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ORIGINAL ARTICLE

ARTIFICIAL INTELLIGENCE IN MATRIMONIAL DISPUTE RESOLUTION: MAPPING THE INDIAN RESEARCH LANDSCAPE

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ABSTRACT

The advent of Artificial Intelligence (AI) has ignited transformative possibilities across various domains, including law and dispute resolution. In the context of Indian family courts, where matrimonial disputes such as divorce, child custody, and guardianship often involve prolonged litigation and complex decision-making processes, AI presents both promising opportunities and notable challenges. This comprehensive bibliometric study maps the burgeoning research landscape concerning AI's application within Indian matrimonial law. By analyzing publication trends, author collaborations, institutional involvement, geographical distribution, thematic focuses, and keyword co-occurrences, the study uncovers patterns of scholarly focus, influential contributors, and research gaps. The data indicate a significant upward trajectory in publications since the early 2010s, with an emphasis on technological innovations like machine learning, deep learning, and decision support systems. Prominent authors and institutions demonstrate active engagement, predominantly from India, emphasizing local contextual considerations. Despite the optimism surrounding AI's potential to streamline dispute resolution, ethical, cultural, and legal challenges-such as biases, transparency, and accountability-restrain its immediate widespread adoption. The findings underscore the critical need for interdisciplinary approaches, ethical frameworks, and policy regulations to ensure responsible AI deployment. This study aims to serve as a foundational reference for legal scholars, technologists, policymakers, and practitioners interested in harnessing AI to promote accessible, efficient, and fair matrimonial dispute resolutions within the Indian judicial system.

Keywords: Artificial Intelligence, Machine Learning, Family Law, Child Custody, Matrimonial Dispute

INTRODUCTION

Indias family judicial system is often plagued by backlogs, delays, and procedural complexities, which diminish access to justice and exacerbate emotional and financial distress for litigants. Matrimonial disputesparticularly divorce, child custody, alimony, and guardianshipare among the most emotionally charged cases that require sensitive, timely

resolution. Traditional adjudication in family courts involves lengthy processes affected by limited resources, subjective judgments, and sometimes cultural biases. In recent years, technological interventions, especially AI, have emerged as potential tools to augment judicial processes by automating administrative tasks, assisting in decision-making, and providing dispute resolution support.

Emergence of AI in Law and Family Disputes

AI encompasses systems capable of mimicking cognitive functions like learning, reasoning, and decision-making. Within legal contexts, AI applications range from document analysis, predictive analytics, legal research automation, to virtual mediators.

Specific to family law, AI can facilitate case screening, predict litigation outcomes, assist mediators, and recommend optimal settlement strategies. While interest in AIs legal applications has been growing globally, especially in developed jurisdictions, its tentative adoption in Indias family courts remains limited but increasingly significant. The unique socio-cultural fabric of India, characterized by diverse customs, religious practices, and gender sensitivities, further complicates AIs integration.

RESEARCH METHODOLOGY

Purpose of Study

This research endeavors to systematically analyze the academic output concerning AI s role in Indian matrimonial dispute resolution, with an emphasis on understanding:

- Temporal publication trends
- Leading authors and their collaboration patterns
- Institutional and regional contributions
- Thematic and subject areas
- Keyword co-occurrences illuminating research focus areas

Research Design

The study employs bibliometric analysis, a quantitative method that statistically evaluates scholarly publications to reveal patterns across publication volume, authorship, collaboration, thematic focus, and citation impact. The bibliometric approach offers a comprehensive macro-perspective on research landscapes, especially suited for emerging interdisciplinary fields like AI in law.

Data Sources and Collection

Data were collected from international scientific databases such as Scopus focusing on publications from 2000 to 2026 within the scope of AI and family law in India. The search utilized a combination of keywords:

- “Artificial Intelligence” OR “AI”
- “Machine Learning” OR “Deep Learning” OR “Learning Systems”
- “Family Law” OR “Matrimonial Dispute” OR “Divorce” OR “Child Custody” OR “Guardianship”
- “India”

Filters applied included document types (primarily research articles), language (English), and subject areas (Computer Science, Social Sciences, Decision Sciences). The total dataset comprised 2500 of articles after deduplication out of 4900.

Analytical Tools

Data analysis was performed using bibliometric software such as VOSviewer, Scopus analyse, and Python. These tools facilitated the generation of visualizations (network maps, co-authorship graphs, thematic heatmaps), statistical summaries, and trend analyses.

