Spread of Hate Speech through Social Media Networks- A Bibliometric Analysis

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Abstract

Modernization with Technological advancements made people closer by changing the paradigm of communication. With the evolution of social media platforms every individual now conveys his thought more precisely than before, but sometimes irresponsible remarks lead to communal violence. Social media has made hate speech more pervasive, thereby attracting the attention of many scientific journals raising awareness on this issue. The purpose of this study is to assess the fundamental expository metrics of the scholarly work on spread of hate speech on online platforms. A bibliometric analysis has been conducted on the basis of the works indexed in the Scopus database in relation to "hate speech" and "social media" over the period of past six years, i.e., from 2017 to 2023. The metrics utilised demonstrate that this topic has attracted more attention from academics in 2017 signifying that the scientific community is interested in this issue.

Keywords: Bibliometric-analysis, Biblioshiny, Hate-speech, India, Scopus, Social-media, VOS viewer

1   Introduction

The internet has become increasingly accessible to all people worldwide, and it is now a crucial component of contemporary communication. People can easily get in touch with others and rapidly exchange ideas. Social media platforms play a vital role in facilitating communication and self-expression. However, they also enable the dissemination of harmful content, such as fake news, hate speech, rumours, conspiracy theories, and offensive comments. *(Godoy, Daniela, 2024).*

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[1] Social media has significantly increased the propagation of hate speech on online social media platforms worldwide. Recently, in Bangladesh, it has been seen that Facebook served as the predominant platform for disseminating hate speech among most of the students. Students' political ideas, opinions, religion, and gender are frequently targeted by online hate speech. *(Atikuzzaman, Md.; Akter, Shohana, 2023).* [2] Similarly, in Myanmar, the brutality against the Rohingya people has been extensively recorded, with Facebook playing a crucial role in the spread of anti-Muslim hate speech in the nation. There is a debate on whether Myanmar's internal problems or the wider conditions of technological adoption are responsible for the current situation. *(Deejay, Aleksandar; Wells, Tamas; Henne, Kathryn; Bächtold, Stefan, 2024).* [3] It shows that, the escalating issue of online harassment, encompassing hate speech and discriminatory behaviour, that becoming increasingly worrisome. Likewise, in Brazil, people have started spreading hate speech against individuals having disability. However, the correlation between hate speech and disability is frequently disregarded. The act of insulting disability can dehumanize individuals, reducing them to their physical or mental limitations, and resulting in negative consequences for society. *(Trindade, Luiz Valério P., 2024).* [4] On social media, hate speech can be expressed both verbally in posts, comments, articles, etc. by using toxic languages or nonverbally in emoticons, stickers, photographs, memes etc. The identification of hate speech in memes is of utmost importance in our interconnected society, particularly within the realm of social media. Memes has significant influence as instruments for disseminating hate speech on a worldwide scale. *(Hermida, Paulo Cezar de Q.; Santos, Eulanda M. dos, 2023).* [5]

The cancerous dissemination of fake news and disinformation on social media is more dangerous for society today than anything else. Social media offers an avenue for like-minded individuals to interact in ways that were previously not possible. However, it can also serve as a fertile environment for the proliferation of hate and fanaticism. Although there has been study conducted on hate speech on social media, our understanding of its impact on users' adoption of extremist ideologies remains limited. *(Schmitz, Matheus; Muric, Goran; Hickey, Daniel; Burghardt, Keith, 2024).* [6] People use the right that enshrined in the Constitution of India as freedom of speech and expression to justify their hateful statements and behaviours. The principle of freedom of speech and expression has traditionally been regarded as a fundamental and indispensable value in democratic societies. Yet, the limits regarding hate speech are still being disputed in various social and political arenas, such as governments, social media platforms, etc. *(Goldman-Hasbun, Julia, 2023).* [7] During COVID-19, in worldwide lockdown, it has been seen an abundance of hate remarks that have disseminated widely on social media only. It exacerbates the division of the world, leading to heightened racial discrimination and mistrust among individuals, which in turn contributes to an increase in criminal activity and harm inflicted on persons, both mentally and physically. The problem is that, there is no significant definition of hate speech provided in any statute that could be universally approved. In general, hate speech is an attack on any person or group based on their gender, identity, caste, religion, etc. Addressing hate speech is a significant challenge for achieving worldwide recovery in the post-pandemic age. *(Wu, Xiao-Kun; Zhao, Tian-Fang; Lu, Lu; Chen, Wei-Neng, 2022).* [8]

Therefore, this work attempts to provide an inclusive bibliometric analysis of the available literature on hate speech on social media platforms and determine the existence of hate speech related research. The bibliometric analysis of articles based on hate, aggressive, abusive, offensive, and derogatory speeches is taken into account. In order to do this, software like R, R Studio, VOS Viewer, and Biblioshiny is used in conjunction with the SCOPUS database. The types of documents, the most active nations, the best journals, relevant affiliations, etc. are the explored parameters. This bibliometric investigation revealed an unexpected necessity to address this issue because of the recent growing instances of hate speech in the digital sphere.

2   Concept and Neccessity to Conduct Bibliometric Analysis

2.1   Spread of hate speech through social media platform

Report[2] says, the total population of India was 1.42 billion in 2023, out of which 467.0 million people use online social media platforms. Figure 1 shows the graph regarding how many people out of the total population of India use different online social media networks such as Facebook, YouTube, Instagram, Twitter, Snapchat, and so forth.
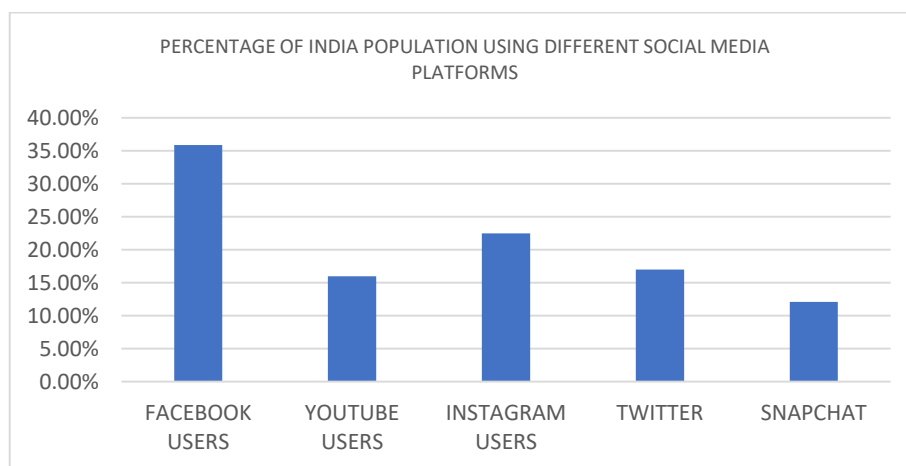

Figure 1. Percentage Of India Population Using Different Social Media Platforms

People basically use social media in order to share their views on different matters, mostly relating to societal issues. Sharing their opinions and views falls under freedom of speech, but they have no right to spread hatred in society through their hateful comments, posts, or contents. Hate speech isn't included under the purview of free speech.

Internet "trolls," who are typically anonymous users who post shocking, offensive, and generally untrue content with the express purpose of evoking a negative response, are responsible for a large portion of online hate speech. Trolls may also try to persuade or enrol the reader to their beliefs if they hold the similar opinions. In addition, social media has given a forum for fanatic and fundamentalist political or religious groups a platform to organise, network, and work together in order to promote their messages of opposition to the status quo and political correctness, as well as to advance racist, anti-feminist, homophobic, transphobic, and other hateful beliefs and ideologies.

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[2] Simon Kemp, "Digital 2023: India", *Datareportal*

Some tech firms, including Facebook, employ artificial intelligence (AI) systems to keep an eye on hate speech. Due to the systems' lack of human-like judgement abilities, AI may not always be a reliable method of policing hate speech. For instance, a user might publish or comment on something that is against the category of hate speech or is against community standards, but if the target term is misspelt or certain letters have been substituted with symbols, the AI algorithms will not be able to identify it. The AI systems that track hate speech are still subject to human oversight.

2.2 What is bibliometric analysis

Bibliometric analysis is a technical and scientific literature review process that can find key sources, authors, or specimens of research, alongside their relationships, by examining all the publications relevant to a particular subject or area. It is an effective tactic to gauging the effect of publications on the scientific society. According to Glanzel (2003)[3], bibliometrics is recognised as an interdisciplinary research area that aims to encompass all scientific disciplines. It is based on scientific data and science strategy. Bibliometric analysis is described as a statistical assessment of published scientific papers, research articles, books, or book chapters. In most cases, bibliometrics is employed to assess the impact or influence of research articles. The impact that a particular research publication will have on subsequent studies is estimated using bibliometric approaches. The conventional method for doing this is to track how frequently an article is cited after it has been published. Bibliometric investigations draw attention to previously unnoticed patterns in particular subjects or disciplines. In order to effectively evaluate and anticipate a field, these structural, technical, dynamic, evaluative, and prognostic models can be used.

