tags, heading tags, inbound links or internal links that help search engine to recognize the structure of the website.

• **Black Hat SEO:** Use techniques that challenge or abolish the rules and guidelines of search engines [15]. These techniques are comparatively takes little time than white hat -

SEO techniques and gave higher results also but now search engines are very much aware of such scam and fraud website they caught you easily and penalize you. These methods may cause sudden increase your rank in search results but as per consequences you were easily penalized by search engines. It may harm the ranking of your website because of unusual behaviour of website. It includes auto generated pages, fraud backlinks creator, keyword stuffing, hidden text etc.

- **Grey Hat SEO:** This is in between of white hat and black hat SEO techniques. But these techniques may not create much impact on your ranking and also may sandbox by search engine.

3.2 Page Ranking

The Black Hat SEO where in this type of search engine optimization the web master is doing spamming in the link or making irrelevant link with some irrelevant niche website. This type of technique is dangerous for long term period because it regularly updates in search engine algorithm crawler and will easily know and identify the spammed technique that been used to optimize the websites. The size of the WWW is rapidly growing day by day and at the same time the number of request or queries handled by SEO has also grown incredibly. Due to the increasing in number of users on the web, the request on web search engine also growing exponentially. In addition, the search engine needs to process according to that result. Therefore, the search engines have applied different techniques in order to extract only relevant documents from the database which can provide intended information to the users. Moreover, to present the documents in an ordered manner, web page ranking methods are applied which can arrange the documents in order based on their relevance, importance and content score and use web mining techniques to order them. Figure shows the different types of page ranking algorithms.
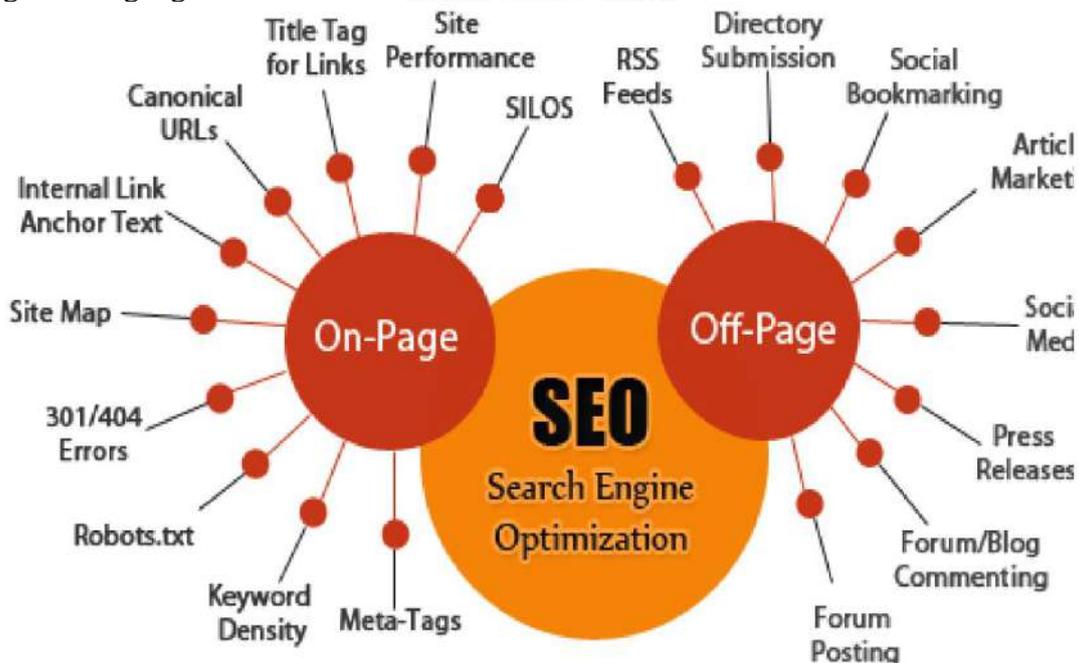

Figure 1: Type of Page Ranking

3.3 Machine Learning

Machine learning methods play an important role in emotion recognition and detection. The processing of classification categories into three categories such as supervised learning, unsupervised learning and reinforce learning. The most of authors applied supervised learning-based classification methods for emotion detection. The supervised learning provides variety of classification algorithm such as neural network, machine learning and data mining algorithm. The most of authors applied series of algorithm for the processing of detection and recognition. The support vector machine, decision tree, KNN LR and CNN are applied for the processing of classification.

IV. PROPOSED METHODOLOGY

4.1 Proposed Algorithm

The proposed algorithm focuses on the efficiency of searching of keywords for organic keywords. The algorithms follow the concept of cascading process of machine learning. The cascading process of neural network enhanced the capacity of classification of data in concern of web pages. The proposed algorithms used two neural network models, Self-Organized (SOM) Map Neural Network and Radial Biases Neural Network (RBF). The process of model work on the basis of unsupervised and supervised.

The process of working algorithm describes here.

Xi= sample of keywords

N =length of keyword

V= vector of keywords data process.

O = mapped data of cluster

G=Group of patterns,

SM=successor matrix

Wn= winner matrix

Bf =final pattern of classification.

