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The Geography of Knowledge and Crime: Exploring India's Cyberbullying Research Trends

Shridhar Sagun Pednekar
University of Mumbai
Basharat Ahmad Malik
basharatmalik123@gmail.com

Govt. Higher Secondary School Devalgam
Azhar U Din Waza
University of Kashmir
Rashmi Katara
Central University of Punjab

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The Geography of Knowledge and Crime: Exploring India's Cyberbullying Research Trends

Shridhar Sagun Pednekar[1]
Mumbai, India, University of Mumbai, shridhar.pednekar@geography.mu.ac.in
Basharat Ahmad Malik[2]
Anantnag, India, Govt. Higher Secondary School Devalgam, basharatmalik123@gmail.com
Azhar U Din Waza[3]
Srinagar, India, Department of Geography, University of Kashmir, Jammu and Kashmir, azhar.ggscholar@kashmiruniversity.net
Rashmi Katara[4]
Punjab, India, Department of Sociology, Central University of Punjab, katara.therashmi96@gmail.com

Corresponding Author: Basharat Ahmad Malik; ORCID: https://orcid.org/0000-0002-0698-232X

Abstract

This study explores India's research landscape on cyberbullying, focusing on research trends, collaboration patterns, thematic orientations, and their relationships to cybercrime prevalence across the country. A systematic, data-driven approach was adopted. Data were retrieved from the Scopus database (1999–2025) using search terms recommended by Singh et al. (2024b), yielding 10,974 global publications, of which 1,018 were affiliated with Indian institutions. Bibliometric tools, including Bibliometrix, VOSviewer, PyBibX, CRExplorer, and Microsoft Excel, were used for analysis. At the same time, cybercrime statistics (2018–2022) from the Ministry of Home Affairs were spatially visualised in ArcGIS 10.8.4 using the choropleth method. India contributes 9.25% of the global cyberbullying literature, nearly three times its share in library and information science research. Contributions come from 1,634 institutions across 80 countries, though an average of 2.36 documents per institution indicates uneven participation. Conference proceedings dominate the output, with a collaboration index of 3.69 reflecting moderate co-authorship. The field remains in an emerging phase (H-index = 10; 8.68 citations per paper) but shows a marked surge post-2020, coinciding with increased digital penetration and social awareness. Cybercrime data indicate a parallel rise in incidents, expanding from concentrated hotspots in 2018 to a nationwide concern by 2022. The study relies on Scopus-indexed literature and official cybercrime records, which may exclude certain regional or non-indexed contributions. Future research could integrate alternative databases and qualitative insights. Findings underscore the urgent need for stronger policy frameworks, targeted awareness initiatives, and digital safety measures in India. They also provide evidence to guide researchers, institutions, and policymakers in prioritising resources and collaborative strategies. This is the first comprehensive mapping of India's scholarly contributions to cyberbullying research, contextualised with real-world cybercrime patterns. By linking bibliometric insights with crime data, the study bridges knowledge production and societal challenges, offering a unique perspective for global and local stakeholders.

Keywords: Cyberbullying, bibliometric analysis, Indian research, social media, online abuse, gender, collaboration networks.

Introduction

The birth of the internet has revolutionised the ways of communication and establishing relationships in society (Castells, 2010: 34–39). In the past two decades, the internet has become an integral part of human life since the advent of Web 2.0, which has broken down the boundaries between producers and consumers of the internet. Web 2.0 provided platforms for social networking, blogging, image/video sharing, and the collaborative production of information and ideas by users (Bruns, 2008). In the 1990s, the impact of the internet was viewed from two broad perspectives: optimistic and pessimistic **(Negroponte, 1995; Postman, 1993;** Vaidhyanathan, 2018). In the contemporary Era, the same analysis can be applied, as society is undergoing digital transformation at a rapid pace (Desai, 2013). Along with several opportunities, the collaborative nature of Web 2.0 has presented many challenges to the entire society in the forms of various cybercrimes (phishing, financial scams, sexting, abuse of personal information, sexual violence, grooming, spreading illegal content, cyberbullying, etc.). Cyberbullying has emerged as one of those challenges at a global scale, with incidents occurring in the United States, Canada, Japan, Scandinavia and the United Kingdom (Campbell, 2005). As there is no universal definition of cyberbullying, the credit for coining the term "Cyberbullying" is unanimously attributed to a Canadian educator, Bill Belsey. He coined the term "cyberbullying" in the early 2000s. Belsey defines cyberbullying as involving the use of information and communication technologies to support deliberate, repeated, and hostile behaviour by an individual or group that is intended to harm others (Belsey, 2004). American social scientists Samir Hinduja and Dr Justin W. Patchin have been studying cyberbullying since 2002. They define cyberbullying as willful and repeated harm inflicted through using the internet, interactive and digital technologies, or mobile phones (Patchin and Hinduja, 2006). They founded the Cyberbullying Research Centre in 2005, which is dedicated to sound research on technology and youth and to providing information about the nature, causes, extent, and issues surrounding cyberbullying (Hinduja and Patchin, 2008).

Severity of cyberbullying was addressed globally after Megan Mierre's suicide (2006), Megan Mierre, an American teenage girl, committed suicide after getting bullied by her online friend Josh on the social networking platform MySpace (Megan Meier Foundation, 2007). After Megan's suicide, her parents found out that the boy Megan was having a friendship with was an adult lady living in their neighbourhood posing as a boy in the online world. The above case of Megan highlighted the anonymous nature of cyberspace, where people become free to play with their identities **(Lindgren, 2025).** According to Sherry Turkle, this idea is considered as 'disembodiment in cyberspace' where individuals feel a disconnect between their physical self and virtual self (Turkle, 1995). Cyberbullying was considered as the extension of traditional bullying (Keith and Martin, 2005; Li, 2007) in terms of the intent of hurting others and enjoying violence **(Olweus, 1978)** but by unconventional means.

Cyberbullying leads to many socio-psychological issues such as isolation, depression, anxiety, poor mental health, falling into drugs or alcohol, peer rejection etcetera (Chadwick, 2014). With the growing internet penetration, various forms of cyberbullying are emerging, which creates the need for in-depth research regarding the above phenomenon. This study focuses on

India's scholarly contribution to the phenomenon of cyberbullying, which takes place due to several reasons like anger, envy, prejudice, and hate towards particular genders, religions, caste, sexual orientation etcetera (Hoff and Mitchell, 2009).

Literature Review

The research landscape of cyberbullying is vast and multifaceted, reflecting both the complexity and the global nature of the issue. Over the past decade, cyberbullying research has expanded significantly, focusing on various aspects such as prevalence, risk factors, consequences, and prevention strategies. Scholars highlight the importance of developing a comprehensive understanding of cyberbullying, given its diverse forms and the varied contexts in which it occurs. Current studies particularly emphasise its prevalence, associated risk factors, psychological and social impacts, and approaches to prevention and intervention.

In terms of prevalence, cyberbullying is recognised as a significant public health concern, with victimisation rates reported to range widely from 6% to 57.5% (Zhu et al., 2021). Research indicates a rapid growth in incidents, especially in educational settings, with the issue exacerbated by increased internet use during the COVID-19 pandemic (Ndibalema, 2024). Most studies have centred on children and adolescents, reflecting their vulnerability, and much of this research has been conducted in developed countries (Barragán Martín et al., 2021; Fatmawati and Haryanto, 2023; Nguyen et al., 2019).

Risk factors identified in the literature include belonging to a minority group, experiencing low psychological well-being, and engaging in high levels of internet use (Jaron Bedrosova et al., 2024). Cyberbullying has also been consistently linked to severe mental health outcomes such as depression, anxiety, and suicidal ideation (Bansal, Garg, Singh, et al., 2023; Kowalski et al., 2025). Importantly, studies reveal an overlap between online and offline victimisation, underscoring the complex interplay between different forms of bullying (Jaron Bedrosova et al., 2024).

Efforts to prevent and address cyberbullying often involve educational and family-based interventions, with schools and parents playing a central role in mitigation strategies (Tozzo et al., 2022). In parallel, technological solutions such as automated detection systems are being developed, though these remain at an early stage (Ademiluyi et al., 2022). Increasingly, scholars argue for comprehensive approaches that bring together mental health professionals, educators, and digital experts to design effective interventions (Tozzo et al., 2022).

Several researchers have examined publication trends and major bibliometric indicators on cyberbullying and related topics at the global level, employing a variety of datasets and analytical approaches (Achuthan et al., 2023; Bansal, Garg and Singh, 2023; Bansal, Garg, Singh, et al., 2023; Cáceres-Reche et al., 2019; Cretu and Morandau, 2024; Denche-Zamorano et al., 2023; López-Meneses et al., 2020a; Peker and Yalçın, 2022; Saif and Purbasha, 2023; Singh et al., 2024; Sood et al., 2024). These investigations typically adopt a multifaceted approach, analysing a range of bibliometric indicators, including publication and citation patterns, co-authorship and institutional collaborations, thematic trends, and conceptual structures.

Several studies provide comprehensive global overviews of cyberbullying research. For example, (Peker and Yalçın, 2022) Conducted a bibliometric and network analysis using Web of Science data (1970–2021), focusing on cross-cultural collaborations, country-level publication patterns, and co-authoring networks. (Achuthan et al., 2023) provided a bibliometric overview of cyberbullying research from 2010 to 2021 through Scopus and Dimensions databases, incorporating perspectives of sustainable development and the impact of COVID-19. Their study highlighted top contributing countries, journals, authors, institutions, and altmetric dimensions. Similarly, (Singh et al., 2024) examined 5,201 Scopus-indexed publications (1999–2023), employing citation, co-citation, collaboration, and keyword co-occurrence networks to identify influential contributors and thematic directions.

In the educational domain, (Cretu and Morandau, 2024) analysed bullying and cyberbullying research (1991–2020) through Web of Science Core Collection, mapping the evolution of publication trends, prolific countries, institutions, authors, and journals. (López-Meneses et al., 2020a) focused on the socioeconomic implications of cyberbullying in education (2004–2019), analyzing 1,128 Scopus articles to identify thematic areas, leading contributors, and geographic patterns. Other bibliometric studies have explored more specialised perspectives. For instance, (Bansal, Garg and Singh, 2023) Conducted a qualitative systematic review with bibliometric analysis focusing on the perpetrators' perspective of cyberbullying (CBP), while (Bansal, Garg, Singh, et al., 2023) examined the impact of cyberbullying on mental health, drawing on Scopus data. (Denche-Zamorano et al., 2023) investigated the intersection of cyberbullying and psychological aspects of self-concept through Web of Science, highlighting influential works, journals, and keywords.

While these studies consistently highlight global trends, they also underline a conspicuous gap: India, despite its large population and growing digital presence, has not been the subject of a dedicated bibliometric investigation. Instead, India typically appears within broader international analyses and is often classified as an “emerging” or “under-researched” region. For instance, (Sood et al., 2024) In their bibliometric study of stress and mental health among school students, they identified India as the tenth most productive country (36 publications), far behind China (753 publications) and the USA (584 publications).

(Achuthan et al., 2023), noted that although China, India, and Indonesia appeared among the top ten publishing countries in cyberbullying research, their contributions were relatively underwhelming given their demographic size and higher susceptibility to cyberbullying. They further pointed to the absence of nationally focused studies on well-being, prevention programs, and interventions in many Asian and African contexts.