2.3 Necessity to conduct bibliometric analysis

The wide use of social media triggers the spread of hatred in society through hateful posts and comments made by people. The growth compels many authors to write articles on such a spread. Here, the researcher wants to do a bibliometric analysis of such articles written on the wide spread of hate speech through social media networks in order to determine how far research has been done in the matter and what way forward there is to act upon further. This bibliometric study covers the Scopus-indexed journal articles of the last six years in order to analyse the published articles and their citation rate in order to ascertain the influence of such articles upon subsequent researchers. The prevalence of social media use is a potent tool for spreading hate speech, derogatory statements and abusive language throughout all digital networks and platforms, which is the cause of the instant rise in online hate speech. In order to adequately study, detect, and neutralise the divisive effects of propaganda, research on hate speech is turning into a subject matter of interest.

3 Methodology

There are various sorts of methods for analysing literature, i.e.; content analysis, meta-analysis, systematic literature reviews, including bibliometric analysis. In bibliometric analysis, published articles are statistically analysed and evaluated. The researcher conducted this research by using bibliometric analysis, as this widely used method uses both mathematical

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[3] Glanzel, W. (2003). Bibliometric as a research field: A course on theory and application of bibliometric indicators, Course Handouts, http://nsdl.niscair.res. in/jspui/bitstream/123456789/968/1/Bib_Module_KUL.pdf (1.20.2016).

and statistical techniques to provide highly effective results. The researcher has used Scopus-indexed articles for the analysis.

3.1   Why Scopus?

The dictionary meaning of Scopus is "one that watches"[4]. Scopus is an abstract and citation database that was introduced by Elsevier in 2004. Approximately 11,678 publishers are represented by the nearly 36,377 publications that Scopus indexes, i.e.; 22,794 operating titles and 13,583 dormant titles, out of which 34,346 are peer-reviewed journals in high-level topic areas[5]. Scopus links a comprehensive, carefully controlled abstract and citation database with these resources in an unprecedented way, using enriched data and connected academic literature from a wide range of fields. Scopus locates credible, current research rapidly, identifies subject matter experts, and provides users access to accurate numbers, rational, and analytical tools. So, in this study, the SCOPUS database was used to get more variability in results.

3.2   Data Source

The bibliometric analysis is conducted by collecting the data from Scopus-indexed journal articles. The search has been done with the search strategy TITLE-ABS-KEY ("hate speech") AND on AND ("social media") from which initially 1590 results were found. By using the exclusion and inclusion methods, the researcher has applied various filters in order to get the most relevant and required papers for the study. The researcher has applied the filters in order to limit the results for the time span of the last six years (2017-2023), only the English language is used for the analysis, the researcher has excluded all the irrelevant subject areas, and the most relevant keywords are taken into consideration. After applying all the filters manually, a final list of 495 results was found that met the study criteria. Then the data was selected and exported in CSV form and imported as a raw file in biblioshiny software in order to conduct bibliometric analysis. Biblioshiny, a R programming language-based software package applied as an open web-based data analysis system, was used to conduct the bibliometric study.

The researcher also exported the entire data selected from Scopus in VOS viewer software in order to build networks of technical publications, scientific journals, researchers, organizations, countries, keywords, or any other terms. The selected particulars in these networks are associated by co-authorship, co-occurrence, citation, bibliographic coupling, or co-citation links. VOS viewer, a software programme, was developed in order to generate maps based on network information, visualise them, and investigate them. This software was primarily designed for bibliometric network analysis.

Here in this paper, for bibliometric analysis, the Scopus database was used to get the documents, R (version 4.3.1), R Studio software packages, biblioshiny and VOS viewer (version1.6.19) were the visualisation tools used for this entire investigation to visualize analysis data results and Microsoft Excel was used to visualize analysis data frequency.

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[4] Merriam-Webster Dictionary

[5] www.wikipedia.com

4   Analysis

4.1   Data analysis by Biblioshiny

4.1.1   **Preliminary Analysis:** Table 1 shows the entire main information about the exported data that was extracted from the Scopus database in CSV form after importing the same into the Biblioshiny database in R packages in order to get the results for bibliometric analysis. The main information demonstrates the time span, the sources, the number of documents, keywords, authors, co-authors, citations, references, and document types that have been taken into consideration to make the study. There are total of 495 raw data points collected from Scopus for the time span of 2017 to 2023. The documents can be categorised into a total of 348 articles, 4 books, 16 book chapters, 109 conference papers, and 18 reviews that have been written in the last six years regarding hate speech on social media. There are 297 different sources, like journals, books, etc., with a 37.08% annual growth rate, 10.78 average citations per document, and 21467 references. These documents have a total of 1271 authors, of whom 112 are authors of single-authored documents. There are 116 single-authored documents and 2.86 co-authors per document, making the collaboration index value for international co-authorships 15.96 percent.

Table 1. Main Information About Data

MAIN INFORMATION ABOUT DATA	
Timespan	2017:2023
Sources (Journals, Books, etc)	297
Documents	495
Annual Growth Rate %	37.08
Document Average Age	2.05
Average citations per doc	10.78
References	21467
DOCUMENT CONTENTS	
Keywords Plus (ID)	1189
Author's Keywords (DE)	1452
AUTHORS	
Authors	1271
Authors of single-authored docs	112
AUTHORS COLLABORATION	
Single-authored docs	116
Co-Authors per Doc	2.86
International co-authorships %	15.96
DOCUMENT TYPES	
Article	348
Book	4
book chapter	16
conference paper	109
Review	18

4.1.2   **Annual scientific production of documents:** Almost everything on this earth is going through some specific phases, like evolution, development, rapid growth, stability, and degradation. Every research topic has also gone through such phases. The annual scientific production evaluated the journey of the research topic within the time period that has been taken here. For the bibliometric analysis, the researcher has taken documents from the years, 2017 to 2023. Figure 2 shows, both in tabular and graphical mode, in which year how many documents have been written on hate speech on different online social media channels. The report explained that before 2018, there was a low production of documents in the area, which shows researchers might not have recognised the seriousness of hate speech-related issues. After that, we can see the rapid growth of production that gradually increases from 2019 to 2022, with a yearly average of 60 articles, which shows that the world and the researchers have started focusing on the matters of hate speech on social media and its harmful impacts on society. The analysis shows that 2022 is the peak point at which the maximum number of articles has been written, i.e., 143 out of 495 documents, and in 2021, a total of 105 documents out of 495 have been written, i.e., the second highest number, whereas in 2017 the total number was 11 out of 495 documents.
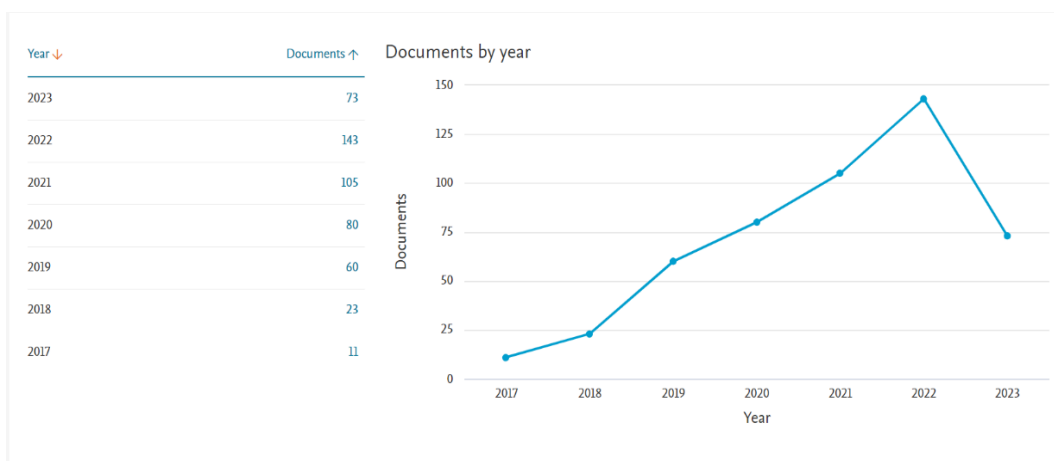

Figure 2. Annual scientific production of documents (Documents by year)