D = dimension of data

R = relation of feature data

S= sample of set

$B^{\emptyset}$= adjust matrix

Ac = learning factor

The process of training sample as $(X_i \in R^D, y_i \in R)$,i=1……………….m

$sample\ of\ input(p)$ if $* = V$

$[s^1, \dots . . s^k] \leftarrow [rand(1,k) \times (p - w)] + 1$

$V \leftarrow n$ vector of neuron

For $i \leftarrow 1\ to\ N\ do$

$O^. \in C^D \leftarrow S * = V$

$N_*^i \in R^D \leftarrow biase\ of\ O$

$G \in R^D \leftarrow pattern\ N$

End for

Input sample of BF $g_*^1, \dots \dots . . g_*^m$

$F_{RBF} \in R^{D \times m} \leftarrow \emptyset([g_*^1, \dots \dots . . g_*^m])\quad Adjust\ W$

$W \in R^D \leftarrow BF^{-1}$

$F \in R^{d., } \leftarrow W^T \emptyset(G)$

For $C \leftarrow 1\ to\ A_c\ do\qquad training\ of\ class\ Cb$

Adjust the weight factor of cascading process

$CC \in R^{d^\sim} \leftarrow$ relative feature process of SOM

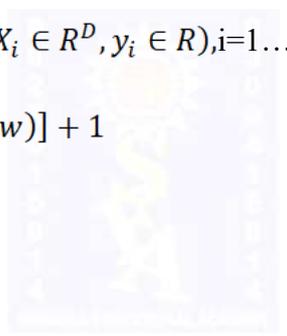Call kernel function

$$k(x_i, x_j) = \exp\left(\frac{-\|x_i - x_j\|^2}{\gamma}\right), \gamma \in R_+$$

End for

Adjustment matrix $B^{\emptyset}$ of space F mapping of same class

$$B_{ij}^{\emptyset} = \begin{cases} e^{\left(-\|x_i - x_j\|^2\right).} \\ e^{\left(-\|x_i - x_j\|^2\right).} \end{cases}$$
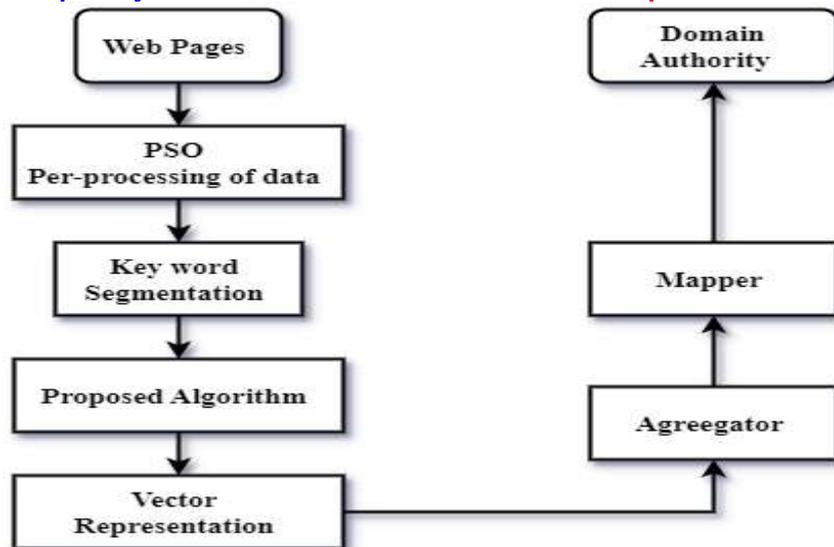
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Figure 2: Proposed Model of Backlinks Optimization using Machine Learning

4.2 Dataset

Knowledge Base. We use Freebase dumped in January 2014 as our knowledge base. Freebase classifies entities into types under various domains such as people/person and book/author. An entity might belong to multiple types in Freebase. Each type under a domain is treated as a query type in our work. We then remove very sparse types such that each type has at least five entities. Finally, there are 444 query types in our type set. Datasets. Our experimental data is comprised of click-through data submitted to a commercial search engine in November 2013. After extracting entity queries, in total there are 56,466,534 queries for 847,682 distinct entities. By generalizing URL collections, there are 30,765 unique URL patterns utilized in our experiments. We use the queries submitted before 22 November, 2013 as the training data to train models. The remaining data is used as the testing data to evaluate performance. For the ground-truth, we adopt click-through data in search engine logs. We treat URLs with SAT-Clicks as the ground-truth.

V. RESULT AND PERFORMANCE ANALYSIS

Table-1: comparative analysis of webpage ranking using SARM, TBF and proposed techniques.