(Singh et al., 2024) likewise emphasized that cyberbullying research remains highly concentrated in the United States and Europe, with China and Australia emerging as additional leaders. While India was acknowledged for some contributions and collaborations, it was ultimately described as an under-researched region. Similarly, (Bansal, Garg and Singh, 2023) identified India as having only 16 publications on cyberbullying perpetration, compared to 102 from the United States and 40 from China, and argued that future research opportunities in India, South America, and Africa remain substantial. In their mental health–focused study,

(Bansal, Garg, Singh, et al., 2023) found only seven Indian publications and classified the country as "emerging," suggesting that cultural and social differences in Asian nations may shape cyberbullying behaviours differently from Western contexts, and therefore require dedicated inquiry.

Taken together, the literature demonstrates that while India has a visible presence in international bibliometric analyses, its research output in cyberbullying remains relatively modest and fragmented. Existing studies repeatedly position India as a "nascent" or "emerging" contributor, with significant potential for future research to address contextual and cultural specificities neglected in global overviews.

To address this gap in academic knowledge, the present study introduces bibliometric indicators for the published literature on cyberbullying, with a specific focus on India. Its objective is to map the research landscape of cyberbullying in India and to identify key contributing scholars, journals, institutions, and collaborative networks. In addition, the study explores key themes through text analysis of titles, abstracts, and author keywords to provide a comprehensive understanding of the field's contributions and emerging trends. By offering insights into the evolution and impact of cyberbullying research in India, this work not only enriches the growing body of multidisciplinary scholarship but also establishes a foundation for future academic investigations in this domain.

Research Methodology

This study employed a systematic approach to analyse the research landscape of cyberbullying in India using data extracted from the Scopus database, with search keywords adopted from (Singh et al., 2024)**Table 1**. Scopus was selected for its recognition as a comprehensive and reputable source frequently used in bibliometric studies (López-Meneses et al., 2020b; Malik, 2025; Vaidya et al., 2021). No starting date was specified, allowing inclusion of publications from the inception of cyberbullying research, yielding 10,974 documents from 1999 to 2025, with data extracted on 19/08/2025. The dataset was then filtered to retain only publications affiliated with Indian institutions, resulting in 1,018 relevant studies. For analysis, a combination of tools was employed: Bibliometrix (Aria and Cuccurullo, 2017) for statistical analysis, VOSviewer (van Eck and Waltman, 2010) for network visualisation, PyBibX (Pereira et al., 2025) for bibliometric processing, and Microsoft Excel for data cleaning and preliminary analysis. Together, these tools facilitated a comprehensive examination of research trends, thematic focus, and collaboration networks in Indian cyberbullying research.

Data on cybercrimes (2018–2022) was collected from the Ministry of Home Affairs (https://www.mha.gov.in) and organised in Microsoft Excel for state-wise consistency. The cleaned data were then linked with the administrative boundary shapefile of India. Spatial analysis and map preparation were carried out in ArcGIS 10.8.4 using the choropleth technique. This approach enabled visualisation of the spatio-temporal distribution and intensity of cybercrimes across Indian states.

Table 1 Search strings used, and the results displayed.

Database	Search String	Results
Scopus	TITLE-ABS-KEY (“chat bullying” OR “chat victimization” OR “cyber aggression” OR “cyber bullying” OR “cyber harassment” OR “cyber mobbing” OR “cyber victimization” OR “cyber violence” OR “cyber-aggression” OR “cyber-bullying” OR “cyberbullying” OR “cybermobbing” OR “digital bullying” OR “e-bullying” OR “electronic bullying” OR “electronic harassment” OR “electronic victimization” OR “internet bullying” OR “online bulling” OR “online bullying” OR “online harassment” OR “online victimization” OR “phone bullying” OR “SMS bullying” OR “technology bullying” OR “text bullying” OR “virtual aggression” OR “virtual mobbing”)	**10974**
	Restricted to India	**1018**

Data Extracted updated on 19/08/2025

Descriptive Analysis:

Table 2 presents a scientometric overview of cyberbullying research based on data extracted from the Scopus database and analysed using PyBibX, an AI-powered Python library for bibliometric research. As of August 19, 2025, the global dataset comprised 10,974 documents, reflecting the extensive international research activity on this topic. India contributed 1,018 documents (including two duplicates), accounting for 9.25% of the global output, almost three times higher than India’s share in fields such as Library and Information Science (Mushtaq et al., 2024). The dataset reveals key metrics, including contributions from 80 countries, 1,634 institutions, 597 sources, and 8,816 citations. These results highlight India’s active and growing participation in global efforts to address cyberbullying through scientific research.

The Indian dataset reflects a moderately sized, internationally collaborative research corpus, with all publications in English. Contributions are spread across 1,634 institutions in 80 countries, though the average of only 2.36 documents per institution suggests uneven participation. Conference papers dominate the output, emphasising rapid dissemination, while the average of 1.28 documents per author indicates modest individual productivity. Collaboration is moderate, with a collaboration index of 3.69, and while most documents (954) are multi-authored, 62 remain single-authored. The citation impact is also moderate, with an

average of 8.68 citations per document. The maximum H-index of 10 suggests that even the most cited Indian researchers in this field have relatively modest influence compared to those in more established disciplines. While these indicators underscore the emergence of cyberbullying research as a focused niche area, variations in citation norms and potential biases in data collection should be considered when interpreting impact.

Table 2 Descriptive Statistics of Cyberbullying Research Output in India.

Main Information	Results
Timespan	2011-2025
Total Number of Countries	80
Total Number of Institutions	1634
Total Number of Sources	597
Total Number of References	28847
Total Number of Languages	1
English (# of docs)	1016
Total Number of Documents	1016
Article (300), Book (7), Book chapter (138), Conference paper (526), Editorial (11), Erratum (1), Note (4), Retracted (1), Review (27), Short survey (1)	
Average Documents per Author	1.28
Average Documents per Institution	2.36
Average Documents per Source	1.71
Average Documents per Year	67.73
Total Number of Authors	3012
Total Number of Authors Keywords	2148
Total Number of Authors Keywords Plus	3386
Total Single-Authored Documents	62
Total Multi-Authored Documents	954
Average Collaboration Index	3.69
Max H-Index	10
Total Number of Citations	8816
Average Citations per Author	2.93
Average Citations per Institution	5.4
Average Citations per Document	8.68
Average Citations per Source	14.77

Figure 1 illustrates the annual publication output of Indian researchers on cyberbullying between 2011 and 2025. The black line depicts yearly publications, while the dotted line shows the two-year moving average. Although early activity between 2011 and 2016 was limited, the period from 2016 to 2020 witnessed a steady rise in research output, reflecting growing awareness of the issue. A sharp increase from 2020 onwards highlights the consolidation of cyberbullying as a prominent research domain in India. This growth can be attributed to rising

social awareness, expansion of digital technologies, and increased research support. Overall, the upward trend underscores India's strengthening contribution to the global research landscape on cyberbullying.

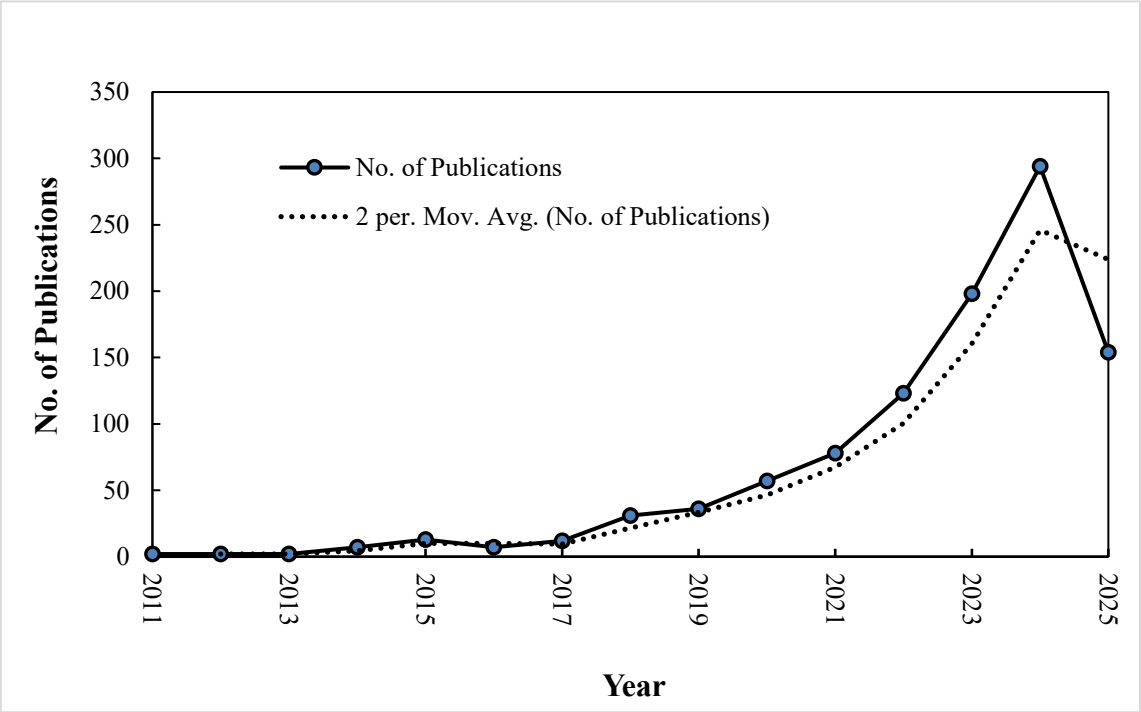


Figure 1 Trend in Cyberbullying Research Output by Indian Researchers (2011–2025): Annual Publications and 2-Year Moving Average

This rising scholarly interest aligns with the documented increase in cybercrime incidents across India. As shown in **Fig. 2,** the spatial distribution of cybercrimes in India between 2018 and 2022 shows a consistent and alarming upward trajectory in both magnitude and geographic extent. In 2018, cybercrime cases were relatively concentrated, with only a limited number of states, most notably Karnataka, Maharashtra, and Uttar Pradesh, falling within the higher incidence categories, while the majority of states remained in lower brackets. By 2019, the intensity had escalated as more states, particularly across the central and southern regions, transitioned into higher ranges, with Karnataka and Telangana emerging as major hotspots. The 2020 map reflects a further surge, with states such as Maharashtra, Assam, and Odisha recording substantial increases, in addition to the already dominant states. In 2021, the crisis deepened further, as several states surpassed the 10,000-case threshold, and the spatial spread broadened into the northern and eastern parts of the country, indicating a shift from localised to more dispersed patterns of cybercrime activity. Finally, in 2022, the escalation reached its peak, becoming a nationwide concern: most states recorded significant volumes, with Maharashtra, Karnataka, Telangana, and Uttar Pradesh reporting the highest concentrations. Taken together, the maps illustrate not only a progressive intensification of cybercrimes in India but also a clear transition from regionally concentrated clusters to a widespread national

challenge, underscoring the urgent need for stronger cyber governance and policy interventions.