4.1.3   **Document Analysis:**

The document types that the researcher has taken into consideration are articles, conference papers, books, book chapters, and reviews. Figure 3 depicts that writing research articles on this particular topic is the popular choice of the researchers or authors. The analysis results are: 70.03% cover the research articles; 22.0% cover conference papers; 0.8% cover books; 3.2% cover book chapters; and 3.6% cover reviews. After articles, conference papers are the second-most-written documents in this period. The wide spread of hate speech issue lead academicians/researchers to aware individuals regarding the same through article writing, conducting conferences and book publishing.
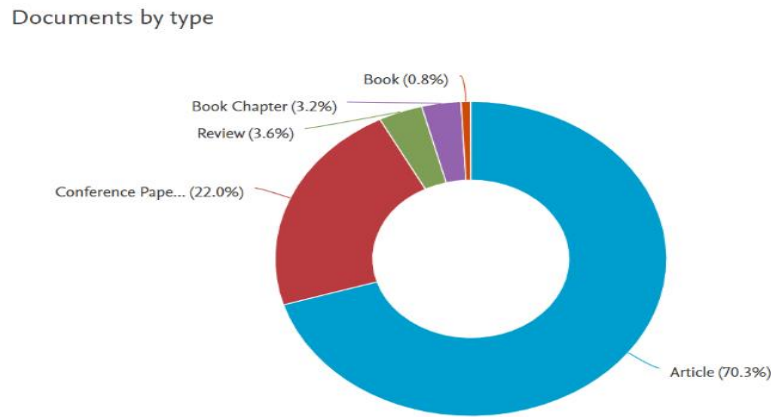
Figure 3. Document Analysis (Documents by type)

4.1.4   **Country's Scientific Production:**

The rapid growth in the use of social media has been shown in most countries. Social media platforms are very successful these days in establishing themselves globally. The research covers 66 countries or territories, out of which the researcher has compared the top 10 countries or territories that have more documents in comparison with others. Figure 4 shows the 10 leading countries with the highest productions, namely, the USA, UK, India, Spain, Germany, Italy, Indonesia, Australia, Brazil, and Canada. In the region, the USA has the highest number of documents, i.e., 234 documents, followed by the UK with 116 documents. India was in the third position in the race, having a frequency of 109 documents on this trending topic, whereas Spain and Germany had 96 and 94 documents, respectively, and were listed in a position after India, and the rest of the countries or regions had less than 50 articles. Research on the subject has been published in the nations highlighted in blue on the map. The quantity of scientific research production increases with colour intensity.
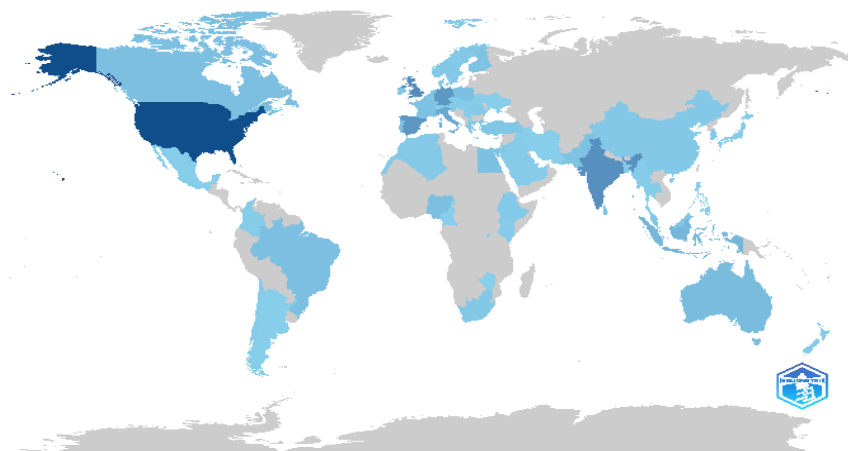

Figure 4. Country's Scientific Production

4.1.5   **Keyword Analysis:** Keywords represent the content of any manuscript and make it specific to the field. The significance of utilising keywords in a research paper is to make it easier for other scholars to figure out the article while they are engaged in a literature review on the field or subject. The fields, subfields, topics, research concerns, etc. that have been addressed by the article are defined by the keywords. To ascertain if and when to make any paper visible to prospective readers, the majority of internet-based searching channels, engines, databases, or journal websites incorporate keywords. Using keywords improves the searchability of publications and boosts the quantity of citations. Therefore, it's necessary to include the most relevant keywords that will make it simpler for other writers to discover the work.

While applying the filters the researcher has given the utmost effort to select all the relevant keywords that are most important to conducting the study. Here figure 5 portrays the top 10 high frequency keywords used in the articles. The terms like social media, social networking (online), speech recognition, speech, deep learning, speech detection, hate speech, classification (of information), computational linguistics and learning systems are the most commonly used words with a frequency more than 20. Figure 6 provides the "Word Tree" which indicates all the relevant keywords used in the 495 documents in percentage that the researcher has taken for the study.
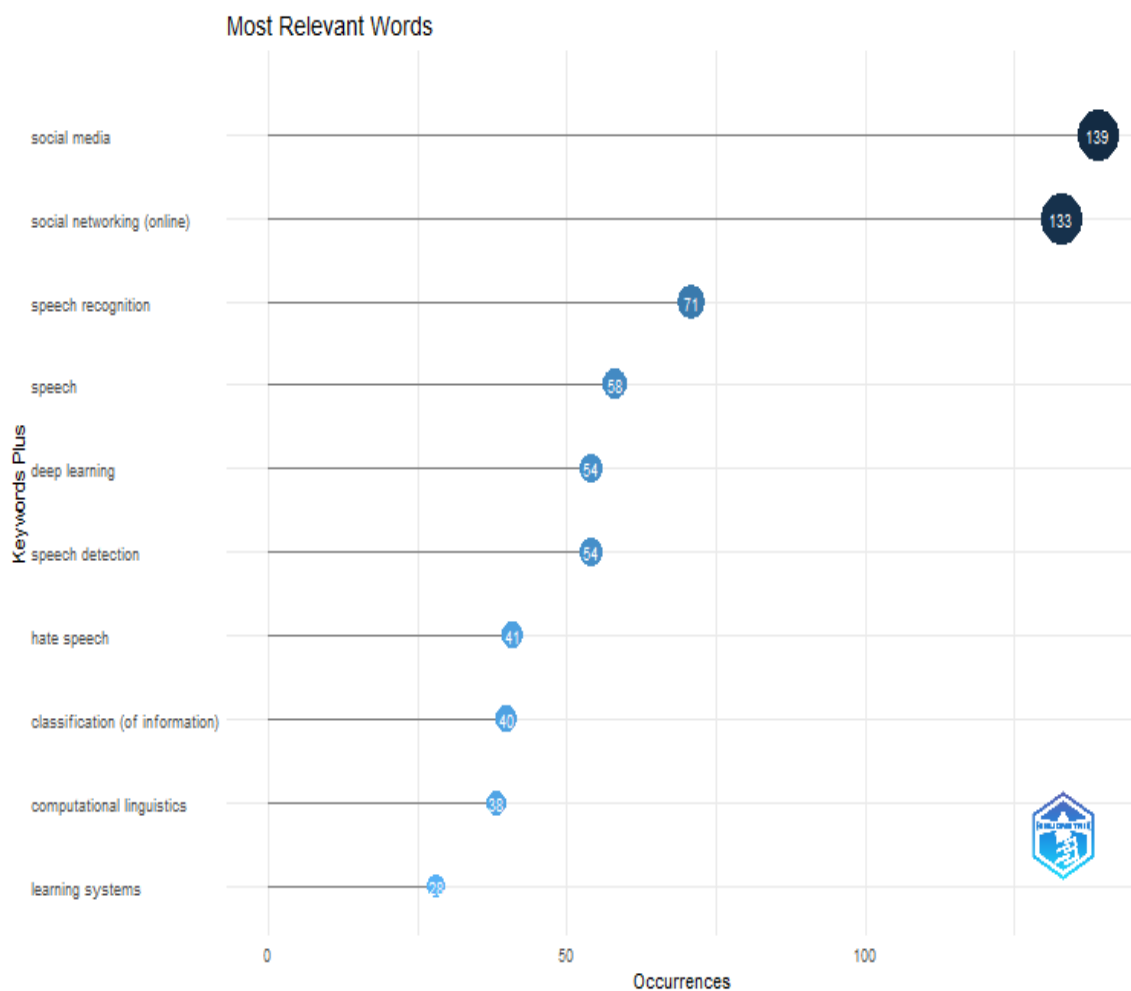