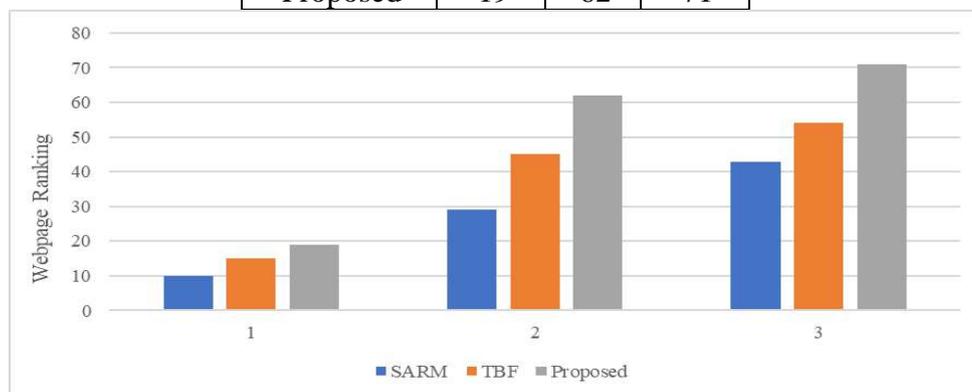| SARM	10	29	43
TBF	15	45	54
Proposed	19	62	71

Fig. 3: Improvement in Webpage Ranking using SARM, TBF and proposed techniques

Table-2: Comparative analysis of webpage ranking using SARM, TBF and proposed techniques

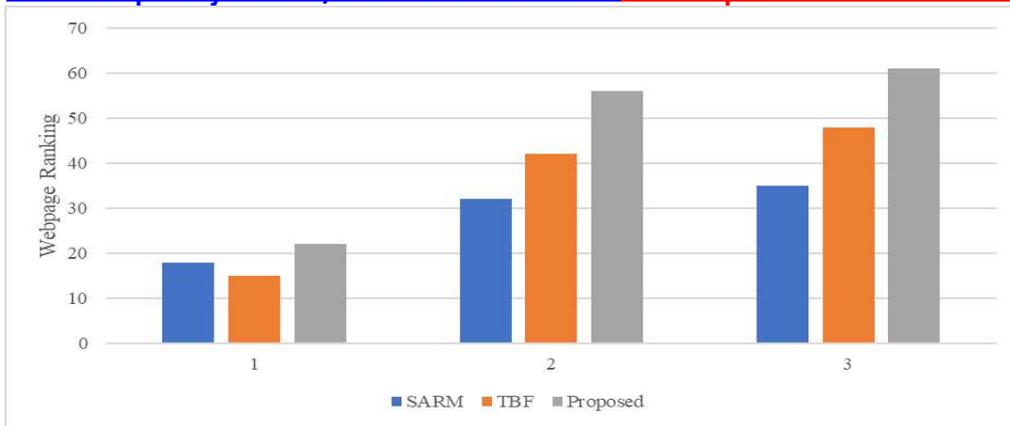| SARM	18	32	35
TBF	15	42	48
Proposed	22	56	61

Fig. 4: Improvement in Webpage Ranking using SARM, TBF and proposed techniques

Table-3: Comparative result analysis crawling of websites

	2500	5000	7500	10000	12500	15000
SARM	0.75	0.65	0.5	0.4	0.55	0.48
TBF	0.8	0.7	0.52	0.5	0.58	0.66
Proposed	0.92	0.85	0.67	0.6	0.66	0.74
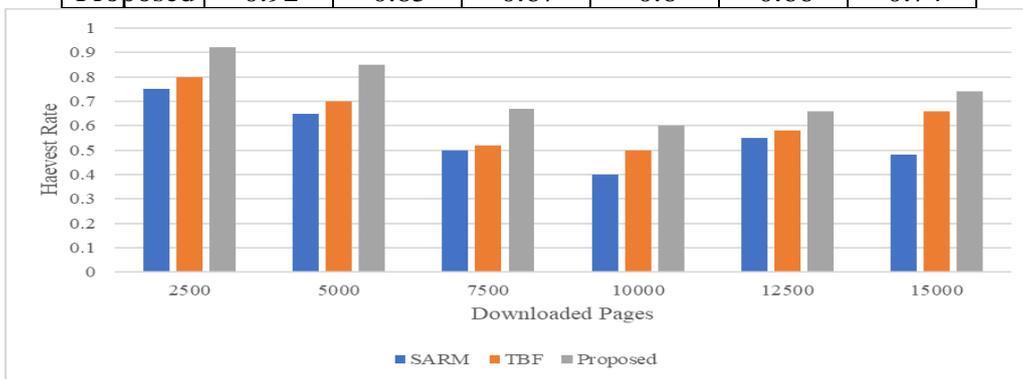
Fig. 5: Performance analysis crawling of websites

Table-4: Comparative result analysis crawling of websites

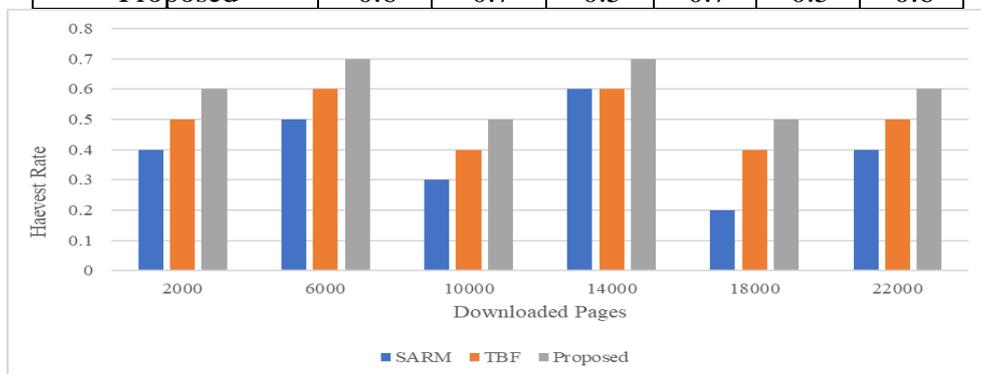| Downloaded pages	2000	6000	10000	14000	18000	22000
SARM	0.4	0.5	0.3	0.6	0.2	0.4
TBF	0.5	0.6	0.4	0.6	0.4	0.5
Proposed	0.6	0.7	0.5	0.7	0.5	0.6