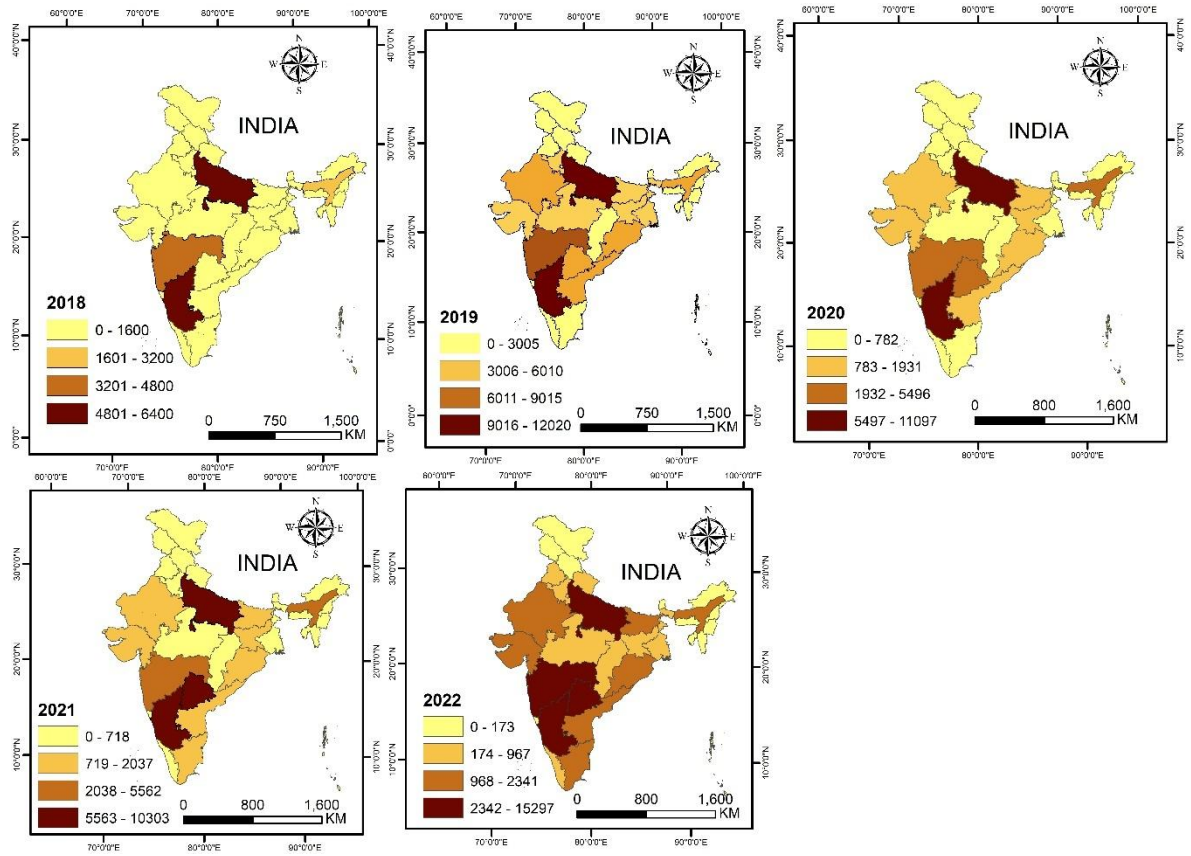


Figure 2 Spatio-temporal distribution of cyberbullying in India, 2018-2022.

Result and Analysis

According to (Singh et al., 2024), the first two scientific papers on cyberbullying at the global level appeared independently in 1999. In contrast, Indian contributions to this field emerged 12 years later. Our study shows that the earliest publications on cyberbullying from India appeared in 2011. The first was by Halder and Jaishankar (2011), titled *"Cyber gender harassment and secondary victimisation: A comparative analysis of the United States, the UK, and India"* in *Victims and Offenders*. This paper examined gender harassment in cyberspace and emphasised how victims often suffer secondary victimisation at the hands of criminal justice systems and Internet service providers, while also suggesting possible solutions through cross-national comparison (Halder and Jaishankar, 2011). The second was by Hallikeri, Dinesha, and Gouda (2011), titled *"Cybersex–a newly emerging obsession"* in the *International Journal of Medical Toxicology and Legal Medicine*. This article discussed cybersex as a form of virtual sexual encounter, noting its link to compulsive online sexual behaviour and sexual addiction, driven largely by the anonymity of the internet (Hallikeri et al., 2011).

Most productive Source titles

Table 3 and **Figure 3** present the top ten most productive source titles for Indian cyberbullying research published between 2011 and 2025, along with key metrics such as Total Publications (TP), Scimago Journal Rank (SJR 2024), best SJR quartile, H-index, and Journal Impact Factor (JIF 2024). Of 1016 documents across 597 distinct source titles, the most prolific outlet was Lecture Notes in Networks and Systems (Springer Nature, Germany), with 56 publications. Like other high-output source including *AIP Conference Proceedings* (USA), *Communications in Computer and Information Science* (Germany), and *Lecture Notes in Electrical Engineering* (Germany), it is a conference proceedings series without a formal impact factor. *Advances in Intelligent Systems and Computing* (Germany) was discontinued in Scopus in 2021, while *CEUR Workshop Proceedings* (Germany), another prominent source title, also lacks an official impact factor.

Among peer-reviewed journals, *IEEE Access* (USA, JIF = 3.4, Q1) and *Multimedia Tools and Applications* (Springer USA, JIF = 3.0, Q1) have the highest impact factors. At the same time, the *Indian Journal of Psychiatry* (India, JIF = 1.7, Q3) is the only Indian journal represented. The dominance of German- and U.S.-based publishers, particularly Springer and IEEE, underscores Indian researchers' reliance on international platforms, though most high-output sources remain conference proceedings rather than journals.

Of the 597 source titles overall, only 103 carried a JIF in 2024. The highest-ranked among these was *Computers in Human Behaviour* (JIF = 9.0, Q1), which published a single article on cyberbullying by Indian authors: *"Cyberbullying research—Alignment to sustainable development and impact of COVID-19: Bibliometrics and science mapping analysis"* (Achuthan et al., 2023). All authors were affiliated with Indian institutions except Robin Kowalski, who is based at the College of Behavioural, Social and Health Sciences, Clemson University, United States.

Although India contributes over 9% of global research on cyberbullying, the analysis of source titles reveals limited publication in top-ranked journals. The fact that only one article appeared in *Computers in Human Behaviour*, a leading journal globally for this field (Singh et al., 2024) This illustrates the gap between productivity and publication in high-impact journals.

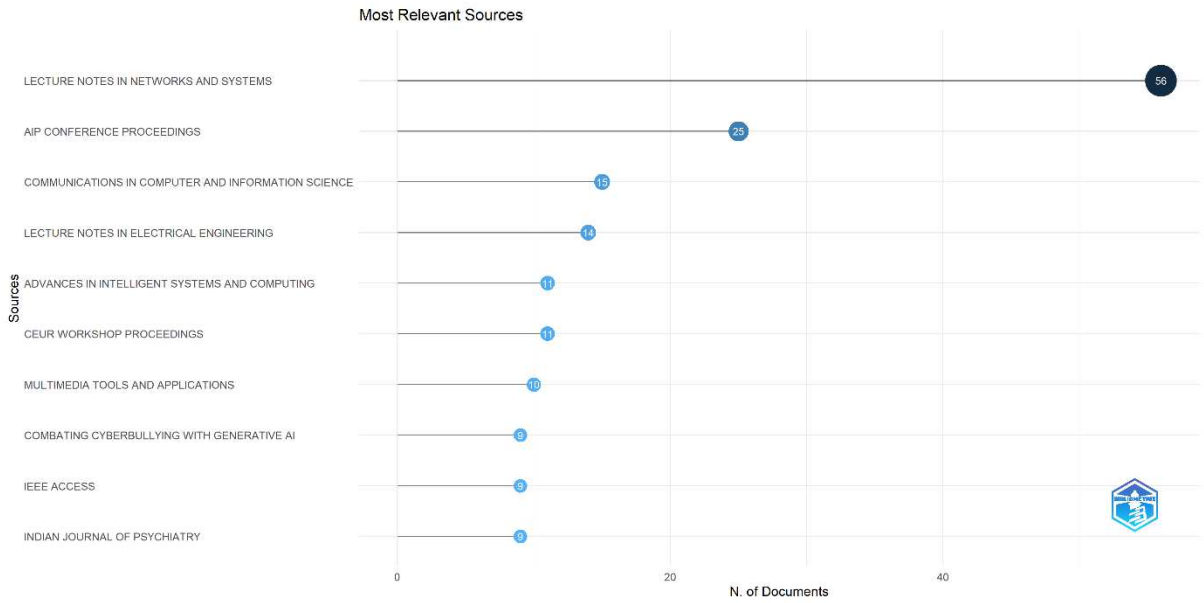


Figure 3 Most Productive Source Titles in Indian Cyberbullying Research

Table 3 Top 10 Most Productive Source Titles for Indian Cyberbullying Research (2011–2025) Along with Key Metrics (SJR 2024, H-Index, and JIF 2024)

Source Title (Country)	TP	SJR	SJR Best Quartile	H-Index	JIF-2024
Lecture Notes in Networks and Systems (Switzerland)	56	0.166	Q4	48	N/A
AIP Conference Proceedings (United States)	25	0.153	-	90	N/A
Communications in Computer and Information Science (Germany)	15	0.182	Q4	75	N/A
Lecture Notes in Electrical Engineering (Germany)	14	0.143	Q4	49	N/A
Advances in Intelligent Systems and Computing (Germany) *	11	N/A	-	81	N/A
CEUR Workshop Proceedings (Germany)	11	0.166	-	69	N/A
Multimedia Tools and Applications (United States)	10	0.777	Q1	116	3.0
IEEE Access (United States)	9	0.849	Q1	290	3.4
Indian Journal of Psychiatry (India)	9	0.518	Q3	58	1.7
Combating Cyberbullying with Generative AI	9	NA	-	NA	NA

TP: Total Publications ***SJR:*** Scimago Journal Rank ***JIF:*** Journal Impact Factor ***N/A:*** Not Available

* **Discontinued in Scopus as of 2021**

Influential publications

Influential publications in a research field are often referred to as 'most cited articles' (Aftab et al., 2019; Ali et al., 2018; Mushtaq et al., 2020, 2024; Raza and Malik, 2018), 'leading articles' (Malik et al., 2021), or 'works with greater impact' (Vaidya et al., 2021). Citation counts are widely recognized as indicators of an article's importance (Garfield, 1972), as highly cited articles generally signify strong influence and relevance within the research community. Such works provide valuable insights into the development of a field, highlight key contributors, and reveal the intellectual structure of research over time (Malik et al., 2019; Mushtaq et al., 2020, 2024). Citation analysis, therefore, is a useful tool to assess research quality, trace knowledge diffusion, and understand the evolution of a domain (Pilkington and Meredith, 2009). In this study, we conducted a citation analysis to identify the most influential publications on cyberbullying.

Table 4 and **Figure 4** provide an overview of the top 10 most influential works in the field, highlighting their total citations, number of authors, and the Indian author(s) among them. Indian researchers have made substantial contributions to cyberbullying research. The first prominent publication introduced a novel three-level hierarchical annotation schema for identifying and characterising offensive language on social media. This work led to the creation of the Offensive Language Identification Dataset (OLID), a publicly available dataset of English tweets annotated by type and target of offensive content. Baseline experiments using various machine learning models on OLID were also presented (Zampieri et al., 2019).