Figure 5. Most Relevant Words

Figure 6. Word Tree

The word dynamic in figure 7 determines the word's frequency over time for the top 10 keywords. The term "social media" which has 33 occurrences in the year 2020, has 139 occurrences in the year 2023, which shows the rapid growth of the use of the word. "Social networking (online)" has a total number of 133 occurrences in 2023 as well. The term "hate speech" which has only 7 occurrences in 2021, has 41 occurrences in 2023 indicating the recognition of the trending topic among the researchers over time. The topic "hate speech on social media" has the most considerable and high frequency terms indicating it the trending area of research these days.
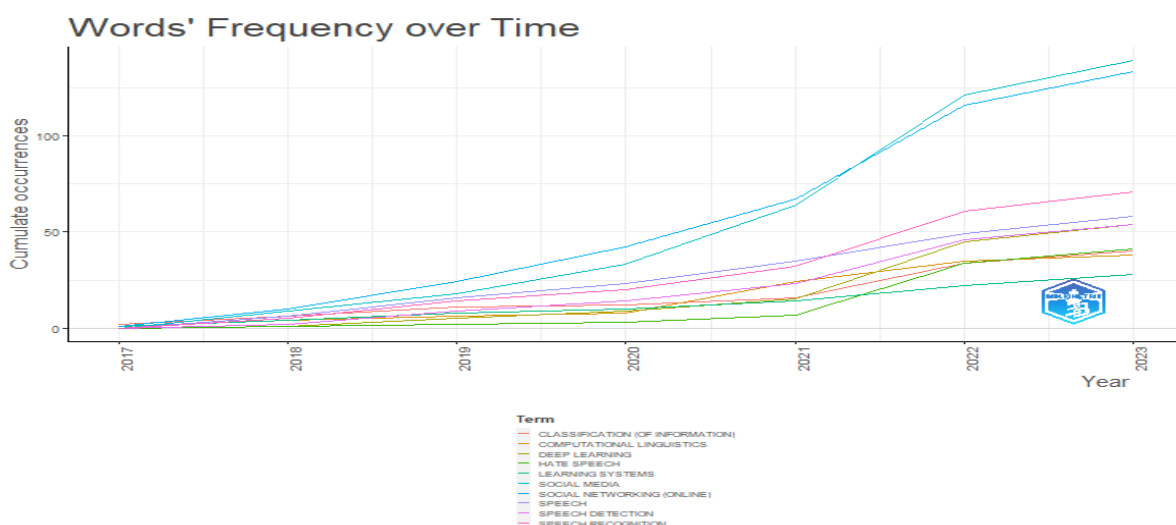

Figure 7. Word's Frequency Over Time

4.1.6   **Most Relevant Authors:** There are numerous authors of different affiliations have started writing regarding spread of hate speech in social media now-a-days. Among all, the top 10 authors here we had for this study were Basil V, Patti V, Zampieri M, Rosso P, Albadi N, Batista F, Benevenuto F, Bilewicz M, Burnap P and Cabrio E. According to Figure 8, the authors who bagged the most articles were Basil V and Patti V who have written a total number of 7 articles followed by the author Zampieri M having 6 articles, Rosso P having 5 articles and rest of the authors having 3 number of articles.

Figure 8. Most Relevant Authors

4.1.7   **Authors collaboration network:** Figure 9 shows the collaboration network of different authors. A collaboration network can be created based on the co-authorship of papers. The magnitude of nodes indicates the quantity of papers contributed by the authors, and the thickness of links indicates the number of papers shared among authors commonly. Here in this figure, the total number of 11 networks has been shown, which have been classified in different colours. The network, including authors named Basil V and Patti V, etc., has the biggest string among them.
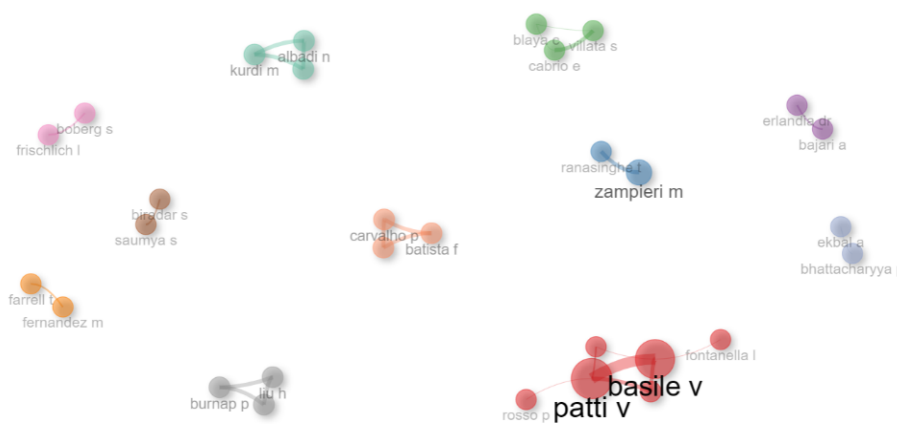

Figure 9. Authors Collaboration Map

4.1.8   **Most relevant sources:**

The author has used journals and books as sources for the study. The result shows a total of 297 entries in order to establish the source list and the number of articles written in those journals or books. Figure 10 depicts the top 10 sources that have published the utmost documents on this topic. Amongst all the journals, "Language Resources and Evaluation Conference, LREC 2022" reached its peak with 15 articles published, followed by "IEEE Transactions on Computational Social Systems" and "Social Media and Society," each with 13 articles published. Next to that, the journal "Social Network Analysis and Mining" has 11 articles published. The journals "Information Communication and Society", "Information Processing and Management," and "New Media and Society" have nine articles published regarding hate speech issues on social media.
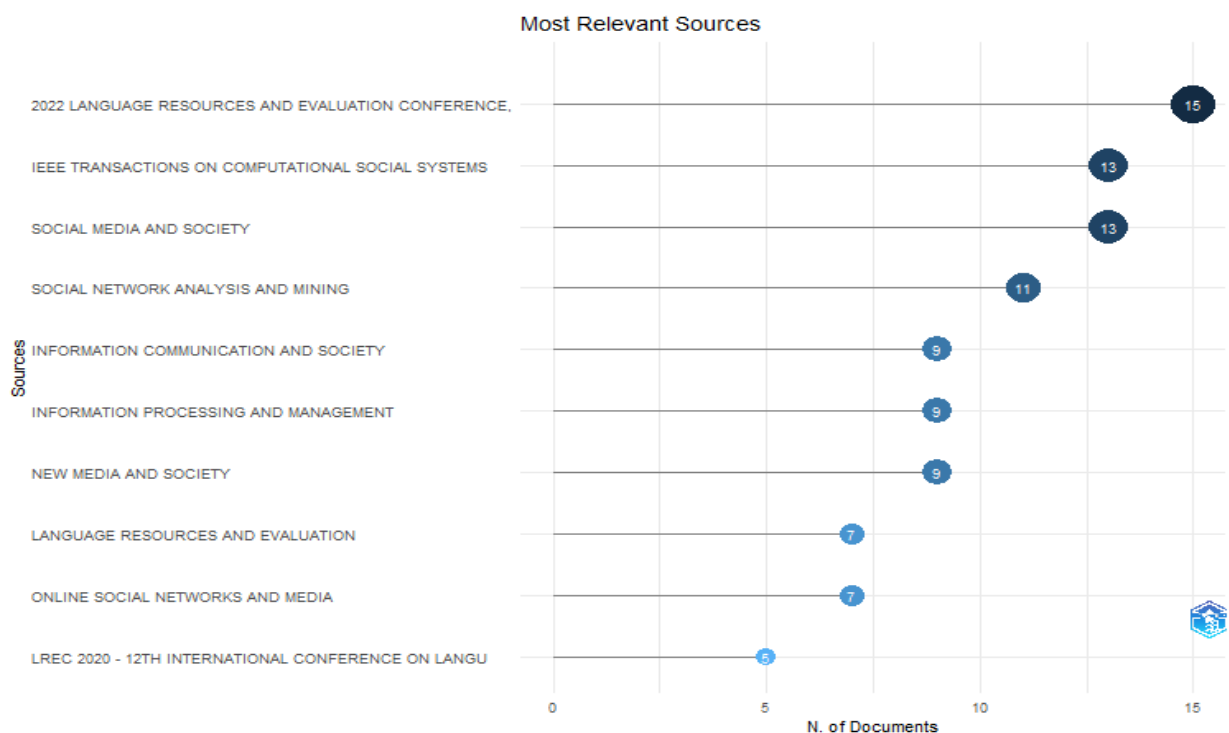