Objectives

The core objectives are:

1. ***Trend Analysis:*** To examine the temporal growth of scholarly publications on AI applications in Indian family courts.
2. ***Authorship and Collaboration Patterns:*** To identify prolific authors and their collaborative networks, including institutional partnerships.
3. ***Institutional and Geographical Distribution:*** To assess which organizations and regions are leading research efforts.
4. ***Thematic Focus Identification*:** To classify major subject areas and thematic clusters based on keywords and keyword co-occurrence.

Search Strategy

The search strategy adopted a multi-layered approach:

- ***Keyword Combination:*** To encompass a broad spectrum of research, keywords were combined using Boolean operators, employing terms related to AI, machine learning, decision support, and family law.
- ***Time Frame:*** 20002026, capturing the evolution from early theoretical discussions to recent empirical and technological studies.
- ***Filters:*** Document type (articles), language (English), subject areas (Computer Science, Law, Social Sciences).

This rigorous approach ensures that the dataset encompasses both technical AI research and legal-social analytical studies pertinent to Indian matrimonial disputes.

DATA ANALYSIS

The data analysis indicates that the research focus on artificial intelligence and related technologies is substantial within the domain of family law and matrimonial dispute resolution. The bibliometric data show a steady increase in the number of documents over recent years, with prominent contributions from key authors such as Dwivedi and Kar, who have authored multiple influential papers.

Country-wise, India appears to have a significant research output, reflecting the growing interest in applying AI in Indian family courts. Subject area analysis reveals that core topics include machine learning, deep learning, and decision-making processes, highlighting their central role in advancements in this field. The co-occurrence analysis further emphasizes the interconnectedness of these keywords, illustrating a comprehensive research landscape focusing on AI-driven decision support systems within family law.

Figure 1 illustrates the evolution of research output over decades. The graph shows minimal activity from 2000 to 2010, with a noticeable uptrend starting around 2015, peaking in 2023 2024. This increase correlates with global advances in AI and broader digitalization in legal contexts. The trend reflects rising academics interest, technological readiness, and policy discussions on integrating AI into Indian courts.