Fig.6: Performance analysis of crawling websites

Table-5: Comparative performance of score measurement SEO with SEO score without optimisation and SEO with optimisation using SARM, TBF and proposed techniques

	SEO Score Without Optimization	SEO With Optimization	Raise Percentage
SARM	63	70	11%
TBF	61	65	7%
Proposed	65	75	18%
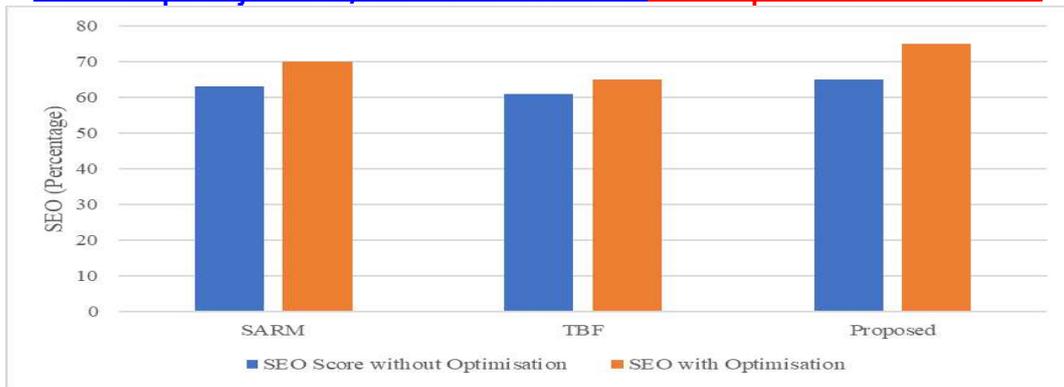
Fig. 7: Performance of SEO score without optimisation and SEO with optimisation using SARM, TBF and proposed techniques.

Table-6: Comparative performance of webpage ranking, number of users and number of sessions and analysis of SEO techniques using SARM, TBF and proposed techniques

	Webpage Ranking	Number of Users	Number of Sessions
SARM	44	72	67
TBF	47	8765	7642
Proposed	68	9676	13549
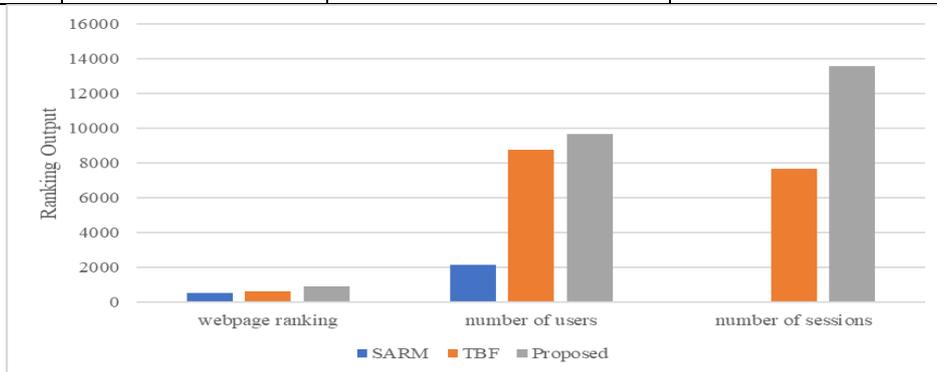
Fig. 8: Performance graph of webpage ranking, number of users and number of sessions and analysis of SEO techniques using SARM, TBF and proposed technique

Table-7: Comparative analysis of webpage ranking using SARM, TBF and proposed techniques

SARM	12	32	46
TBF	18	48	58
Proposed	21	69	70
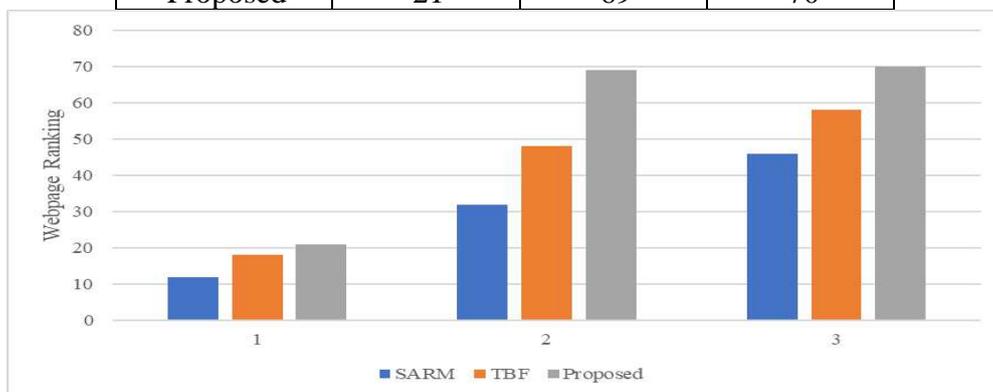
Fig. 9: Improvement in Webpage Ranking