Figure 10. Most relevant sources

4.1.9   **The three-field plot analysis:** The three-field plot means the reference analysis, keyword and the author. The metadata CR stands for the description 'Cited References', the AU stands for 'author' and the DE stands for 'keyword'. Figure 11 shows the most significant authors giving contributions to a number of periodical journals using the most popular keywords like "Hate speech", "Social media", "Twitter", "Hate speech detection", "Deep learning", "Machine learning" and "Fake news" etc and by citing different article references.
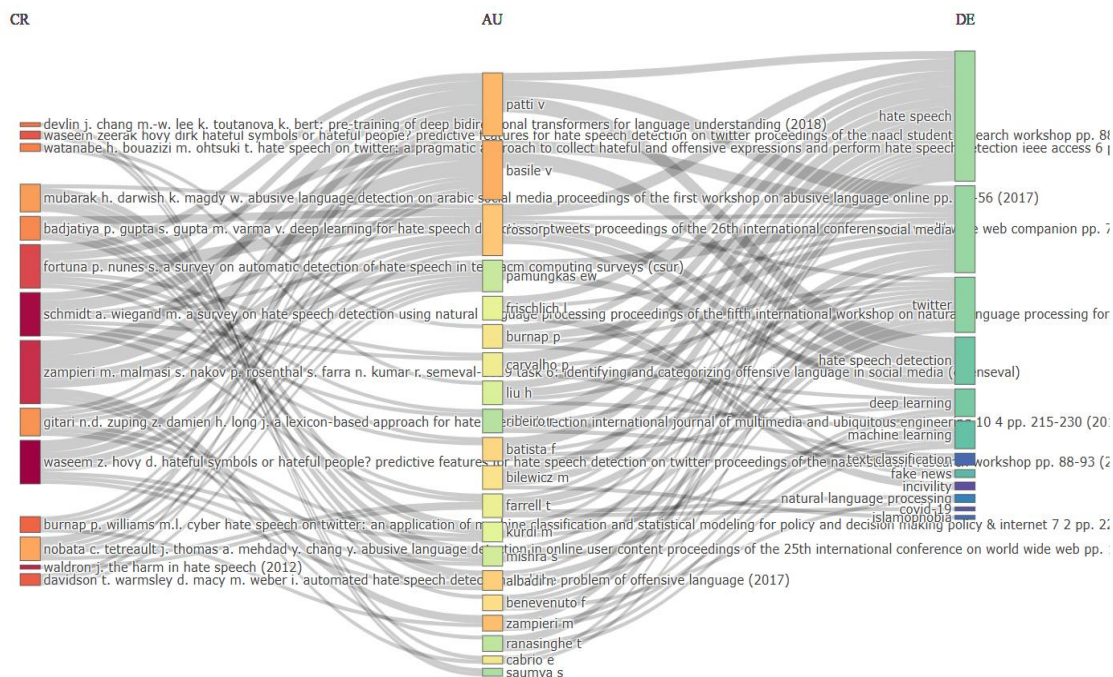
Figure 11. The three-field plot analysis

4.1.10 **Most relevant affiliations:** The top 10 institutions associated with our study were the University of Southern California, the University of Turin, Cardiff University, the University of Oxford, the Rochester Institute of Technology, the University of Jordan, the Queensland University of Technology, the University of Helsinki, the University of Edinburgh, and the University of Amsterdam. According to Figure 12, the leading institution was the University of Southern California with 24 articles, followed by the University of Turin with 15 articles, Cardiff University with 14 articles, and the University of Oxford with 12 articles. Whereas the Rochester Institute of Technology and the University of Jordan were on the same footing, having a total of 10 articles.
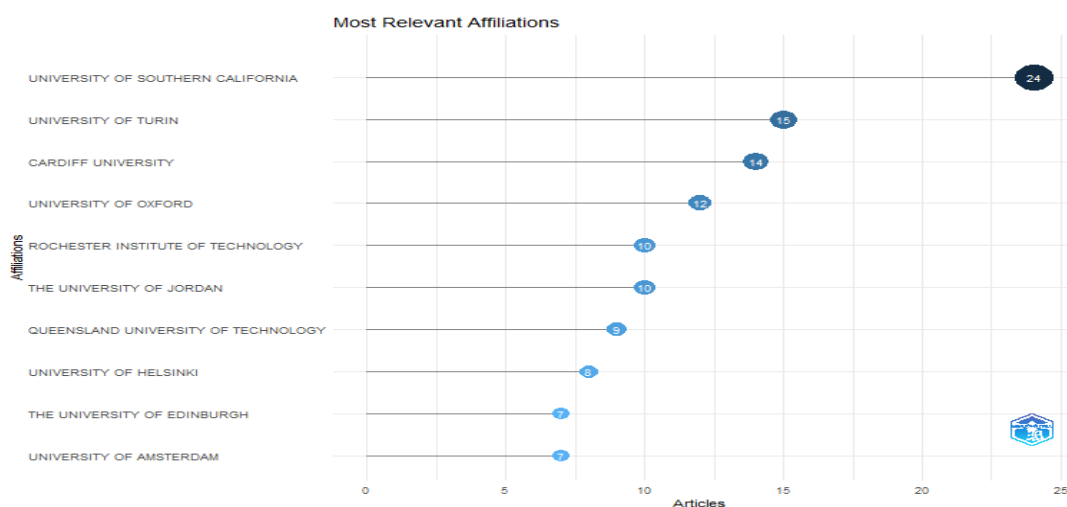

Figure 12. Most relevant affiliations

4.1.11 Corresponding authors countries:

If we count the corresponding author countries, the result shows that a number of articles were published by scholars in 60 different countries. Out of which 19 countries had great publications with a high frequency rate, as shown in figure 13. It lists the countries with the greatest production rates based on the frequency distribution of the countries where the corresponding author is affiliated. Figure 14 depicts two types of articles such as, single country publications (SCP), in which all the authors are from same country and such publications symbolise as intra-country collaboration, and multiple country publications (MCP), in which authors are from different countries and such publications denote inter-country collaboration, i.e., international collaboration. The USA has the leading position, with 46 papers accounting for 0.093 percent of all published papers, out of which only 7 articles were published in collaboration with other countries. Next to it, the United Kingdom ranked in second place with 35 papers, a 0.071 frequency rate, and four collaborated papers, followed by Germany with 21 papers, a 0.042 frequency rate, and two collaborated papers. Whereas India ranked in sixth position with 15 articles, none collaborated with any other country.
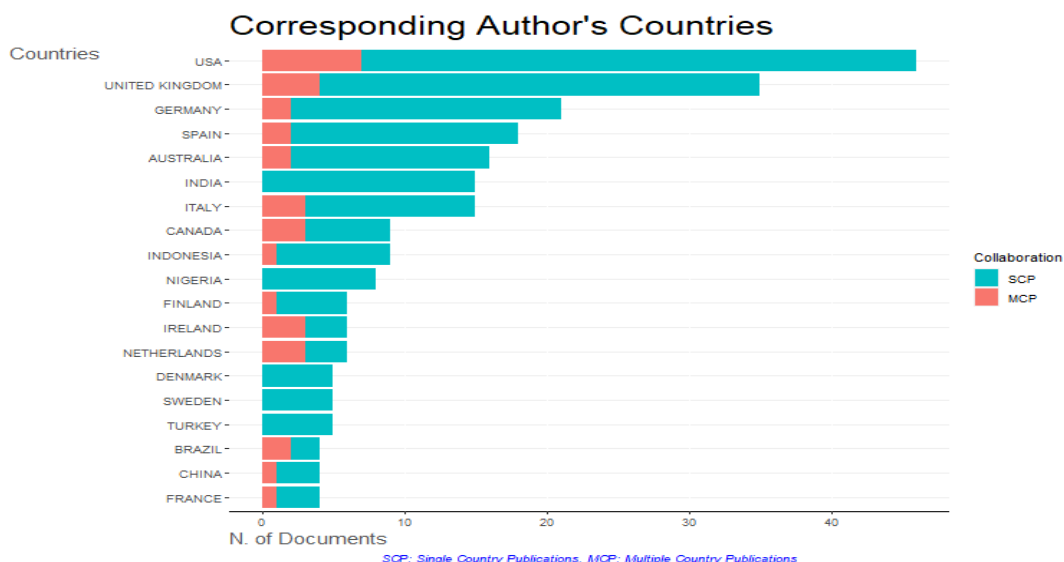