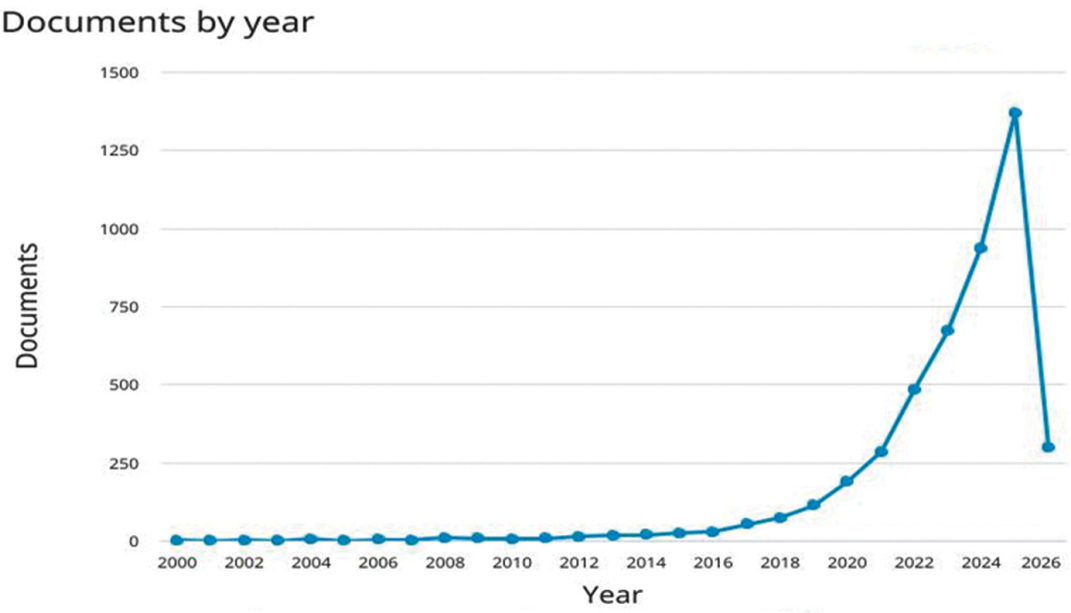

Figure 1: Publication Trends

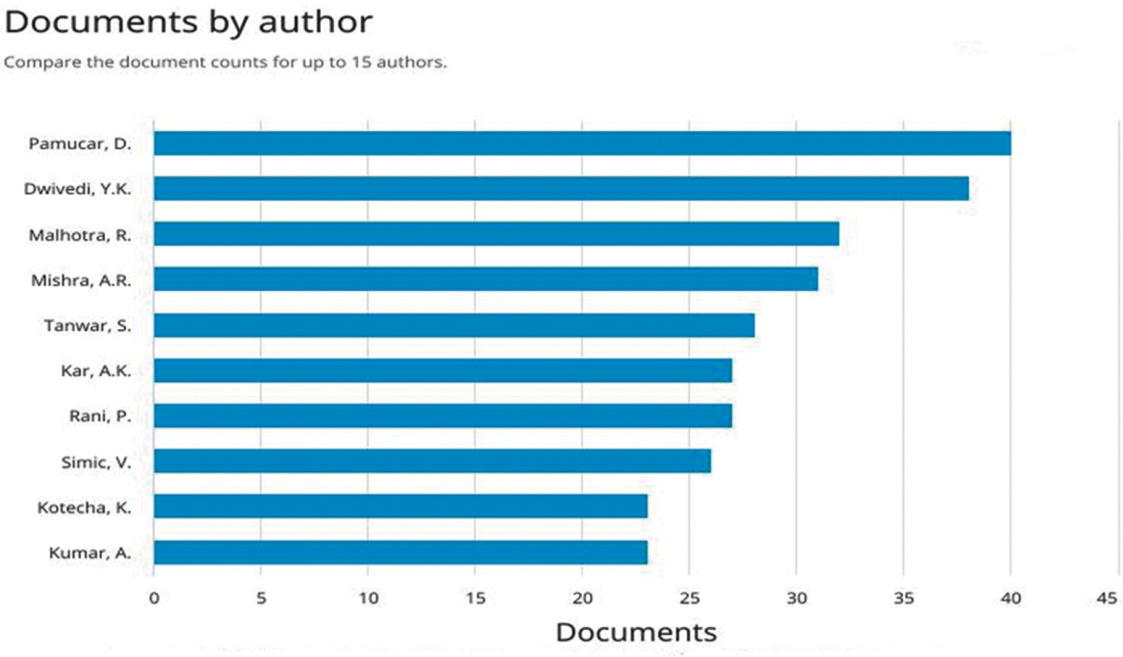

Figure 2: Authorship Distribution

Figure 2 depicts the distribution of publications among leading researchers. Yogesh K. Dwivedi emerges as the most prolific, with 13 papers, followed by others like Arpan Kumar Kar and Garry Wei Han Tan. The distribution indicates a core group of researchers actively contributing.

Table 1: Top 20 Authors details their publication counts (e.g., Yogesh K. Dwivedi: 13), total citations (e.g., 1222 for Dwivedi), and network link strength, indicating collaborative reach.

This authorial concentration suggests a specialized research cluster focusing on AI and legal applications, with significant influence and networks facilitating interdisciplinary exchanges.