Table-8: Comparative analysis of webpage ranking using SARM, TBF and proposed techniques
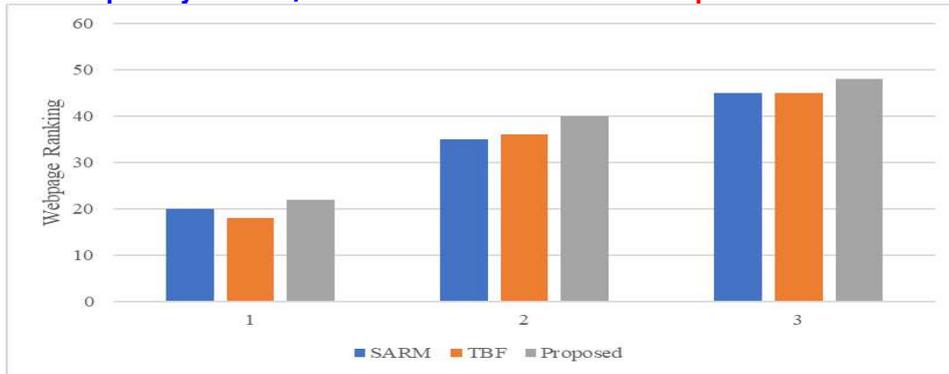
SARM	20	35	45
TBF	18	36	45
Proposed	22	40	48

Fig. 10: Improvement in Webpage Ranking

Table-9: Comparative result analysis crawling of websites

	2500	5000	7500	10000	12500	15000
SARM	0.66	0.57	0.63	0.68	0.7	0.74
TBF	0.57	0.62	0.68	0.71	0.68	0.67
Proposed	0.78	0.68	0.72	0.81	0.71	0.8
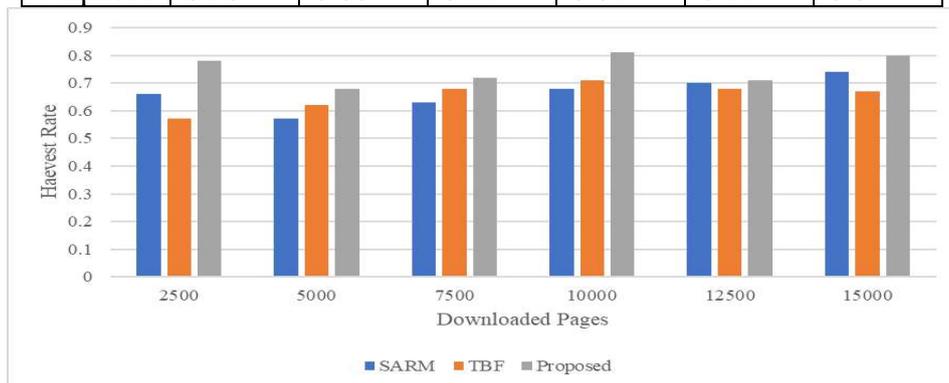
Fig. 11: Performance analysis of crawling websites

Table-10: Comparative result analysis crawling of websites

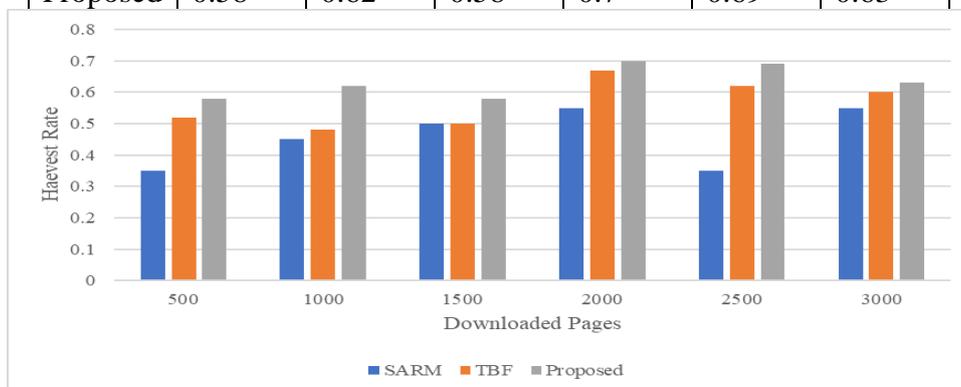|	500	1000	1500	2000	2500	3000
SARM	0.35	0.45	0.5	0.55	0.35	0.55
TBF	0.52	0.48	0.5	0.67	0.62	0.6
Proposed	0.58	0.62	0.58	0.7	0.69	0.63

Fig. 12: Performance analysis of crawling websites

Table-11: comparative performance of score measurement SEO with SEO score without optimisation and SEO with optimisation using SARM, TBF and proposed techniques