The second influential publication involved benchmarking efforts such as the shared task on aggression identification, which attracted diverse systems and highlighted the challenges of classifying aggressive content in both Hindi and English social media (Kumar et al., 2018). Significant advancements by Indian authors also include the application of deep learning and the development of specialised datasets. For example, Agrawal and Awekar (2018) demonstrated the effectiveness of deep learning models in detecting cyberbullying across multiple platforms and varied topics like racism, sexism, and personal attacks, addressing limitations of prior single-platform, feature-based approaches (Agrawal and Awekar, 2018).

To address linguistic diversity, Bohra et al. (2018) developed a Hindi-English code-mixed dataset for hate speech detection, accompanied by a supervised classification system, reflecting the prevalence of code-mixing in multilingual societies. The innovative spirit also extends to hybrid approaches and low-resource language support. (Bohra et al., 2018). Yuvaraj et al. (2021) proposed an integrated model combining Artificial Neural Networks (ANN) with Deep Reinforcement Learning (DRL), which significantly improved cyberbullying detection performance through a reward-penalty mechanism (Yuvaraj et al., 2021).

A comprehensive review by Jain et al. (2021) identified cyberbullying as a critical targeted threat within online social networks, framing it within broader security and privacy challenges (Jain et al., 2021). Likewise, Roy et al. (2020) introduced a Deep Convolutional Neural Network (DCNN) framework for hate speech detection on Twitter, which, given its overlap

with cyberbullying, improved prediction accuracy by effectively capturing tweet semantics (Roy et al., 2020).

Another important contribution came from Chavan and Shylaja (2015), who proposed two novel hypotheses for feature extraction to detect peer-directed cyber-aggressive comments on social media. Their approach enhanced detection accuracy by about 4% over traditional methods (Chavan and Shylaja, 2015). Fazil and Abulaish (2018) further advanced the field by proposing a hybrid method to detect automated spammers on Twitter that integrates community-, metadata-, content-, and interaction-based features. Their study revealed that interaction- and community-based features were most effective in spam detection (Fazil and Abulaish, 2018).

Finally, D'Cruz and Noronha (2013) investigated workplace cyberbullying in India's IT and ITES-BPO sectors, identifying its unique characteristics, including boundarylessness, permanence, anonymity, and invisibility. Their study also emphasised the potential of digital traces to provide evidence in dispute resolution. Together, these contributions underscore the diverse and influential role of Indian researchers in advancing cyberbullying scholarship (D'Cruz and Noronha, 2013).

These ten influential publications collectively study the complex and evolving nature of cyberbullying and aggressive language in online environments, highlighting both human experiences and computational detection methods. One paper specifically explores workplace cyberbullying in India's IT sector, identifying unique characteristics such as its "boundaryless" spread and the dual role of technology in both perpetuating harm and providing evidence for redressal. The other two sources focus on applying machine learning and deep learning techniques to identify various forms of online aggression, detailing experiments with different models and datasets across multiple social media platforms, and strategies such as transfer learning and data augmentation for improved detection, particularly in low-resource languages like Marathi. Together, the texts underscore the multidimensional challenges of online harassment, necessitating both a nuanced understanding of its human impact and advanced technological solutions for identification and intervention.

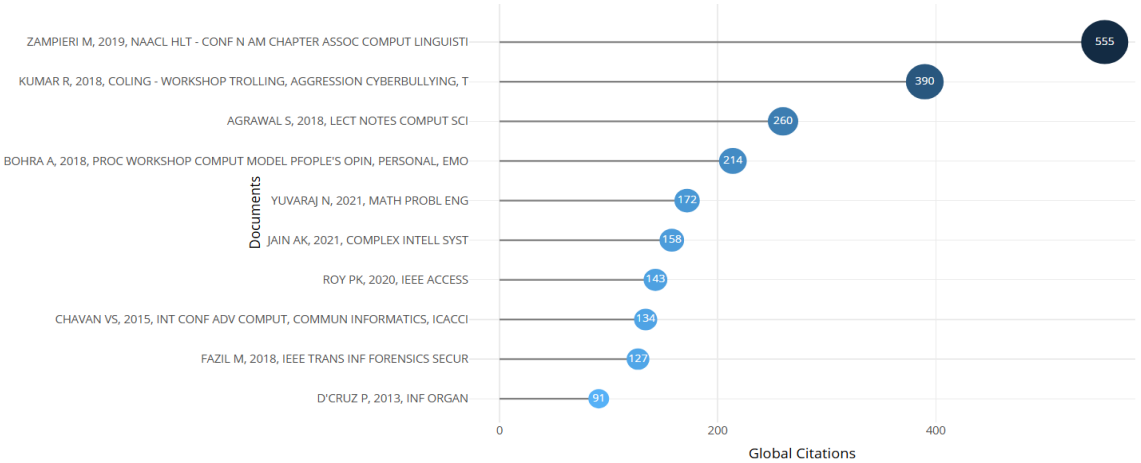


Figure 4 Most Cited Document

Table 4 Top 10 Influential Publications by Indian Researchers on Cyberbullying

Title of the Publication	TC	TNA	Indian Author(s)	Reference
Predicting the type and target of offensive posts in social media posts	578	6	Kumar R.	(Zampieri et al., 2019)
Benchmarking Aggression Identification in social media	393	4	Kumar R.; Ojha A.K.	(Kumar et al., 2018)
Deep learning for detecting cyberbullying across multiple social media platforms	275	2	Agrawal S.; Awekar A.	(Agrawal & Awekar, 2018)
A dataset of Hindi-English code-mixed social media text for hate speech detection	220	5	Bohra A.; Vijay D.; Singh V.; Akhtar S.S.; Shrivastava M.	(Bohra et al., 2018)
Nature-Inspired-Based Approach for Automated Cyberbullying Classification on Multimedia Social Networking	205	10	Yuvaraj N.; Srihari K.; Dhiman G.; Somasundaram K.; Rajeskannan S.; Soni M.; Gaba G.S.	(Yuvaraj et al., 2021)
Online social networks security and privacy: comprehensive review and analysis	200	3	Jain A.K.; Sahoo S.R.; Kaubiyal J.	(Jain et al., 2021)
A framework for hate speech detection using deep convolutional neural network	156	4	Roy P.K.; Tripathy A.K.; Das T.K.	(Roy et al., 2020)
Machine learning approach for detection of cyber-aggressive comments by peers on social media network	136	2	Chavan V.S.; Shylaja S.S.	(Chavan & Shylaja, 2015)
A Hybrid Approach for Detecting Automated Spammers in Twitter	131	2	Fazil M.; Abulaish M.	(Fazil & Abulaish, 2018)
Navigating the extended reach: Target experiences of cyberbullying at work	99	2	D'Cruz P.; Noronha E.	(D'Cruz & Noronha, 2013)

Kumar R.= Bhim Rao Ambedkar University, India
Ojha A.K.= Jawaharlal Nehru University, India
Agrawal S. = Adobe Systems, Noida, India
Awekar A. = Indian Institute of Technology, Guwahati, India
Bohra A.; Vijay D; Singh V.; Akhtar S.S. & Shrivastava M = International Institute of Information Technology, Telangana, Hyderabad, India
Yuvaraj N. = Training and Research, ICT Academy, Chennai, India
Srihari K. = Department of Computer Science and Engineering, SNS College of Technology, Coimbatore, India
Dhiman G. = Department of Computer Science, Government Bikram College of Commerce, Patiala, Punjab, India
Somasundaram K. & Rajeskannan S. = Dept of Computer Science and Engineering, Chennai Institute of Technology, Chennai, India
Soni M. = Dept of Computer Science and Engineering, Jagran Lakecity University, Bhopal, India
Gaba G.S. = School of Electronics and Electrical Engineering, Lovely Professional University, Phagwara, India
Jain A.K. & Kaubiyal J. = National Institute of Technology Kurukshetra, Kurukshetra, India
Sahoo S.R.; Roy P.K.; Tripathy A.K. & Das T.K.= Vellore Institute of Technology Andhra Pradesh, Amaravati, India
Chavan V.S. & Shylaja S.S. = Department of Information Science and Engineering, P.E.S Institute of Technology, Visvesvaraya Technological University, Bangalore, India
Fazil M. = Department of Computer Science, Jamia Millia Islamia, Delhi, India
Abulaish M. = Department of Computer Science, South Asian University, Delhi, India
D'Cruz P. & Noronha E. = IIM Ahmedabad, India

Most Prolific/Influential Authors

Between 2011 and 2025, Indian cyberbullying research engaged 3,405 contributing authors (2,890 unique) who collectively produced 1,016 publications. Using the full author names extracted from the Scopus dataset and processed through Excel's Power Query editor, we identified the most prolific contributors (**Table 5**). As shown in **Figure 5**, Sriparna Saha (18 publications) and Krishanu Maity (14 publications), both affiliated with the Indian Institute of Technology Patna, Department of Computer Science and Engineering, emerge as the two leading researchers in this domain. The inclusion of international scholars such as Michelle F. Wright and Chang Shu further underscores the global and collaborative nature of cyberbullying research involving Indian institutions. This visualization highlights not only the key contributors but also the temporal trends shaping the field.

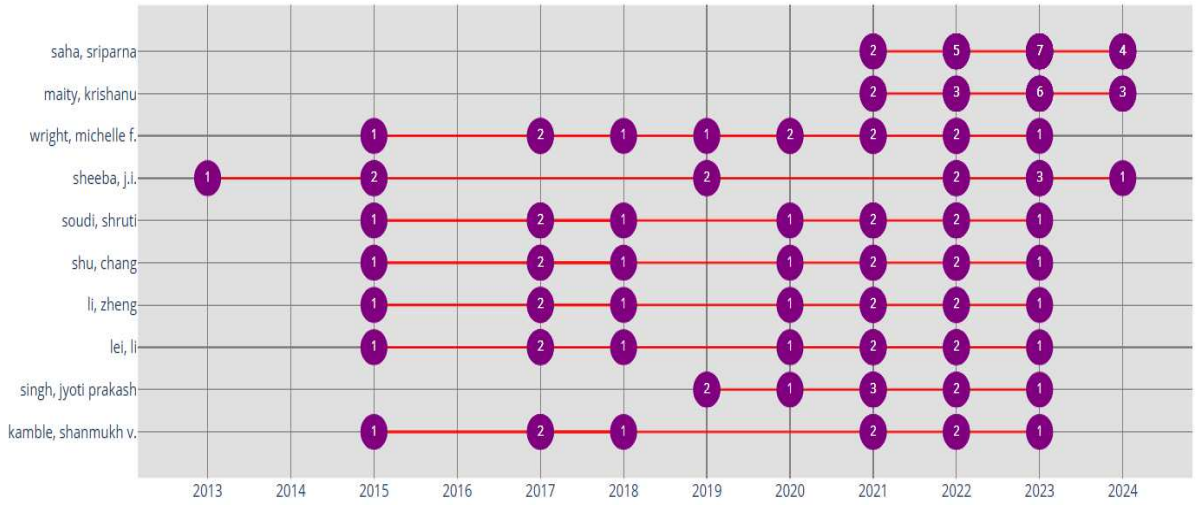


Figure 5 Most Productive Authors over the years.

To further assess author productivity, Lotka's Law was applied (Figure 6). The dotted line in the figure represents the theoretical distribution, against which actual productivity was compared. Consistent with Lotka's Law, approximately 63% of authors contributed only one paper, 15% contributed two papers, and 7% produced ten or more. The Kolmogorov–Smirnov Goodness-of-Fit test confirmed the dataset's adherence to Lotka's Law ($p = 0.025$), while also indicating deviations between the theoretical model and observed author productivity.