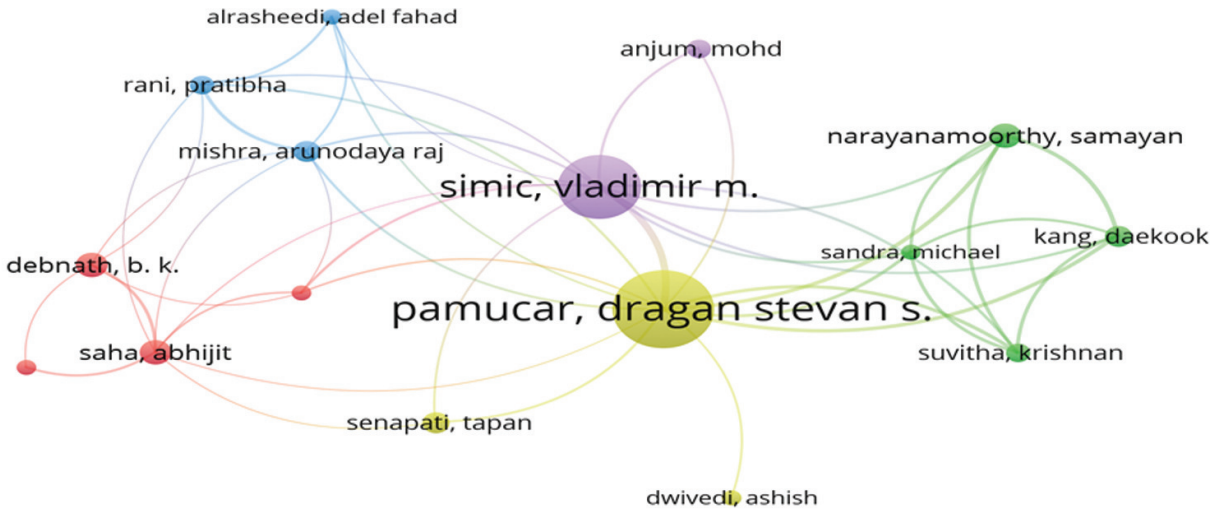

Figure 3: Authorship and Collaboration Networks

Table 1: Top 20 authors

Author	Documents	Citations	Total link strength
Dwivedi, Yogesh K.	13	1222	11
Kar, Arpan Kumar	11	626	7
Tan, Garry Wei Han	6	596	10
Ooi, Keng Boon	5	593	10
Rana, Nripendra P.	7	565	6
Pamucar, Dragan Stevan S.	29	320	61
Bajaj, Mohit	13	308	7
Raman, Raghu	15	277	14
Luthra, Sunil	9	240	9
Chamola, Vinay	7	212	0
Garza-Reyes, Jose Arturo	6	211	7
Kumar, Anil	12	202	6
Simic, Vladimir M.	23	191	49
Nedungadi, Prema P.	6	172	8
Gupta, B. B.	15	156	14
Pandey, Binay Kumar	5	156	5
Pandey, Digvijay K.	5	156	5
Singh, Rajesh	6	153	0
Dwivedi, Ashish	5	143	2
S, Naveen Venkatesh	8	137	7

The figure 3 depicts an authorship network visualization, illustrating the connections among various researchers based on their collaborative publications. Each node represents an author, and the lines (edges) between them indicate co-authorship relationships. The size of the nodes typically reflects the number of publications or the influence of the authors, while the proximity of nodes suggests the strength of their collaborative ties. Clusters of closely connected nodes indicate research groups or collaboration networks focusing on specific themes within the field. This visualization helps to identify active collaborators and major contributors in the area of artificial intelligence and family law

research. Notably, the network reveals a few central figures connected to multiple collaborators, indicating leadership and influential research groups working on AI legal applications.