Figure 13. Corresponding authors countries

4.1.12 Countries' collaboration World Map:
The total number of 108 entries has been formed with the 495 data extracted from Scopus showing collaboration between various countries throughout the world. The relationships between various nations are depicted in Figure14, with the USA, India, and the UK exhibiting the highest levels of cooperation. Figure 15 demonstrates that the USA and UK have the highest frequency of 7 documents that has been collaborated between them. USA with Qatar and USA with Germany have a total number of 3 collaborated documents, whereas the USA with India and India with Ireland have a total number of 2 documents that have been collaborated.
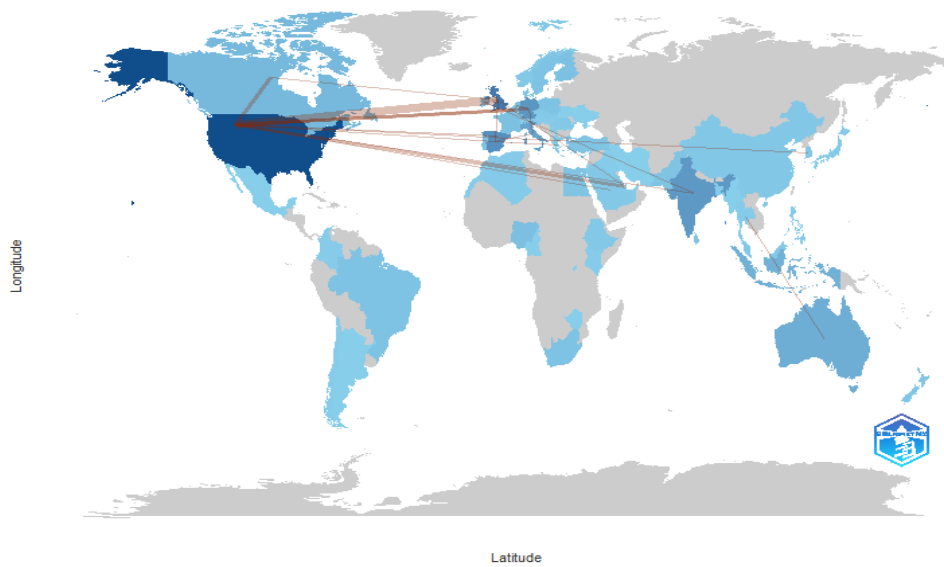
Figure 14. Countries' collaboration World Map

4.1.13 **Year-wise cited references:**

The prominence of research on this topic is shown by the number of references mentioned each year. As of 2018, the number of citations increased quickly, as shown in Figure 15. This honours the fascination with the analysis of hate speech that inquisitor have. It can be related, as was previously said, to the growth of the practice of social media networks as well as the expansion of online hate speech. Statistics from publications citing 2754 references in 2018 indicate that year was a statistically high point. Next to that, in 2019, the number of references was 2493, and in 2020, the number of references was 2403, showing a depreciation in the number of references.
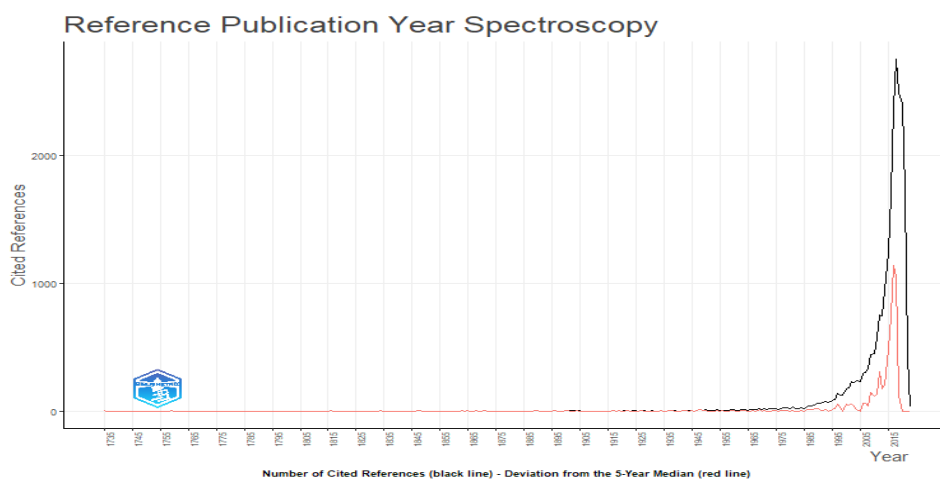

Figure 15. Year-wise cited references (Reference Publication Year Spectroscopy)

4.1.14 **The Thematic map:** Figure 16 shows the thematic map. A thematic analysis was performed here based on the frequency of word pairs occurring together in order to analyse the challenges of particular study themes in this field. The observed results were grouped into different study themes and mapped in two-dimensional spaces based on relevance degree (centrality) and development degree (density). The map categorised the metaverse research themes into four categories: niche themes, motor themes, emerging or declining themes, and basic themes. The locations with the greatest population density were motor themes, basic themes, and in-between niche themes and motor themes. The upper-right quadrant with strong centrality and a high density of motor themes indicates areas of scholarly inquiry that are well-developed, pertinent, and have the potential to guide future research. The cluster network of motor themes shows the primary outcome of the work, resulting in metaverses such as "human", "social network", "hate", "human experiment," etc. The second quadrant, which is occupied by niche themes, is developed and separated from other themes. The metaverses, such as "social networking (online)", "speech recognition", "speech detection", "hate speech", "deep learning", "offensive language", "social media platforms," etc., stand in between niche and motor themes, indicating their strong relevancy and high degree of development. The third quadrant, which is occupied by emerging or declining themes, stands for marginal and underdeveloped sections. It contained emerging metaverses such as "internet", "racism", "ideology", "social movement," etc. that need to develop more in future research. The terms such as "ethnicity", "mass media", "media role," etc. coexist between niche themes and emerging themes, indicating low relevancy with moderate development. The fourth quadrant is occupied by basic themes with a low level of development, including metaverses such as "social media", "speech", Facebook, "cyber hate", "network security", misinformation," etc. The basic theme mostly addresses general topics related to universal issues that cut across various research fields of study.
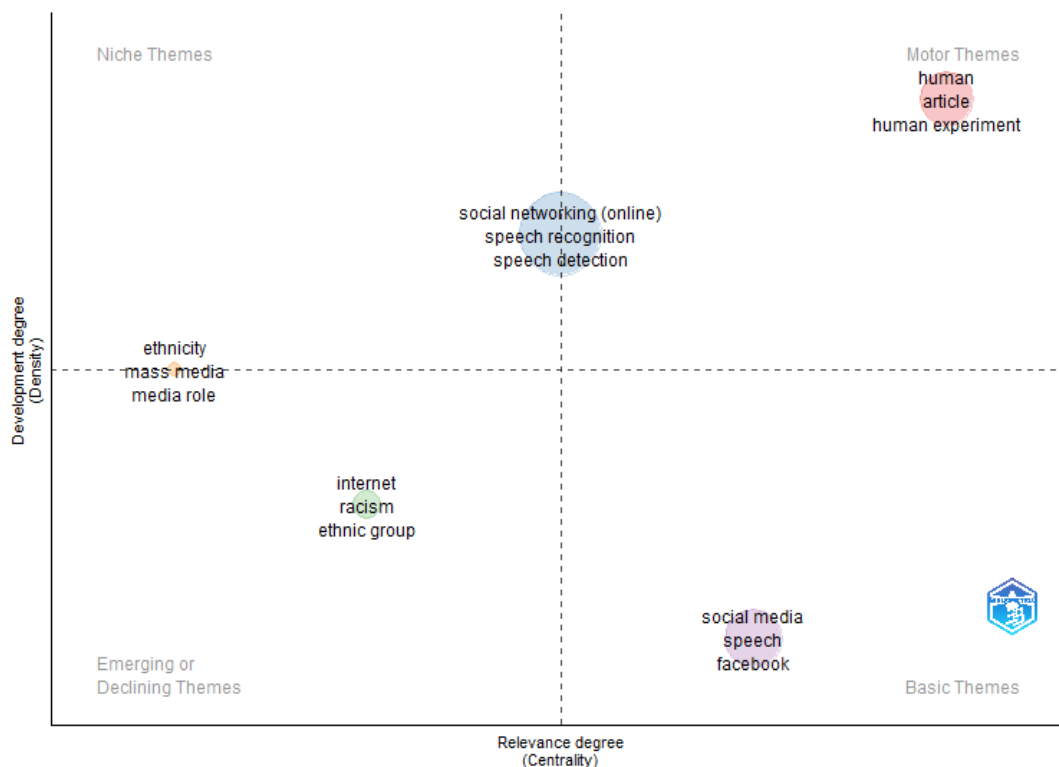

Figure 16. The Thematic map

4.2   Findings by VOS viewer software

The researcher used the latest version 1.6.19 of VOS viewer software to study the data networking and to visualize the maps created based on the network. The VOS viewer postulates three visualizations of the map constructed, i.e. The network visualization, the overlay visualization, and the density visualization.

4.2.1   **Network Visualization:** Figure 17 depicts network visualization using the VOS viewer. Each node in this network stands for a different type of unit, such as a paper, author, nation, organization, keyword, or journal. The dimension of the node shows the frequency, or number of occurrences, of the keyword. The keyword occurs more frequently the larger the node. Here the term hate speech detection has 96 occurrences with 1519 total link strengths, likewise the term fake news has 74 occurrences with 1150 total link strengths. The co-occurrence of keywords, or the occurrence of keywords together, is shown by the link between the nodes. The thickness of the link indicates the frequency of co-occurrences of keywords, or the number of occasions the keywords occur together. The frequency of co-occurrences of keywords increases with the thickness of the relationship between nodes. Each colour indicates a thematic cluster, and the nodes and links inside each cluster can be used to demonstrate how that theme (cluster) is covered by various topics (nodes), as well as the connections (links) that exist between those topics (nodes) when they manifest as a part of that theme (cluster).