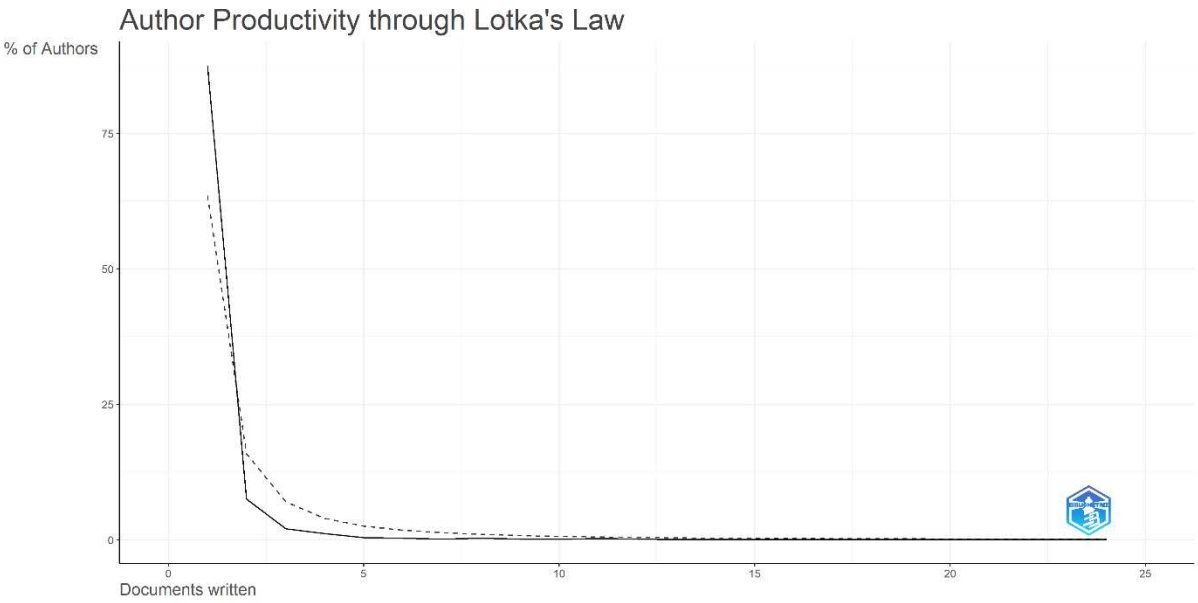


Figure 6 The fit of Indian cyberbullying research distribution as compared to Lotka's law.

Table 5 Most prolific authors with total publications and total citations.

AU	Affiliation	TP	TC
Saha, Sriparna (Not a single publication as first author)	Indian Institute of Technology Patna, Department of Computer Science and Engineering, Patna, 801103, India	18	263
Maity, Krishanu (12 are as first author articles)	Indian Institute of Technology Patna, Department of Computer Science and Engineering, Patna, 801103, India	14	162
Wright, Michelle F.	Department of Psychology, Pennsylvania State University, Pennsylvania, PA, United States	13	215
Shu, Chang	Department of Psychology, Renmin University of China, Beijing, China	11	151
Soudi, Shruti (Not a single publication as first author)	Karnatak University, Department of Psychology, India	11	151
Sheeba, J.I. (2 are as first author articles)	Puducherry Technological University, Department of Computer Science and Engineering, India	11	169
Li, Zheng	Beijing University of Technology, Beijing, 100021, China	11	151
Lei, Li	Renmin University of China, Beijing, 100872, China	11	151
Kamble, Shanmukh V. (Not a single publication as first author and all these publications of him are in collaboration with Wright, Michelle F.)	Karnatak University, Dharwad, India	10	127
Singh, Jyoti Prakash (Not a single publication as first author)	National Institute of Technology Patna, Bihar, India	9	262
Bhatia, M.P.S. (One publication of him among these are as first author)	Department of Computer Science and Engineering, Netaji Subhas University of Technology (Formerly, Netaji Subhas Institute of Technology), New Delhi, India	9	76
Bhattacharyya, Pushpak (Not a single publication as first author)	Indian Institute of Technology Bombay, Department of Computer Science and Engineering, Mumbai, 400076, India	8	89
Sandhu, Damanjit (two publication of him among these are as first author)	Department of Psychology, Punjabi University, Patiala, Patiala, India	7	27
Kumari, Kirti (All these publication of her are as first author publications)	Institute of Technical Education and Research, Siksha ‘O’ Anusandhan, Odisha, Bhubaneswar, India	7	240

Co-citation network of cited references

For this analysis, the cited reference data were normalized using the CRExplorer software Version 2.0 (Thor et al., 2016), this procedure of normalizing the cited references has had been used in the earlier studies as well (Vaidya et al., 2021). Out of a total of 1,016 documents, 16 did not contain any cited reference data, while the remaining 1,000 documents included 30,844 non-distinct cited references. Among these, 1,178 cited references lacked publication years and were therefore excluded from the analysis. In addition, 72 cited references contained only years or numeric values without complete bibliographic information; these were also removed using the "Remove the selected Reference…" option in the software. To further refine the dataset, the clustering and merging facilities of CRExplorer were applied, and identical cited references were manually merged. After normalization, the dataset comprised 22,187 unique cited references across the 1,000 documents related to cyberbullying. The normalized dataset was then exported as a Scopus file for co-citation network analysis in VOSviewer version 1.6.20 (van Eck and Waltman, 2010). **Figure 7** presents the co-citation reference association network. A minimum citation threshold of 30 was applied, resulting in a co-citation network of 33 works. The size of each node (circle) represents the number of citations that a particular reference received within the network. Publications grouped in the same cluster share stronger co-citation links, and the resulting network revealed four distinct clusters.

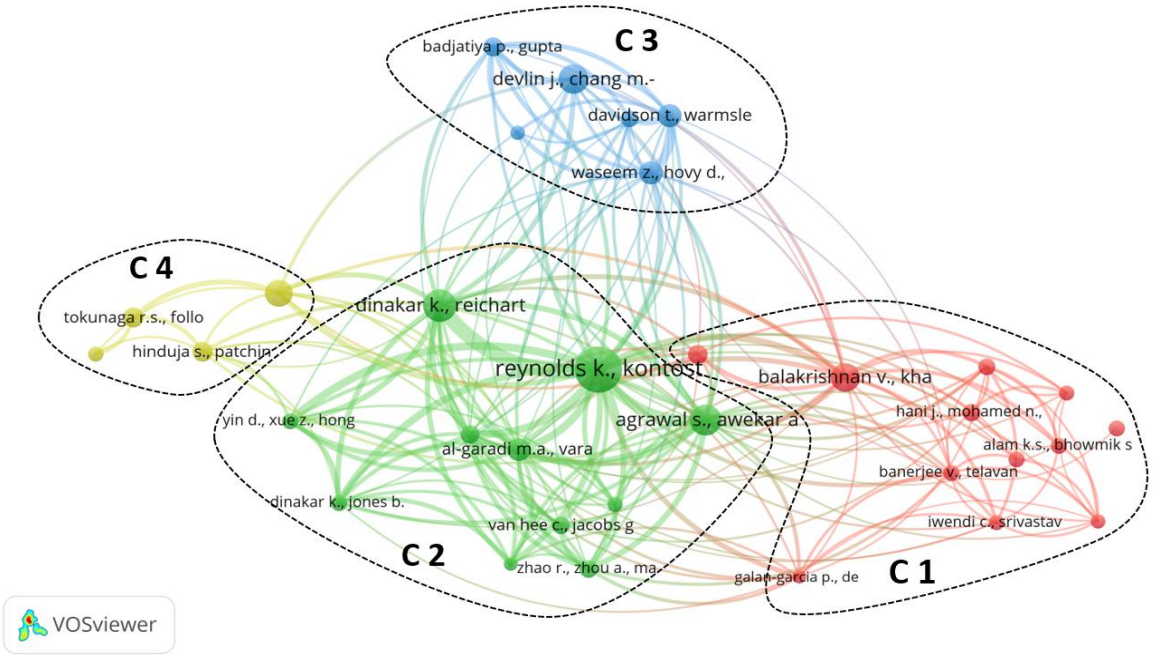


Figure 7 Co-citation network of cited references.

The first cluster (C1) consisted of 12 publications among them the prominent one examines the automatic cyberbullying detection using machine learning techniques, primarily focusing on social media platforms. This study highlights efforts to improve the accuracy of detection by

integrating diverse features such as users' psychological traits like personality (Big Five and Dark Triad) and sentiment (Balakrishnan et al., 2020). The second prominent study successfully demonstrates that combining psychological features and sentiment significantly improves cyberbullying detection accuracy, particularly noting the impact of extraversion, agreeableness, neuroticism, and psychopathy, achieving up to 92.8% accuracy with Neural Networks(Hani et al., 2019). The third study is actually a review study that reveals that many existing studies misrepresent the core definition of cyberbullying, often failing to account for its repetitive, intentional, and peer-specific nature, and frequently utilize imbalanced datasets or single messages for analysis. The publications in Cluster 1 largely converge on the development and evaluation of computational approaches for detecting cyberbullying on social media platforms, particularly Twitter. They highlight the application of traditional machine learning techniques, ensemble models, and more recent advances in deep learning, including neural networks, hybrid architectures, and pre-trained language models such as BERT. Several studies also stress the importance of user-centred

features, such as psychological traits, alongside purely linguistic or content-based signals, thereby broadening the scope of detection frameworks. Collectively, these works not only provide systematic reviews of the field but also demonstrate practical implementations, comparative analyses, and case studies, underscoring both the technical challenges and the evolving sophistication of cyberbullying detection solutions. Overall, Cluster 1 reflects a strong research focus on algorithmic and model-driven strategies to improve accuracy, scalability, and prevention mechanisms in online environments.

Second Cluster (C2) consisted of 11 publications, the first of which is a conference paper in which the authors sought to detect cyberbullying using machine learning techniques, specifically focusing on language patterns found in online interactions. The authors developed a custom dataset by crawling content from Formspring.me, a question-and-answer website, chosen for its high proportion of content from teens and young adults, and a significant amount of bullying. This data was then labelled by human workers via Amazon Mechanical Turk, with posts classified as containing cyberbullying or not. Various lexical features, such as the number and severity of “bad” words, were extracted to train machine learning models using the Weka toolkit, with the aim of prioritising the accurate identification of true-positive cyberbullying instances over minimising false positives (Reynolds et al., 2011). The second prominent publication is also a conference paper by Dinakar, Reichart, and Lieberman (2011), which addressed the problem of textual cyberbullying by decomposing it into topic-sensitive text classification tasks. Using a dataset of 4,500 YouTube comments, they tested both binary and multiclass classifiers and found that binary classifiers tailored to individual labels outperformed multiclass models. Their study highlights that cyberbullying detection can be more effective when approached through specialized, topic-specific classifiers (Dinakar et al., 2011). The third publication by Agrawal and Awekar primarily addresses the challenges of automatically detecting cyberbullying across various social media platforms (SMPs) and different forms of harassment using deep learning models and transfer learning (Agrawal and Awekar, 2018). The

publications in Cluster 2 collectively emphasise the foundational development of cyberbullying detection methods across different social media platforms, with a strong reliance on machine learning, feature engineering, and contextual analysis. Early studies laid the groundwork by applying supervised learning techniques to online harassment, a line of work later extended to include topic-sensitive classification, user context modelling, and common-sense reasoning for prevention and mitigation. The field then advanced through the integration of deep learning approaches, enabling cross-platform detection and large-scale empirical studies of social media text. Other contributions focused on bullying-specific linguistic features, the combination of social and textual analysis, and peer-to-peer aggression in online environments, while Twitter was also explored as a major platform for cybercrime detection. Collectively, these works highlight a progressive shift from traditional machine learning toward more sophisticated, context-aware, and deep learning approaches, thereby shaping the methodological foundations of cyberbullying detection research.