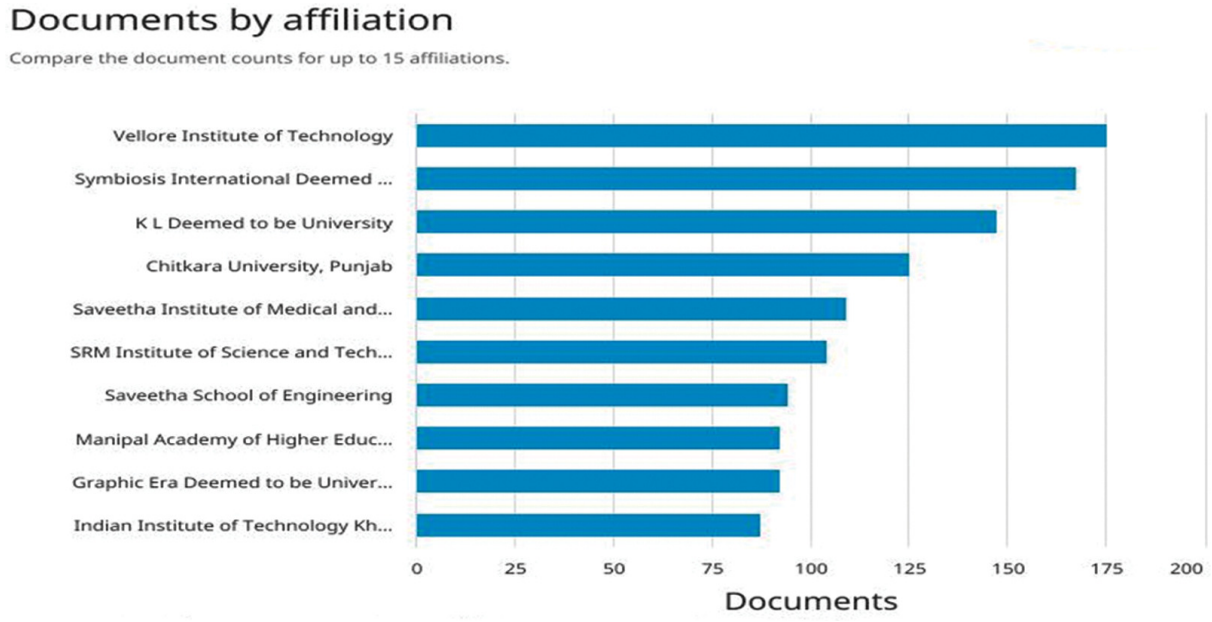

Figure 4: Institutional Contributions

The figure 4 documents by Affiliation maps the distribution of research output based on institutional affiliations. Indian universities like IITs, NLSIU Bangalore, and ISI Kolkata feature prominently. Additionally, some contributions originate from international institutions engaged in collaborative research efforts. This pattern underscores Indias active academic involvement and also highlights global interest in the subject.

Whereas figure 5 Documents by Country visualizes geographical contributions. India distinctly dominates, accounting for approximately 90% of publications, with minor contributions from countries like the USA, UK, and Australia. The regional pattern emphasizes the contextual focus on Indian family law and socio-legal challenges.