	SEO Score Without Optimisation	SEO With Optimisation	Raise Percentage
SARM	70	80	12%
TBF	68	82	18%
Proposed	72	88	21%
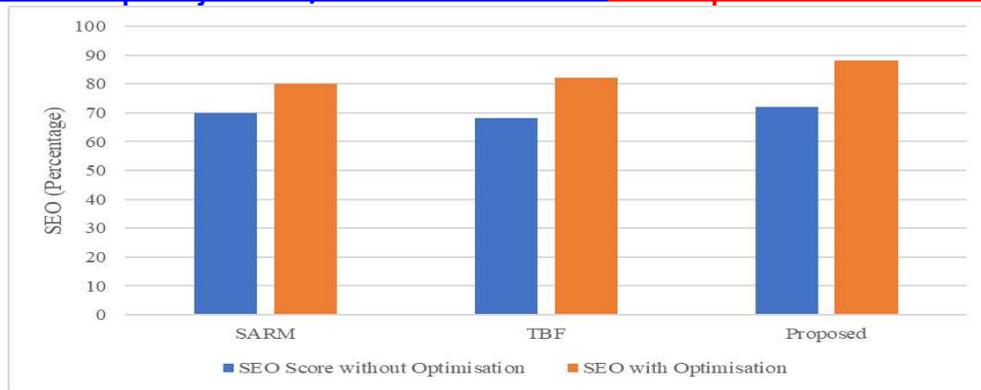
Fig. 13: Performance of SEO score without optimisation and SEO with optimisation using SARM, TBF and proposed techniques.

Table-12: Comparative performance of webpage ranking, number of users and number of sessions and analysis of SEO techniques using SARM, TBF and proposed techniques

	Webpage Ranking	Number of Users	Number of Sessions
SARM	658	1125	232
TBF	964	1804	657
Proposed	1057	2014	867
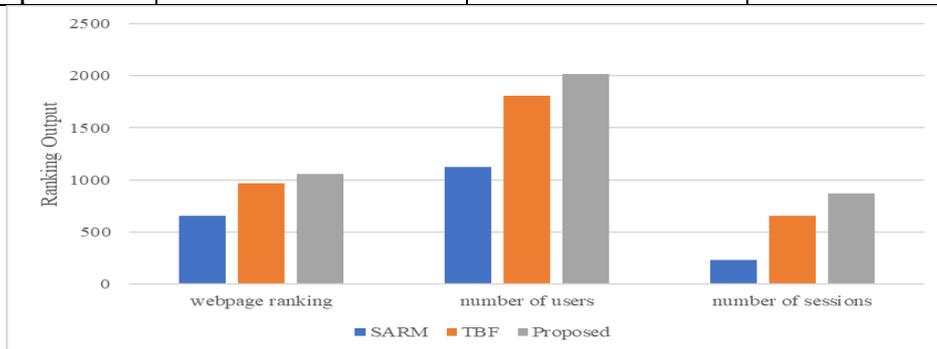
Fig. 14: Performance graph of webpage ranking, number of users and number of sessions and analysis of SEO techniques using SARM, TBF and proposed techniques

Table-13: Comparative analysis of webpage ranking using SARM, TBF and proposed techniques

SARM	20	30	42
TBF	38	39	47
Proposed	51	52	67
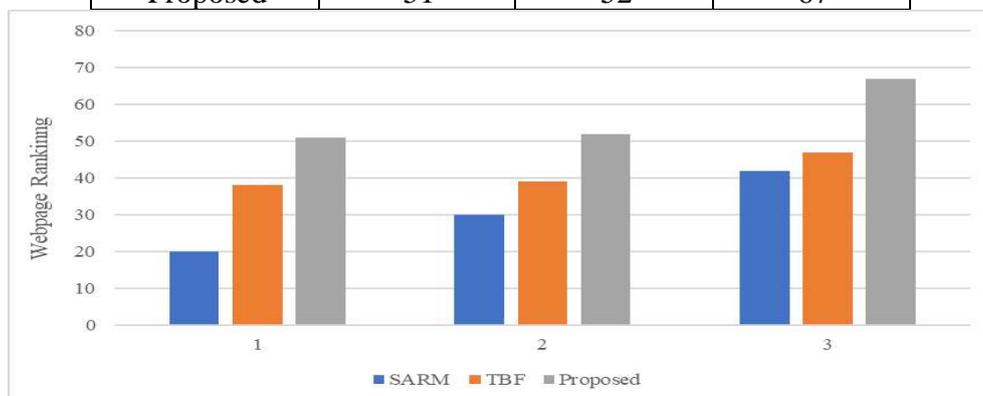
Fig. 15: Improvement in Webpage Ranking.

Table-14: Comparative analysis of webpage ranking using SARM, TBF and proposed techniques
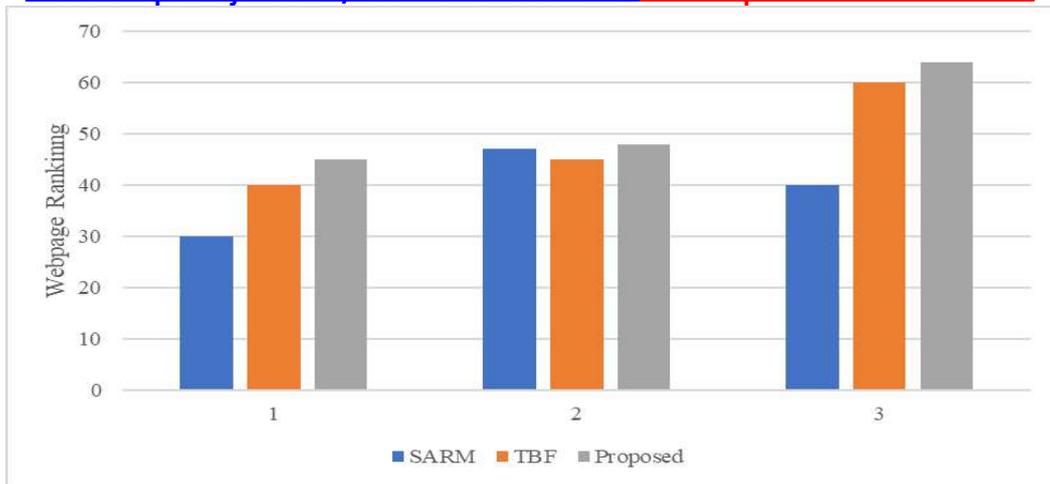
SARM	30	47	40
TBF	40	45	60
Proposed	45	48	64