Cluster (C3) comprises six publications that primarily focus on advancing natural language processing methods for detecting hate speech, abusive content, and offensive language, topics closely related to cyberbullying research. Foundational contributions such as GloVe word embeddings and the BERT transformer architecture have provided powerful representation learning techniques that have significantly improved performance on text classification tasks, including harmful content detection. Building on these, several studies investigated predictive linguistic and social features for identifying hate speech on Twitter, while others highlighted the challenges of distinguishing hate speech from offensive but non-hateful language. Early applications of deep learning approaches demonstrated the potential of neural networks in enhancing detection performance compared to traditional machine learning models. Collectively, this cluster underscores the importance of robust language representations, feature engineering, and deep learning frameworks for addressing the complexities of detecting abusive and harmful content in online environments.

The last cluster (C4) consisted of four publications. The publications in Cluster 4 focus on the psychological and social dimensions of cyberbullying, with particular attention to its prevalence, impact, and association with mental health outcomes. These works critically review and synthesise research on youth victimisation in digital environments, highlighting how online bullying often mirrors or extends traditional bullying experiences. They emphasise the severe consequences for adolescents, including emotional distress, academic difficulties, and, in extreme cases, suicide. Collectively, this cluster underscores the broader social and psychological implications of cyberbullying, providing an essential foundation for understanding its effects on well-being and for framing the need for effective prevention and intervention strategies.

Country Collaboration

It was found that all publications on cyberbullying produced by Indian authors involved collaborations with researchers from 80 other countries. The international collaboration map for Indian cyberbullying research highlights India as the central hub of scholarly activity in this field **Fig 8**. Its large node signifies the country's dominant contribution and leadership, with

strong collaborative ties extending to neighbouring and regional countries such as Pakistan, Malaysia, Saudi Arabia, and Indonesia. These countries have been working in close collaboration with Indian researchers, as also noted in an earlier study by (Malik et al., 2021), which examined scholarly output from Jammu and Kashmir and revealed similar patterns of regional collaboration. These regional partnerships suggest that cyberbullying research in India is not only growing domestically but also benefits from shared concerns and expertise across South and Southeast Asia.

Beyond regional connections, India also collaborates with Western countries, including the United States, the United Kingdom, Italy, and Spain, with the U.S. emerging as a particularly significant partner due to its high research output and global influence. Collaborations with countries like Japan, Austria, Cyprus, and the Czech Republic illustrate broader, though less dense, global engagement. More peripheral nodes, such as Ethiopia and Australia, indicate occasional but weaker partnerships. Overall, the network underscores India's role as a driving force in cyberbullying research, while also highlighting opportunities to expand international collaborations to strengthen global visibility and cross-cultural perspectives in this important area.

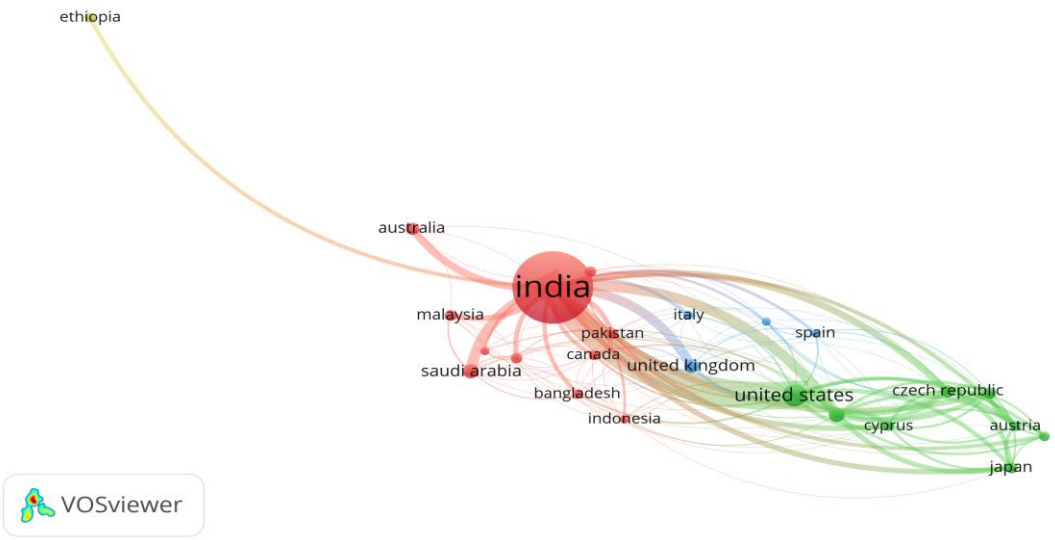


Figure 8 Country Collaboration

Keyword co-occurrence analyses

To generate **Figure 9**, we used VOSviewer version 1.6.20, focusing exclusively on author keywords. In this type of network, node size reflects keyword frequency, while node proximity indicates the degree of co-occurrence across publications. Such analysis helps in identifying the main themes being studied in relation to cyberbullying in India. Figure 8 presents the keyword co-occurrence network for 848 publications out of the 1,016 publications, as 168 did not contain author keywords. During preprocessing, different variants and synonyms of terms were standardised and merged, and irrelevant terms were excluded using a thesaurus file (.txt). To construct the network, a minimum threshold of ten keyword occurrences was applied,

resulting in 51 items (nodes) organised into five clusters. The nodes displayed in Figure 8 thus represent the core thematic areas addressed in the selected publications.

The research landscape, derived from author keyword analysis, is structured into four distinct but interconnected thematic clusters. This structure reveals a mature and multifaceted approach to the problem.

The first cluster 1 (Red) generated from the analysis of author keywords of Indian cyberbullying research, using VOSviewer software, may be described as the Socio-Psychological and Contextual Dimension. This cluster brings together 16 closely related terms: *adolescents, anxiety, bullying, COVID-19, cybersecurity, cyber victimisation, cyberbullying, cybercrime, depression, harassment, India, internet, mental health, social media, tweet, and victimisation*. These collectively highlight the human-centred and contextual nature of cyberbullying studies in India. The concentration of terms such as adolescents, victimisation, depression, and anxiety emphasises the vulnerability of young populations to cyberbullying and its profound mental health consequences. The inclusion of keywords like harassment, cybercrime, and cyber victimisation points toward the behavioural manifestations of online abuse, while social media, the internet, and tweets reflect the dominant platforms where such incidents occur. Notably, the presence of COVID-19 underscores the pandemic's role in exacerbating online risks, while cybersecurity links these issues to broader digital safety concerns. Taken together, this cluster illustrates how Indian research situates cyberbullying within a socio-psychological framework, contextualised by cultural and technological factors, and underscores the urgent need for interventions that address both mental health outcomes and digital safety.

The second cluster (Green), labelled *Next-Generation AI Detection Models*, represents the advanced technical core of Indian cyberbullying research and reflects the growing reliance on sophisticated Deep Learning and Natural Language Processing (NLP) approaches for automated detection. Comprising 14 keywords: *accuracy, BERT, bidirectional long short-term memory (BiLSTM), classification, convolutional neural network (CNN), cyberbullying detection, deep learning, detection, ensemble learning, GloVe, hate speech, long short-term memory (LSTM), online harassment,* and *word embedding*. This cluster highlights the transition from conventional machine learning to state-of-the-art AI architectures. Central to this body of work are models such as BERT, BiLSTM, and CNN, which enable nuanced language understanding and contextual text classification. Complementary techniques like *GloVe word embeddings* and *ensemble learning* are employed to improve model performance and robustness. The overarching goal of this cluster is to enhance the accuracy and reliability of detection systems, particularly in identifying complex and harmful online behaviors such as *hate speech* and *online harassment*. This cluster underscores India's active contribution to the global frontier of AI-driven solutions for cyberbullying, demonstrating both methodological innovation and practical applicability.

The third cluster (Blue), labelled *Algorithmic Classification & Sentiment Analysis*, reflects the traditional machine-learning foundation of cyberbullying research in India, serving as the practical backbone of early detection studies. Comprising eight keywords: *feature extraction,*

logistic regression, naïve Bayes, random forest, sentiment analysis, support vector machine (SVM), term frequency-inverse document frequency (TF-IDF), and *Twitter*. This cluster emphasises the use of well-established classification algorithms that remain reliable and widely applied. Core methods include SVM, Random Forest, Naïve Bayes, and Logistic Regression, all of which form the basis for supervised classification tasks. These approaches are supported by fundamental text-processing techniques such as TF-IDF, which convert textual data into quantifiable features for model training. The application focus is on sentiment analysis, particularly leveraging data from platforms like Twitter, where online interactions often reveal bullying-related sentiment and behaviour. This cluster highlights how Indian researchers have utilised accessible and effective machine learning tools to develop practical detection models, laying the groundwork for more advanced deep learning approaches in subsequent research.

The fourth cluster (Yellow), labelled *Overarching Frameworks and Security Principles*, represents the conceptual and ethical umbrella of Indian cyberbullying research, integrating the foundational disciplines and broader considerations that frame the field. Comprising six keywords: *artificial intelligence, machine learning, natural language processing, privacy, security,* and *text classification.* This cluster situates cyberbullying detection within the larger landscape of AI-driven research. It highlights the enabling disciplines of Artificial Intelligence, Machine Learning, and Natural Language Processing, which collectively provide the methodological backbone for automated detection systems. At its core, the cluster underscores *text classification* as the central task, linking the technical to the applied. Importantly, it also emphasises ethical imperatives, particularly *privacy* and *security*, reflecting the recognition that cyberbullying detection technologies must not only achieve technical accuracy but also operate within strict ethical and legal frameworks. This cluster thus represents the strategic, conceptual layer of research that bridges technical innovation and responsible, secure application.

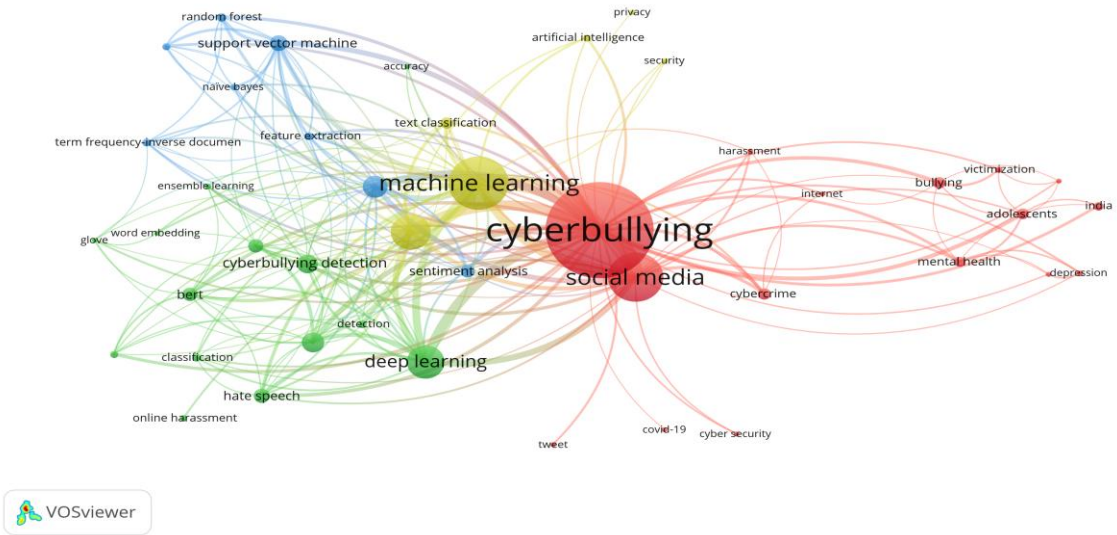


Figure 9 Author Keyword Co-occurrence analysis.