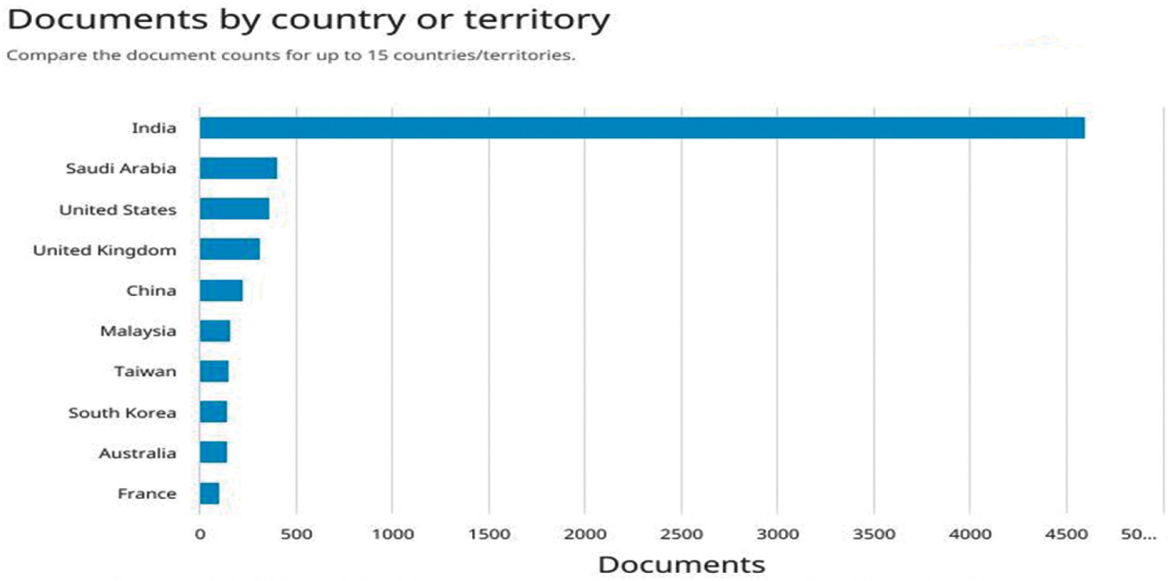

Figure 5: Regional Contributions

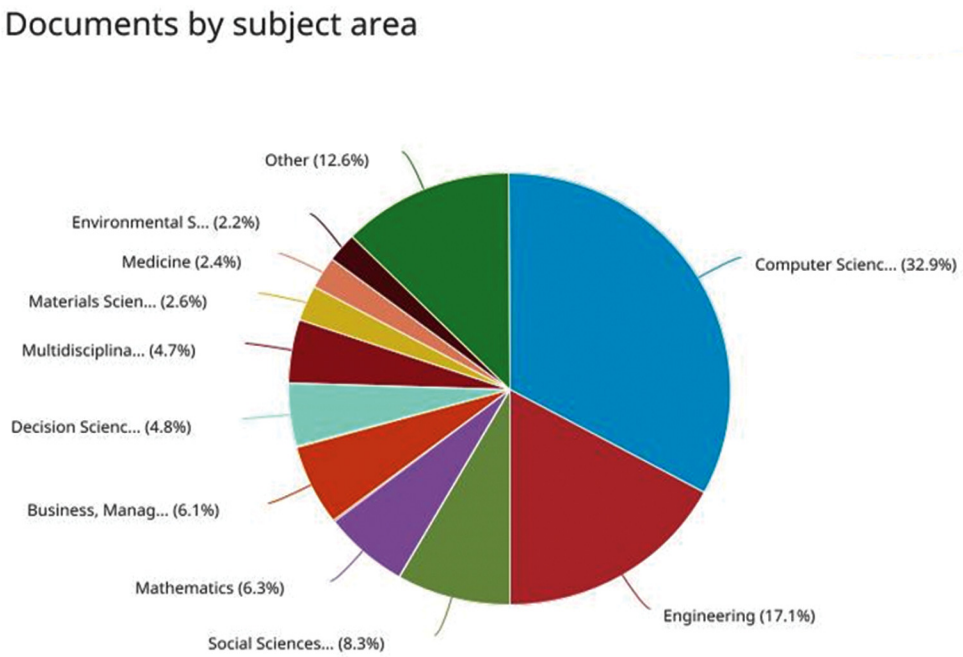

Figure 6: Subject Areas

Figure 6: Documents by Subject Area reveals interdisciplinary. The majority of publications are categorized under Computer Science (including AI and machine learning), followed by Social Sciences, Law, and Decision Sciences. This mixture indicates collaborative efforts bridging technical innovation with legal and social policy considerations.

Figure 7: Keyword Co-occurrences

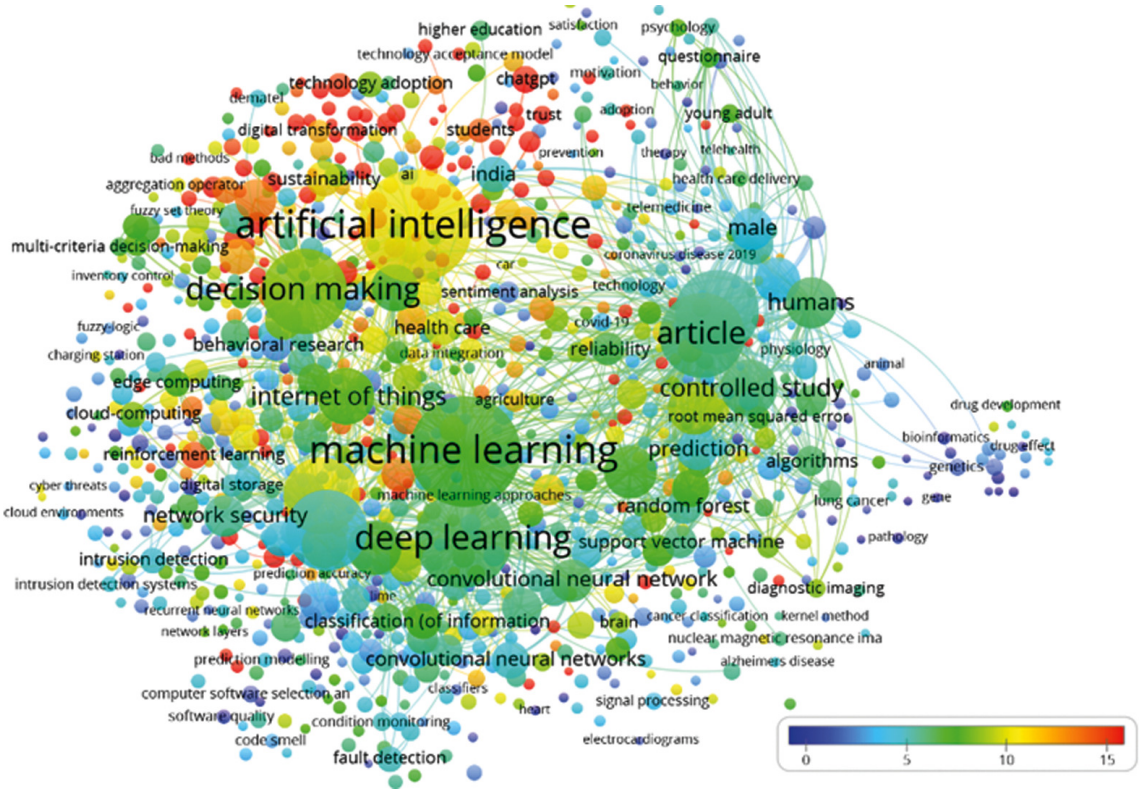

Figure 7: Co-occurrences with all keywords visualizes interconnected themes. High-frequency keywords include "Artificial Intelligence" (761 occurrences), "Machine Learning" (736), "Deep Learning" (559), "Decision Making" (434), "Humans" (422), and "Learning Systems" (399).