Fig. 16: Improvement in Webpage Ranking.

Table -15: Comparative result analysis crawling of websites

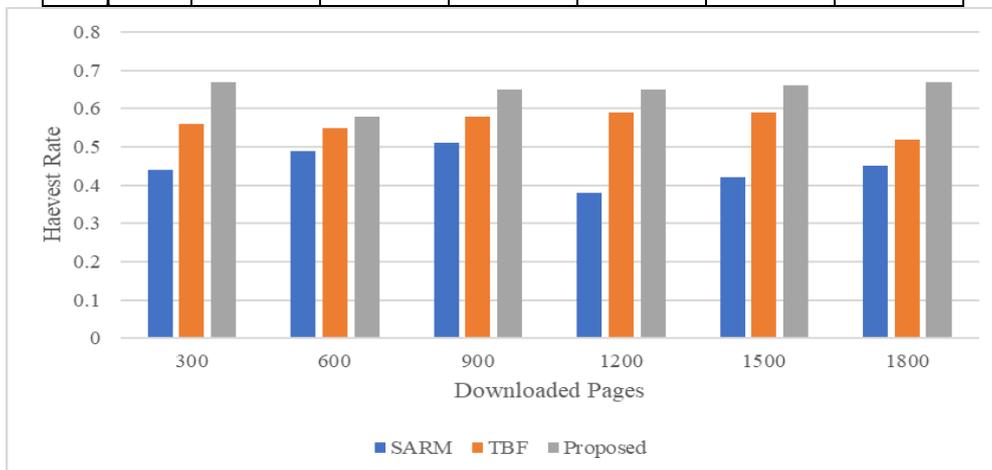|	300	600	900	1200	1500	1800
SARM	0.44	0.49	0.51	0.38	0.42	0.45
TBF	0.56	0.55	0.58	0.59	0.59	0.52
Proposed	0.67	0.58	0.65	0.65	0.66	0.67

Fig. 17: Performance analysis of crawling websites

Table-16: Comparative result analysis crawling of websites

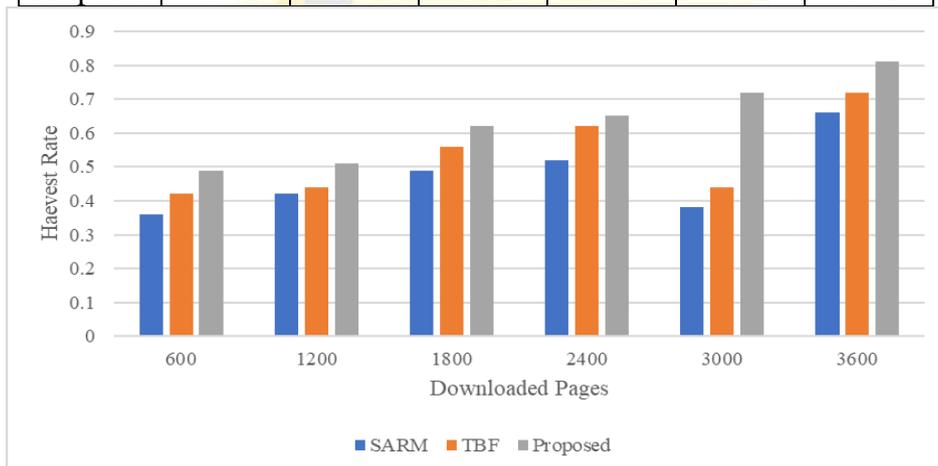|	600	1200	1800	2400	3000	3600
SARM	0.36	0.42	0.49	0.52	0.38	0.66
TBF	0.42	0.44	0.56	0.62	0.44	0.72
Proposed	0.49	0.51	0.62	0.65	0.72	0.81

Fig. 18: Performance analysis of crawling websites

Table-17: Comparative performance of score measurement SEO with SEO score without optimisation and SEO with optimisation using SARM, TBF and proposed techniques