Thematic Map

The strategic map provides a clear overview of the thematic structure of cyberbullying research, positioning clusters along dimensions of centrality (relevance) and density (development) **Fig. 10**. The analysis reveals that *cyberbullying* is a motor theme, indicating it is both central to the field and well-developed, with strong connections across related topics. This highlights it as a dominant and established area of research, particularly focusing on technological interventions and the role of social media. In contrast, the *human* cluster is identified as a niche theme, suggesting it is well-developed internally but less connected to the broader research landscape. This likely reflects focused studies on human factors, such as the experiences of adolescents or specific populations, that are important but not central to the wider discourse.

Meanwhile, *mental health* appears as an emerging or declining theme, reflecting its relatively weaker integration with other areas in the dataset despite its relevance to the broader consequences of cyberbullying. This suggests that while there is growing recognition of the psychological impacts of online harassment, its connections to other research themes remain underdeveloped. Overall, the map emphasizes cyberbullying as the field's core concern, with human-focused studies forming a specialized niche and mental health research representing a developing frontier. To strengthen insights, future work should explore keyword specificity, track temporal trends, and compare across databases to assess whether themes like mental health are truly marginal or instead represent a rising research priority.

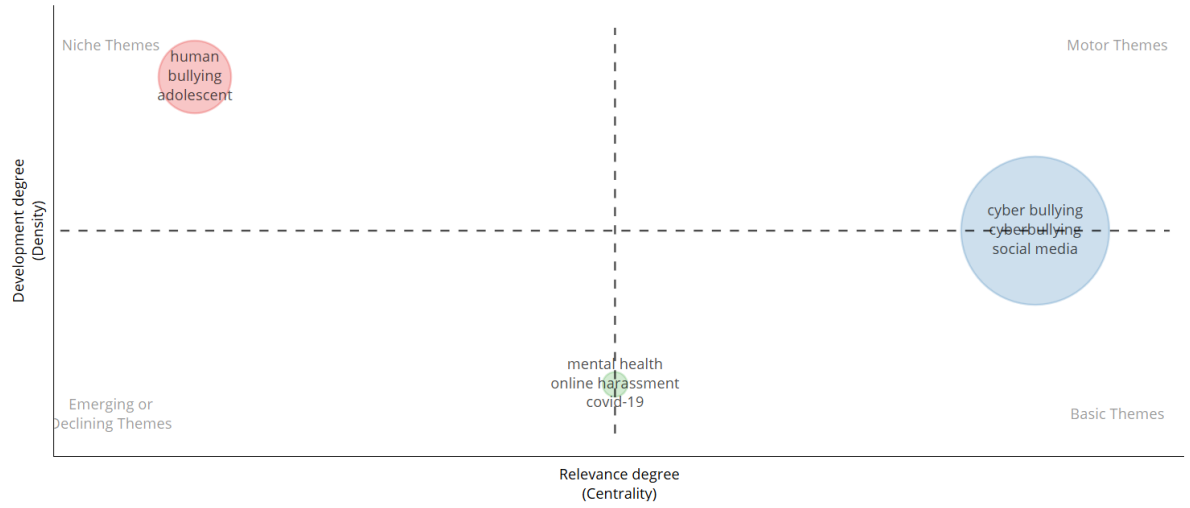


Figure 10 Thematic Map

Discussion/Conclusion

Cyberbullying has emerged as a social phenomenon which becomes more intense than traditional bullying due to anonymity and disinhibition in the cyberspace (Suler, 2004) & (Turkle, 1999). It fetched attention of scholars globally in the early 2000s after various cases in different developed countries. This bibliometric analysis confirms that Indian research engagement with this critical issue has increased significantly since 2019. Key contributors

such as Saha, Sriparna; Maity, Krishanu; and Wright, Michelle have driven a corpus of influential work spanning the prediction of offensive posts, deep learning-based detection, hate speech identification, and the analysis of workplace cyberbullying. This growth has been fundamentally collaborative, with strong ties to research networks in the United Kingdom, United States, China, Germany, Japan, and Italy.

Building on these findings, this study provides the first thorough bibliometric evaluation of this research landscape, highlighting both its significant advancements and enduring challenges. The fact that India contributes a substantial 9.25% of global publications on cyberbullying is a notable achievement given its relatively recent entry into the field. The sharp rise in publications after 2020 reflects increased social awareness, deeper digital penetration, and a growing urgency to address online harms, particularly for vulnerable populations like adolescents. The prevalence of conference papers indicates a research community actively engaged in timely dissemination, though the modest citation impact and H-index values suggest this work is still developing its influence on the global scholarly stage.

Analysis of collaboration patterns confirms India's integration into international research networks, demonstrated by a moderate collaboration index (3.69) and partnerships with 80 countries. However, these findings also highlight the need for more robust and sustained collaborations to enhance the global visibility and impact of Indian scholarship. The identification of highly prolific authors, influential publications, and leading institutions offers an evidence-based overview of existing research capacity, which can help policymakers and funding agencies better target support for emerging research groups.

Thematic mapping identified four distinct clusters: (1) socio-psychological and contextual factors of cyberbullying, (2) deep learning-based detection methods, (3) traditional machine learning frameworks, and (4) overarching AI and security principles. Together, these clusters demonstrate a multidisciplinary approach, spanning from understanding the human and psychological impacts of cyberbullying to developing advanced computational detection models. Nevertheless, the research landscape remains somewhat fragmented, with a need for more longitudinal studies and a greater focus on intervention strategies and policy-oriented outcomes.

From a societal perspective, these findings align with official cybercrime data, which show a shift from localised hotspots to a broader national concern between 2018 and 2022. This escalating threat underscores the critical need for robust, evidence-based interventions, including integrating AI-driven detection systems into social media platforms, comprehensive public awareness campaigns, and stronger digital safety regulations. Future research should prioritise developing culturally contextualised models, multilingual datasets (especially for India’s diverse linguistic landscape), and longitudinal studies to evaluate the effectiveness of interventions.

In conclusion, research on cyberbullying in India is experiencing rapid growth and increasing international recognition. By fostering stronger collaborations, prioritising interdisciplinary approaches, and translating research findings into actionable policies, India can significantly

advance the global scientific understanding of cyberbullying and mount an effective societal response to this pervasive digital-age challenge.

Limitations of the study

Although the present study makes a significant contribution to the literature, it is still subject to certain limitations. Since this study is based on the Scopus database, it excludes articles from other databases like WoS, Dimensions, etc. Future researchers may consider incorporating data from the excluded databases. Also, the present study is limited to journal publications and excludes grey literature. Given the increasing trend in research based on grey literature, researchers in the future may study the performance of literature either solely on grey literature or by combining grey and white literature for a more in-depth understanding. Further, the decision to include studies that comprise both victims and perpetrators, as well as those based solely on perpetrators, may have introduced bias. Hence, this might limit the explanation of the results to some extent. We also recommend that future researchers conduct a systematic literature review to analyse the contents and variables used in the studies. Further, future researchers are recommended to explore: a) the conditions or factors that can hinder an individual from engaging in the pro-cyberbullying behaviours, (b) present-day scales and inventories that can be used to assess cyberbullying attitudes or develop one, (c) analyse the intergenerational differences that affect cyberbullying attitudes and (d) explore individual-level interventions that can hinder such behaviour or attitude.

Funding Declaration

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Ethical Declaration

This study is based exclusively on bibliographic data retrieved from scholarly databases and does not involve human participants, human tissue, or identifiable personal data. Therefore, ethical approval from an institutional ethics committee was not required for this study. The research was conducted in accordance with applicable research integrity standards.

Competing Interests

The authors declare that they have no competing interests that are relevant to the content of this article.

References

Achuthan K, Nair VK, Kowalski R, et al. (2023) Cyberbullying research — Alignment to sustainable development and impact of COVID-19: Bibliometrics and science mapping analysis. *Computers in Human Behavior* 140. Elsevier Ltd.

Ademiluyi A, Li C and Park A (2022) Implications and Preventions of Cyberbullying and Social Exclusion in Social Media: Systematic Review. *JMIR Formative Research* 6(1). JMIR Publications Inc.: e30286.

Aftab A, Malik BA and Ali NP (2019) Characteristics and trends in Crowd sourcing literature: Contribution of BRICS nations. In: *Challenges in Library and Information Services: Strategies and Tools*, 2019, pp. 88–96. Unidest Education.

Agrawal S and Awekar A (2018) Deep learning for detecting cyberbullying across multiple social media platforms. In: *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 2018, pp. 141–153. Springer Verlag.

Ali PMN, Malik BA and Raza A (2018) Bibliometric analysis of literature on knowledge sharing. *Annals of Library and Information Studies* 65(4): 217–227.

Aria M and Cuccurullo C (2017) bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics* 11(4). Elsevier Ltd: 959–975.

Balakrishnan V, Khan S and Arabnia HR (2020) Improving cyberbullying detection using Twitter users' psychological features and machine learning. *Computers and Security* 90. Elsevier Ltd.

Bansal S, Garg N, Singh J, et al. (2023) Cyberbullying and mental health: past, present and future. *Frontiers in Psychology* 14: 1–19.

Bansal S, Garg N and Singh J (2023) Perpetrators' perspective on cyberbullying: a qualitative systematic review with bibliometric analysis. *Library Hi Tech* 43(1): 423–455.

Barragán Martín AB, Molero Jurado M del M, Pérez-Fuentes M del C, et al. (2021) Study of cyberbullying among adolescents in recent years: A bibliometric analysis. *International Journal of Environmental Research and Public Health* 18(6): 1–11.

Belsey B (2004) 'Always On? Always Aware!' Available at: https://cyberbullying.ca/ (accessed 19 August 2025).

Bohra A, Vijay D, Singh V, et al. (2018) *A Dataset of Hindi-English Code-Mixed Social Media Text for Hate Speech Detection*. Available at: https://github.com/deepanshu1995/HateSpeech-Hindi-.

Bruns A (2008) The Future Is User-Led: The Path towards Widespread Produsage. *The Fibreculture Journal* (11): 1–10.

Cáceres-Reche M-P, Hinojo-Lucena F-J, Ramos Navas-Parejo M, et al. (2019) The phenomenon of cyberbullying in the children and adolescents population: A scientometric analysis. *Research in Social Sciences and Technology* 4(2). OpenEd Network: 115–128.

Campbell MA (2005) Cyber Bullying: An Old Problem in a New Guise? *Australian Journal of Guidance & Counselling* 15: 68–76.