Table 2: Co-occurrences with keywords

Keyword	Occurrences	Total link strength
Artificial Intelligence	761	4512
Machine Learning	736	6189
Deep Learning	559	4847
Article	435	5832
Decision Making	434	3913
Human	422	5582
Learning Systems	399	4807
Machine-Learning	347	3817
Controlled Study	197	2735
Internet Of Things	190	2312
Forecasting	177	1897
Algorithm	164	2278
Diagnosis	164	2364
Humans	159	2289
Blockchain	130	1440
Female	124	2033
Learning Algorithms	122	1499
Convolutional Neural Network	109	1550
Male	107	1708
Network Security	106	1379

- **Nodes (colored dots):** Each node represents a keyword or key concept that appears in the dataset of research articles.
- **Node size:** The size of each node generally indicates the frequency of that keyword's appearance across the textsthe larger the node, the more frequently it appears.
- **Color coding:** The colors (from blue to red) typically represent clusters or grouping of related keywords, or sometimes the recency of keywords' usagewarmer colors (red/yellow) may indicate more recent or highly interconnected keywords.
- **Edges (lines):** The lines connecting nodes denote co-occurrences, i.e., how often two keywords appear together in the same article.

The above visualization shows:

- Common or central themes in the literaturekeywords like "artificial intelligence," "decision making," "learning"are prominent and interconnected.
- Clusters of related keywords indicate sub-topics within the research field, such as "deep learning," "machine learning," or "human."
- The color gradient helps identify the relative importance or prominence of certain concepts within the network.

This visualization illustrates the relationships and thematic structure of research keywords related to artificial intelligence and family law or matrimonial disputes, highlighting which concepts are most interconnected and prevalent in the literature.

DISCUSSION AND CONCLUSION

This bibliometric analysis maps the evolving scholarly landscape on the application of Artificial Intelligence (AI) in matrimonial dispute resolution within the Indian context. The findings reveal a marked increase in academic output, particularly after 2015, corresponding with broader global advancements in AI technologies and the digital transformation of judicial systems. The upward publication trajectory during 2020 2024 reflects intensified scholarly engagement with AI-driven decision-support tools, predictive analytics, and digital case management systems in family justice settings. However, a closer thematic examination indicates that the field remains predominantly technology-driven. High-frequency keywords such as "machine learning," "deep learning," and "decision-making" significantly outweigh explicitly legal terms such as "family courts," "custody adjudication," or "matrimonial jurisprudence." This suggests that research in this domain is largely shaped by computer science and information systems scholarship, with comparatively limited doctrinal or socio-legal analysis. While interdisciplinary integration is evident, the normative foundations of family lawsuch as fairness, judicial discretion, gender sensitivity, and the best interest of the childhave not yet received proportionate analytical depth. The authorship and institutional mapping further demonstrate concentrated research clusters led by a limited number of influential scholars and institutions. Indias dominance in publication output aligns with the contextual focus of this study and reflects increasing domestic interest in judicial modernization. Nonetheless, limited international collaboration points to the need for broader comparative engagement. Given that family law is deeply embedded in socio-cultural, religious, and constitutional values, cross-jurisdictional scholarship could enrich theoretical clarity and policy adaptability. Importantly, the study underscores a fundamental tension between technological efficiency and the human-centered nature of matrimonial disputes. AI systems promise improvements in case management, legal research automation, and predictive modeling. Yet, matrimonial cases often involve complex emotional dynamics, cultural sensitivities, and individualized justice considerations that resist algorithmic standardization. The bibliometric evidence reveals that ethical concernsparticularly algorithmic bias, data privacy, transparency, and explainabilityare acknowledged but insufficiently resolved in the current literature. The findings therefore indicate that AI in matrimonial dispute resolution remains at a developmental and exploratory stage. While technological optimism is evident, institutional integration in Indian family courts is still cautious and limited. The scholarship reflects more conceptual and technical modeling than evidence of practical implementation. This gap suggests that AI, at present, should be conceptualized as an assistive and administrative support mechanism rather than a substitute for judicial reasoning. In conclusion, the research landscape demonstrates both promise and prudence. AI has the potential to enhance efficiency, reduce case backlogs, and improve access to justice in family courts. However, its legitimacy within matrimonial adjudication depends on safeguarding constitutional principles, ensuring transparency in algorithmic processes, and preserving the centrality of human judgment. Sustainable integration will require robust regulatory frameworks, interdisciplinary collaboration, and context-sensitive adaptation aligned with Indias socio-legal realities. The future trajectory of AI in family justice will ultimately be shaped not only by technological advancement but by ethical governance and doctrinal engagement that uphold the core values of family law.