As shown in Figure 17, the total number of items is 501, divided into 8 clusters with 58866 total link strengths. Cluster 1 has 145 substances, Cluster 2 has 115 objects, Cluster 3 has 58 items, Cluster 4 has 58 items, Cluster 5 has 37 elements, Cluster 6 has 32 items, Cluster 7 has 31 items, and Cluster 8 has 25 items.
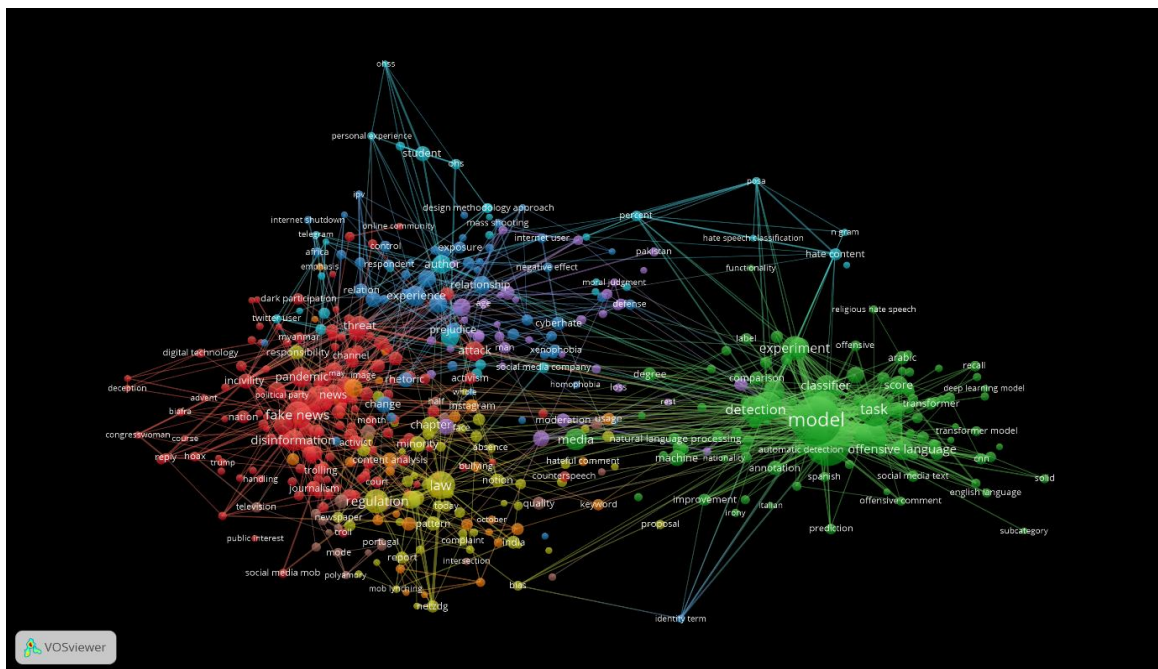

Figure 17. Network Visualization

4.2.2 **Overlay visualization:** Figure 18 represents the overlay visualization. The bottom right-hand corner of the visualisation displays a colour bar. It describes the graphical scoring mapping. Blue (lowest score) through green (middle score) to yellow (highest score) are the hues that are typically used. Colours represent journal impact factors in the overlay visualisation presented in Figure 13. Journals with a colour of blue, for instance, have an impact factor of less than 5, those with a colour of green, for instance, have an impact factor of between 10 and 15, and journals with a colour of yellow, for instance, have an impact factor of 20 or more.
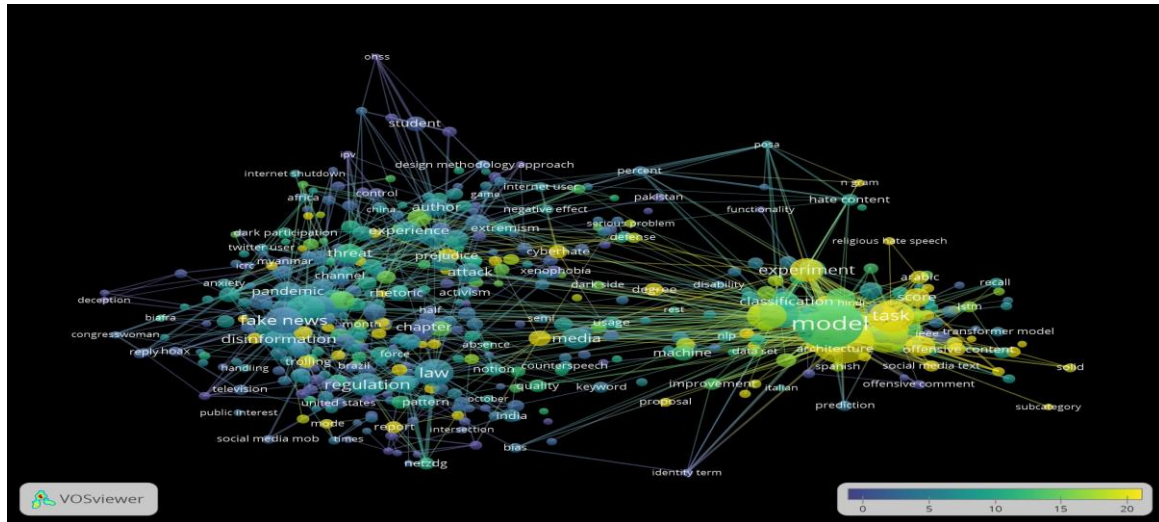

Figure 18. Overlay visualization

4.2.3 **Density visualization:** The selection panel for the density visualisation offers two variations: item density and cluster density. Item labels serve as representations for items in item density visualisation. The density of the items is indicated by the hue. A point's hue tends towards yellow the more objects there are around it, and this is also true of their weights: the more objects around a point, the greater their weights. The hue of a point in the cluster density visualisation is created by combining the colours of various clusters. The quantity of items in the vicinity of the point that are a part of a certain cluster determines how much weight is given to its hue. Figure 19 depicts the item density visualization.
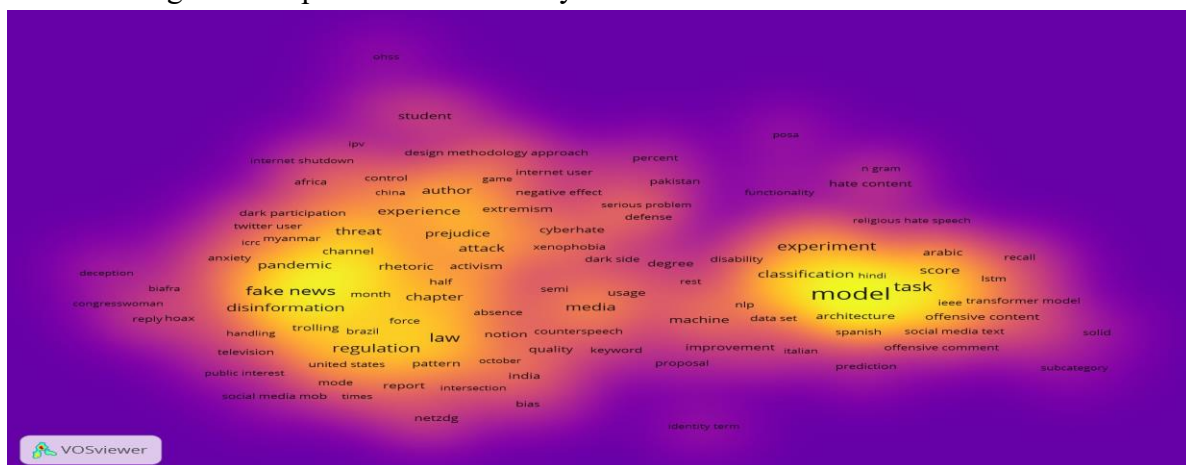