Castells M (2010) The Rise of the Network Society, Second Edition, With a New Preface. *The Rise of the Network Society, Second Edition, With a New Preface*. Wiley-Liss Inc.: 1–597.

Chadwick S (2014) *Impact of Cyberbullying, Building Social and Emotional Resilience in Schools*. Springer Cham.

Chavan VS and Shylaja S (2015) Machine Learning Approach for Detection of Cyber-Aggressive Comments by Peers on Social Media Network. In: *2015 International Conference on Advances in Computing, Communications and Informatics (ICACCI)*, Kochi, 4 August 2015, pp. 2354–2358. IEEE.

Cretu DM and Morandau F (2024) Bullying and cyberbullying: a bibliometric analysis of three decades of research in education. *Educational Review* 76(2): 371–404.

D'Cruz P and Noronha E (2013) Navigating the extended reach: Target experiences of cyberbullying at work. *Information and Organization* 23(4): 324–343.

Denche-Zamorano Á, Barrios-Fernandez S, Galán-Arroyo C, et al. (2023) Science Mapping: A Bibliometric Analysis on Cyberbullying and the Psychological Dimensions of the Self. *International Journal of Environmental Research and Public Health* 20(1).

Desai G (2013) *The Virtual Transformation of the Public Sphere: Knowledge, Politics, Identity*. New Delhi: Routledge.

Dinakar K, Reichart R and Lieberman H (2011) *Modeling the Detection of Textual Cyberbullying*. Available at: www.aaai.org.

Fatmawati L and Haryanto H (2023) Bibliometric Mapping Analysis of the Cyberbullying Phenomenon Among Children. *Proceedings Series on Social Sciences & Humanities* 12: 186–193.

Fazil M and Abulaish M (2018) A Hybrid Approach for Detecting Automated Spammers in Twitter. *IEEE Transactions on Information Forensics and Security* 13(11). Institute of Electrical and Electronics Engineers Inc.: 2707–2719.

Garfield E (1972) Citation Analysis as a Tool in Journal Evaluation. *Science* (178): 471–479.

Halder D and Jaishankar K (2011) Cyber gender harassment and secondary victimization: A comparative analysis of the United States, the UK, and India. *Victims and Offenders* 6(4): 386–398.

Hallikeri V, Dinesha S V. and Gouda HS (2011) Cyber sex - a newly emerging obsession | Request PDF. *International Journal of Medical Toxicology and Legal Medicine* 13(3): 13–18.

Hani J, Nashaat M, Ahmed M, et al. (2019) Social media cyberbullying detection using machine learning. *International Journal of Advanced Computer Science and Applications* 10(5). Science and Information Organization: 703–707.

Hinduja S and Patchin JW (2008) Cyberbullying: An exploratory analysis of factors related to offending and victimization. *Deviant Behavior* 29(2). Taylor & Francis Group: 129–156.

Hoff DL and Mitchell SN (2009) Cyberbullying: causes, effects, and remedies. *Journal of Educational Administration* 47(5). Emerald Publishing: 652–665.

Jain AK, Sahoo SR and Kaubiyal J (2021) Online social networks security and privacy: comprehensive review and analysis. *Complex and Intelligent Systems* 7(5). Springer International Publishing: 2157–2177.

Jaron Bedrosova M, Dufkova E, Machackova H, et al. (2024) Bias-Based Cyberaggression Related To Origin, Religion, Sexual Orientation, Gender, and Weight: Systematic Review of Young People's Experiences, Risk and Protective Factors, and the Consequences. *Trauma, Violence, and Abuse*. Epub ahead of print 2024. DOI: 10.1177/15248380241275971.

Keith S and Martin ME (2005) Cyber-Bullying: Creating a Culture of Respect in a Cyber World. *Reclaiming Children and Youth: The Journal of Strength-based Interventions* 13(4). Crisis Prevention Institute. Circulation Department, 3315 North 124th Street Suite H, Brookfield, WI 53005. Tel: 800-285-7910; Fax: 262-783-2360; e-mail: rcy@crisisprevention.com; Web site: http://www.crisisprevention.com/store/reference/rcy.html: 224.

Kowalski RM, Giumetti GW, Patchin J, et al. (2025) Cyberbullying and Social Media. In: Christakis DA and Hale L (eds) *Handbook of Children and Screens: Digital Media, Development, and Well-Being from Birth Through Adolescence*. Cham: Springer Nature Switzerland, pp. 433–438. Available at: https://doi.org/10.1007/978-3-031-69362-5_59.

Kumar R, Ojha AK, Malmasi S, et al. (2018) *Benchmarking Aggression Identification in Social Media*. Available at: https://competitions.codalab.org/.

Li Q (2007) New bottle but old wine: A research of cyberbullying in schools. *Computers in Human Behavior* 23(4). Pergamon: 1777–1791.

Lindgren Simon (2025) *Digital Media and Society*. 3rd ed. London: SAGE Publications Ltd.

López-Meneses E, Vázquez-Cano E, González-Zamar MD, et al. (2020a) Socioeconomic effects in cyberbullying: Global research trends in the educational context. *International Journal of Environmental Research and Public Health* 17(12): 1–31.

López-Meneses E, Vázquez-Cano E, González-Zamar MD, et al. (2020b) Socioeconomic effects in cyberbullying: Global research trends in the educational context. *International Journal of Environmental Research and Public Health* 17(12): 1–31.

Malik BA (2025) Tracking the citations and applications of RPYS in academic publications: insights from Scopus data. *Performance Measurement and Metrics*. Emerald Publishing. Epub ahead of print 2025. DOI: 10.1108/PMM-10-2024-0050.

Malik BA, Aftab A and Naushad Ali PM (2019) Mapping of crowdsourcing research: A bibliometric analysis. *DESIDOC Journal of Library and Information Technology* 39(1): 23–30.

Malik BA, Mushtaq M and Malik MA (2021) Research Output of Jammu and Kashmir Articles: A Scientometric Analysis Using Science Citation Index–Expanded. *Serials Librarian* 81(2). Routledge: 176–189.

Megan Meier Foundation (2007). Available at: https://www.meganmeierfoundation.org/ (accessed 19 August 2025).

Mushtaq M, Malik BA, Raza A, et al. (2020) Inclinations of Global Research on Saffron as Represented by Science Citation Index-Expanded. *Library Philosophy and Practice* (4070): 1–17.

Mushtaq M, Malik BA and Khan N (2024) Measuring the growth and impact of library and information science research in India: a multidimensional scientometric assessment. *Global Knowledge, Memory and Communication*. Emerald Publishing. Epub ahead of print 2024. DOI: 10.1108/GKMC-04-2023-0126.

Ndibalema PM (2024) The growth of cyberbullying among youth in higher learning institutions: a bibliometric analysis. *Educational Dimension* 10: 143–166.

Negroponte N (1995) *Being Digital*. Alfred a Knopf Inc.

Nguyen G, Dlugolinsky S, Bobák M, et al. (2019) Machine Learning and Deep Learning frameworks and libraries for large-scale data mining: a survey. *Artificial Intelligence Review* 52(1). Springer Netherlands: 77–124.

Olweus Dan (1978) *Aggression in the Schools: Bullies and Whipping Boys*. Hemisphere Pub. Corp. ; Distributed solely by Halsted Press.

Patchin JW and Hinduja S (2006) Bullies Move Beyond the Schoolyard: A Preliminary Look at Cyberbullying. *Youth Violence and Juvenile Justice* 4(2): 148–169.

Peker A and Yalçın RU (2022) Mapping Global Research on Cyber Bullying in the Context of Cross-Cultural Collaborations: A Bibliometric and Network Analysis. *Frontiers in Communication* 7(March): 1–7.

Pereira V, Basilio MP and Santos CHT (2025) PyBibX – a Python library for bibliometric and scientometric analysis powered with artificial intelligence tools. *Data Technologies and Applications* 59(2). Emerald Publishing: 302–337.

Pilkington A and Meredith J (2009) The evolution of the intellectual structure of operations management-1980-2006: A citation/co-citation analysis. *Journal of Operations Management* 27(3): 185–202.

Postman Neil (1993) *Technopoly : The Surrender of Culture to Technology*. New York: Random House US.

Raza A and Malik BA (2018) A Bibliometric Analysis of the Journal of Knowledge Management. *Journal of Indian Library Association* 54(2): 91–99.

Reynolds K, Kontostathis A and Edwards L (2011) Using machine learning to detect cyberbullying. In: *Proceedings - 10th International Conference on Machine Learning and Applications, ICMLA 2011*, 2011, pp. 241–244.

Roy PK, Tripathy AK, Das TK, et al. (2020) A framework for hate speech detection using deep convolutional neural network. *IEEE Access* 8. Institute of Electrical and Electronics Engineers Inc.: 204951–204962.

Saif ANM and Purbasha AE (2023) Cyberbullying among youth in developing countries: A qualitative systematic review with bibliometric analysis. *Children and Youth Services Review* 146. Elsevier Ltd.

Singh A, Rejeb A, Nangru H, et al. (2024) Global research trends on cyberbullying: A bibliometric study. *Computers in Human Behavior Reports* 16. Elsevier Ltd: 1–23.

Sood A, Sharma D, Sharma M, et al. (2024) Prevalence and repercussions of stress and mental health issues on primary and middle school students: a bibliometric analysis. *Frontiers in Psychiatry* 15. Frontiers Media SA.

Suler J (2004) The online disinhibition effect. *Cyberpsychology and Behavior* 7(3). Cyberpsychol Behav: 321–326.

Thor A, Marx W, Leydesdorff L, et al. (2016) Introducing CitedReferencesExplorer (CRExplorer): A program for reference publication year spectroscopy with cited references standardization. *Journal of Informetrics* 10(2). Elsevier Ltd: 503–515.

Tozzo P, Cuman O, Moratto E, et al. (2022) Family and Educational Strategies for Cyberbullying Prevention: A Systematic Review. *International Journal of Environmental Research and Public Health* 19(16).

Turkle S (1995) *Life on the Screen: Identity in the Age of the Interne*. Simon & Schuster.

Turkle S (1999) Cyberspace and Identity. *Contemporary Sociology* 28: 643–648.

Vaidhyanathan S (2018) *Antisocial Media: How Facebook Disconnects Us and Undermines Democracy*. United Kingdom: Oxford University Press.

Vaidya P, Malik BA and Ali PMN (2021) Characteristics and Trends in Literature of Library Service Quality as Reflected in Scopus. *Serials Librarian* 81(2). Routledge: 145–175.

van Eck NJ and Waltman L (2010) Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics* 84(2). Springer Netherlands: 523–538.

Yuvaraj N, Srihari K, Dhiman G, et al. (2021) Nature-Inspired-Based Approach for Automated Cyberbullying Classification on Multimedia Social Networking. *Mathematical Problems in Engineering* 2021. Hindawi Limited.

Zampieri M, Malmasi S, Nakov P, et al. (2019) Predicting the Type and Target of Offensive Posts in Social Media. In: *Proceedings of NAACL-HLT 2019*, Minneapolis, 2019, pp. 1415–1420. Association for Computational Linguistics. Available at: http://bit.ly/2FhLMVz.

Zhu C, Huang S, Evans R, et al. (2021) Cyberbullying Among Adolescents and Children: A Comprehensive Review of the Global Situation, Risk Factors, and Preventive Measures. *Frontiers in Public Health* 9(March): 1–12.