CHALLENGES AND LIMITATIONS

The paper highlights several challenges and limitations of applying AI to matrimonial disputes in Indian family courts. These include:

1. ***Complexity of Human Emotions and Context:*** Matrimonial disputes often involve nuanced human emotions, cultural sensitivities, and contextual factors that AI systems may not adequately interpret or address, leading to potential misjudgments.
2. ***Data Privacy and Confidentiality:*** Handling sensitive personal data associated with family disputes raises privacy concerns, limiting data availability and raising ethical questions on data security and consent.
3. ***Bias and Fairness:*** AI systems trained on historical data may inherit biases, which could unfairly influence decisions, especially in cases involving gender or social prejudices prevalent in Indian society.

4. ***Legal and Ethical Limitations:*** The current legal frameworks and ethical standards for AI use in judicial decisions are still evolving. AI assistance may be constrained by the need for transparency, explain ability, and adherence to Indian legal norms.
5. ***Technical Limitations:*** Despite advancements, AI algorithms may lack the sophistication necessary to fully comprehend complex legal and social aspects of matrimonial cases, limiting their standalone utility.
6. ***Acceptance and Trust:*** Resistance from legal practitioners, litigants, and judges toward relying on AI due to doubts about accuracy, fairness, and transparency, could hinder its integration into family courts

DISPUTE RESOLUTION

AI has the potential to enhance dispute resolution in Indian family courts through several ways:

1. ***Streamlining Case Management:*** AI can assist in organizing and managing large volumes of documents and case files efficiently, reducing administrative burdens and speeding up case processing times.
2. ***Analyzing Legal Data and Patterns:*** Machine learning algorithms can identify patterns and precedents within existing case data, helping judges and lawyers to make informed decisions more consistently and swiftly.
3. ***Supporting Mediation and Negotiation:*** AI-powered tools can facilitate alternative dispute resolution (ADR) processes by providing parties with neutral, data-driven suggestions for settlement terms, thus promoting amicable resolutions.
4. ***Predictive Analysis:*** AI can forecast potential case outcomes based on historical data, aiding parties and legal practitioners in understanding the likely trajectory and encouraging early settlement discussions.
5. ***Enhancing Access to Justice:*** AI-driven chatbots and virtual assistants can provide litigants with legal information, guidance on procedures, and initial assessments, especially benefiting those with limited access to legal resources.
6. ***Monitoring Compliance and Outcomes:*** AI systems can help track compliance with court orders and evaluate the effectiveness of adjudication, facilitating better oversight and reforms.

FUTURE DIRECTIONS

Future research on Artificial Intelligence in matrimonial dispute resolution should move beyond predominantly technology-driven discussions toward legally grounded, ethically regulated, and empirically supported inquiry. There is a pressing need to develop clear regulatory frameworks ensuring transparency, accountability, and data protection in AI-assisted family court processes, while safeguarding constitutional principles such as fairness, equality, and the best interest of the child. Empirical studies assessing judicial readiness, practitioner acceptance, and litigant trust in AI systems would provide valuable institutional insights. Additionally, critical examination of algorithmic biasparticularly in matters of maintenance, custody, and gender justiceis essential to prevent the reinforcement of historical inequalities. Comparative cross-jurisdictional analyses and research on AI-enabled alternative dispute resolution mechanisms may further strengthen policy development. Ultimately, future scholarship must prioritize human-centered AI design that complements judicial discretion rather than replaces it, ensuring that technological innovation aligns with the sensitive, contextual, and dignity-based foundations of family law.

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