Figure 19. Density visualization

4.2.4   **Visualization of author's keyword:** The total number of 1452 author's keywords resulted in a bibliometric analysis. Here, the VOS viewer shows the total number of 16 author's keywords that met the threshold of at least 100 occurrences in a document. A total of two clusters were formed, demonstrated by two diverse colours with blatant keywords. The author's keywords visualised were "hate speech", "social medium", "social media platform", Facebook, twitter," etc. The curved lines joining together demonstrate the researchers' interest in subjects related to these keywords. The node size controls the number of author keywords. Figure 20 depicts 'Hate speech' and 'Social medium' having the maximum count from 2017 to 2022. The author's keyword hate speech has 775 occurrences with a total link strength of 6314, belonging to cluster 1 and having average publication in the year 2021.
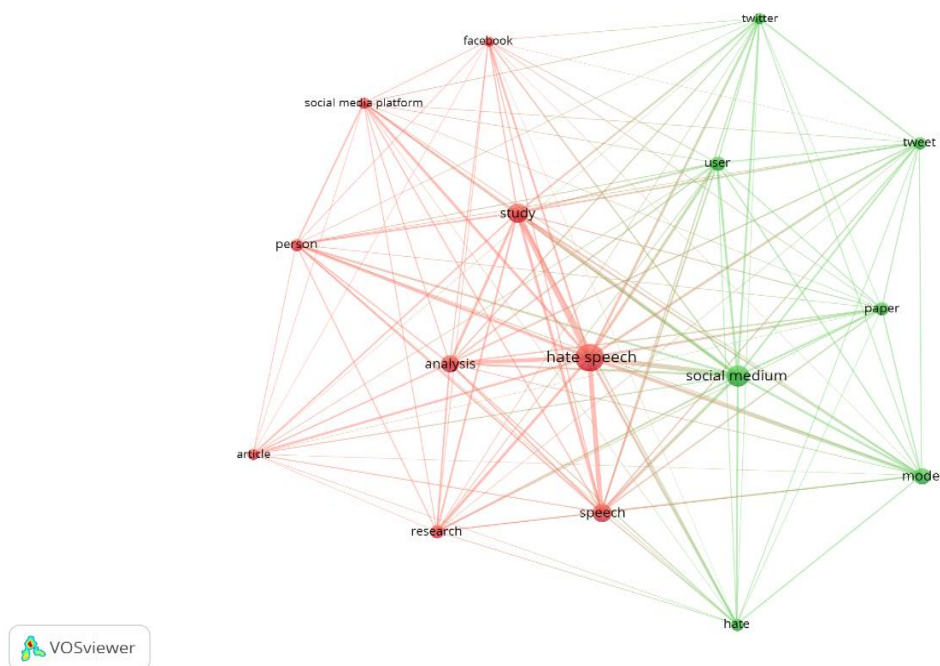

Figure 20. Visualization of author's keyword

5   Discussion

The hate speech literature review analysis focuses on numerous elements, as the term has not been defined in any statute and covers a wide area of research. In general, hate speech is an offensive speech or derogatory statement that can be made to any person or any group relating to their religious minority, colour, caste, sexual orientation, etc. To study the issue properly, regarding the wide spread of hate speech (both online and offline), regarding hate speech detection, to make a thorough review, etc., advanced tools and strategies are required. Here, the researcher has used Biblioshiny and VOS viewer software to read the documents extracted from the Scopus database. The issues relating to hate speech are a multidisciplinary area of research. Therefore, the bibliometric study of hate speech on social media can cover subject areas such as social science, psychological analysis, and social behavioural analysis. If we analyse the graphs and charts in a prospective manner, we can get progressive movements in a positive way. The analysis says that the topic is trending. Many researchers have already worked on it, indicating their serious approach to the matter in the past six years.

Figure 2 shows the increasing number of studies in 2022, which is a good sign as it directs researchers interests in the social issue. Countries like the United States, the United Kingdom, and India are guiding the race in hate speech research. Writing articles and conference papers is mostly pursued by researchers in this domain. The study has analysed the worldwide publications in top institutions on this current issue, written by eminent authors and researchers. The study examines the relevant words, keywords, and co-occurrence of the author's keyword. The study observes clusters, network visualisations, thematic maps, etc. The biblioshiny software has given efficient results in all areas except the cluster and network analysis portion, which was quite clumsy and not visible properly, for which the researcher preferred to use VOS viewer software. The researcher feels there is a lack of advanced tools to identify technical disparaging posts, insulting memes, defamatory cartoons, etc.

6   Relevancy to Social Work and Human Rights

Freedom of speech and expression is a fundamental human right that recognised and safeguarded in many democratic cultures. Apart from the Constitution of India under Article 19(1)(a), it is codified in numerous international and national laws and treaties also, notably Article 19 of the Universal Declaration of Human Rights and the First Amendment to the United States Constitution. Every Individual has the freedom to communicate their views, ideas, opinions, and beliefs through freedom of speech and expression. But this freedom never entertained expression of hatred through derogatory statements or use of offensive remarks to entice people for violence. Hate speech is one of the most serious social issues now-a-days which leads to incite hatred, violence, discrimination and mob lynching in the society. Social media platform becoming a medium to spread it in fast forward mode. It is the need of an hour to focus on the matter to curtail violence and uphold a pact of societal peace and concord.

By this bibliometric study the researcher has highlighted the spread of hate speech in worldwide through social media. The study shows the number of eminent researchers having written up on this matter in different affiliations belonging to different countries emphasizing the seriousness of this social issue, despite of which many corners have not been touched yet regarding hate speech dissemination that exacerbated by social media platforms. This research depicts the hike in spread of hate speech in past six years through online platforms in order to bring the attention of the law-making bodies to make reform in the existing laws to curb the menace. Freedom of speech and expression is a fundamental human right and Hate speech, which has neither a definite definition nor a definite law, is a threat to social security.

7   Conclusion

Online hate speech is a significant threat in digital environments, resulting in further marginalization of ethnic minorities. *(Odağ, Özen; Moskovits, Jules, (2024).* [9] Social media platforms are being more often utilized to disseminate harmful content and hate speeches, causing governments to enact legislation to enhance responsibility and ensure that those responsible are held accountable. Since 1994, South Africa has implemented comprehensive legislation to combat hate speech and hate crimes. This legislation specifically addresses all types of media and individuals who engage in discriminatory behavior based on factors such as race, color, religion, and group affiliation.

It is essential to address the weaponization of social media in order to effectively combat hate speech and crime. *(Odeku, Kola O.; Kgaphola, Justice, (2023).* [10] From an Indian standpoint, the prevalence of hate speech on social media platforms is steadily rising. Without a clear and specific definition in the legal system, identifying harmful content becomes difficult and challenging. Defining the boundaries of hate speech could face a similar outcome as Section 66-A of the Information Technology Act, which was removed by the Supreme Court of India[6] for severely infringing upon freedom of speech. The Indian Government implemented the Information Technology Rules, 2021, in order to guarantee cyber security, while worries about censorship remain. India should prioritize the identification of issue areas that are impeding the effectiveness of current laws. *(Kaushik, Kriti; Agarwal, Sonu, 2024).* [11]

The aim of this bibliometric research was to assess the significance and consequences of the spread of hate speech on online social media and the need for an hour is to be alarmed in order to curb hate crimes for peaceful society. Between 2017 and 2023, information was gathered from top journals and books that were indexed under the Scopus category. By addressing the development through bibliometric research in the field and also discussing the purpose of authors, organisations, and institutions, the study's conclusions have both clear theoretical and practical consequences. The study shows a significant rise in the quantity of articles published in the middle period, which is vibrant and stimulating. This paper effectively presented an extensive and thorough bibliometric examination of the subject, which is what makes it novel. Bibliometric tools such as Biblioshiny and VOS viewer have been used to make the study more prominent. For researchers and overseers, bibliometric studies can offer pertinent and useful information. As a result, the findings of such bibliometric research can be helpful to academics, managers, public officials, consultants and experts in their field.

8   Way to Further Research

To identify spread of hate speech through social media, this work seeks to explain its characteristics and research possibilities. For scholars interested in making a contribution to this field of study, this overview summarises earlier work in the field. To strongly influence other studies and research projects by making use of all available analyses and data to make reference to future developments. There are various research databases, including Web of Science, ScienceDirect, the Directory of Open Access Journals (DOAJ), PubMed and others. However, for this bibliometric analysis, only the SCOPUS database was taken into account to get the research papers. The time parameters were taken from 2017 to 2023. Therefore, the researcher here anticipates that additional comprehensive studies on hate speech recognition on online social media platforms will be welcoming steps in any way in the future. The researcher suggested that more substantial number of journals should presumably be used in future investigations. Future discussions should focus on the expansion of these fields of study and the productivity of the scholars who work in them. For better outcomes, future research should examine how newly emerged methodological approaches have been applied in bibliometric investigations.

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[6] Shreya Singhal v. Union of India, AIR 2015 SC 1523

Ethics declarations:

The authors of this article, do here by declare that this article is the original work and has not been published anywhere else.

Consent for publication:

Consent of all participants have been taken for publication.

Availability of supporting data:

The authors confirm that all data generated or analysed during this study are included in this article. Furthermore, data sources provided under the methodology part of this article and data supporting the findings of this study were all publicly available in Scopus at the time of submission.

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