	SEO Score without Optimisation	SEO with Optimisation	Raise Percentage
SARM	64	68	6%
TBF	66	72	8%
Proposed	65	75	12%
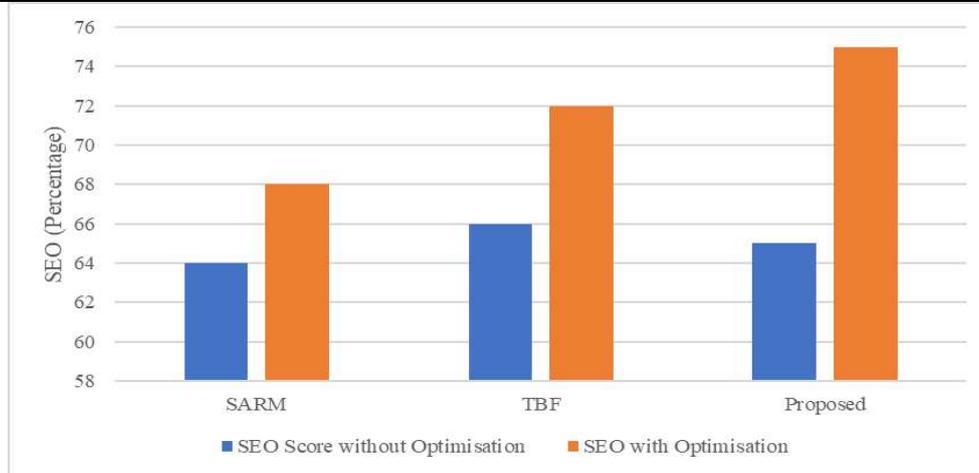
Fig. 19: Performance of SEO score without optimisation and SEO with optimisation using SARM, TBF and proposed techniques

Table-18: Comparative performance of webpage ranking, number of users and number of sessions and analysis of SEO techniques using SARM, TBF and proposed techniques

	Webpage Ranking	Number of Users	Number of sessions
SARM	666	1257	324
TBF	1400	3000	675
Proposed	1800	4521	935
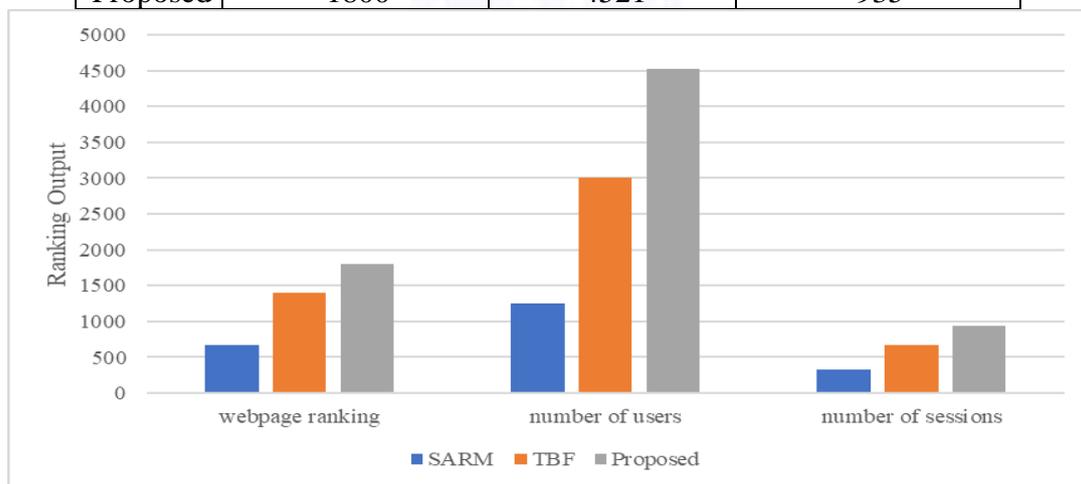
Fig. 20: Performance graph of webpage ranking, number of users and number of sessions and analysis of SEO techniques using SARM, TBF and proposed techniques

VI. CONCLUSION & FUTURE SCOPE

Online advertising has become an essential component of the marketing strategies of both small and large businesses in recent years. Increased website traffic and overall turnover are positively affected by search engine optimisation (SEO) and a focus on pertinent, conversion-oriented keywords. In this research, the results analysis emphasises the superiority of the proposed algorithm over existing methods, including the Search Algorithm Ranking Model (SARM) and the Traditional Backlink Framework (TBF). SARM and TBF concentrate on the enhancement of general ranking, whereas the proposed algorithm concentrates on the quality

and relevance of backlinks, resulting in more substantial branding benefits and search engine performance. Lastly, the simulation results verify that ranking consistency is a critical factor in web search, and our model substantially improves the performance of both relevance ranking and ranking consistency. In order to optimise hyperlinks, the algorithm that has been proposed includes a number of innovative features. These consist of automated outreach, relevance scoring, and sophisticated keyword analysis to acquire high-quality backlinks. The algorithm guarantees that backlinks effectively contribute to the website's branding and search engine ranking by prioritising links from authoritative and contextually pertinent websites.. The proposed algorithm guarantees the website's branding and search engine performance long-term advantages by establishing a high-quality and robust backlink profile. In the competitive digital market, enduring success is achieved through consistent development in user engagement and rankings. The proposed algorithm outperforms these existing methods in a variety of metrics, such as backlink quality, relevance, and overall impact on branding, as per the results obtained. The algorithm's efficacy in optimising backlinks for improved performance is emphasised by this analysis.

In future studies, the performance could be greatly enhanced by combining it with modern, cutting-edge ranking algorithms. The main goal of future research will be to add the idea of ranking consistency to the most up-to-date models for learning to rank. The suggested algorithm could be better in the future. Adding advanced machine learning techniques and real-time data processing could make the algorithm even better.

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