Emerging Trends and Insights: A Comprehensive Bibliometric Analysis of Artificial Intelligence Applications in Healthcare and Psychology

Abstract

Purpose—This study provides a comprehensive bibliometric analysis of advancements in Artificial Intelligence in Healthcare and Psychology (AIHCP), focusing on emerging trends and their implications for future research and practice. Given the rapid developments in AI technologies and their applications in these fields, a detailed examination of research patterns and thematic areas is critical.

Design/methodology/approach—Using a two-stage filtering process, we analyzed 1,499 documents from 1960 to 2023, narrowing down to 1,362 documents published between 2013 and 2023, and further focusing on 11 publications from 2018–2023. Data were retrieved from the Scopus database, and analyses included frequency distribution by journals, authors, countries, and organizations, as well as network visualization of co-occurring keywords. Thematic clusters were identified using VOSviewer software, and text mining/mapping of abstracts was conducted for deeper insights.

Findings—We identified seven thematic clusters, including AI technological capabilities, healthcare security, psychological interventions, and the role of chatbots and machine learning. Key findings reveal the evolving focus of research, highlighting opportunities for innovation and addressing existing challenges. These clusters provide a global overview of the trends and underline the potential of AI in transforming healthcare and psychology.

Originality/value—This study offers a unique perspective by combining bibliometric analysis with text mining to explore AIHCP trends comprehensively. The findings serve as a foundation for future research, emphasizing the integration of AI technologies into healthcare and psychology practices while addressing critical gaps and opportunities.

Keywords: Bibliometric analysis, Artificial Intelligence, Healthcare, Psychology, Text mining, VOSviewer, Scopus

Introduction

Artificial intelligence (AI) is a fast-changing field of computer science that involves developing algorithms and systems capable of carrying out tasks that usually require human intelligence (Littman et al., 2022). It is the study of how computers can learn and reason, perceive and interact with the world, and solve complex problems using a variety of approaches, including machine learning, deep learning, natural language processing, and computer vision (Sarker, 2021). AI aims to create machines that can operate autonomously, make data-based decisions, and adapt to new situations and environments (Khayyam, Javadi, Jalili, & Jazar, 2020). AI can potentially revolutionize many aspects of our lives, including healthcare, transportation, finance, education, and entertainment (Diamandis & Kotler, 2020). With the increasing availability of data and computing power, AI has become more accessible to businesses, researchers, and individuals, leading to a surge in innovation and development (Affandi & Talmees; Mhlanga, 2021). AI can be divided into two general categories: strong AI and narrow

AI (Kalanderian & Nasrallah, 2019). AI systems built for a single purpose, such as image recognition or natural language processing, are called narrow AI (Gil, Hobson, Mojsilović, Puri, & Smith, 2020). These highly specialized systems can perform their tasks with great accuracy and speed. On the other hand, general AI refers to systems that can perform a wide range of tasks and reason and learn like humans (Gunning & Aha, 2019). General Artificial intelligence is still in its formative stages, and researchers are working towards creating systems that can mimic human intelligence more holistically. Despite AI's potential benefits, concerns about its impact on employment, privacy, and safety exist. As AI systems become more capable, there are fears that they may replace human workers, exacerbate existing inequalities, and be used to perpetrate cyberattacks. AI can revolutionise healthcare by improving diagnosis, treatment, and patient outcomes (Farina, Zhdanov, Karimov, & Lavazza, 2022).

A chatbot is computer software designed to mimic human communication; it is typically used in message or chat interfaces. (Adam, Wessel, & Benlian, 2021). Chatbots enable more human-like interactions between users and themselves by utilizing natural language processing (NLP) to comprehend user inputs and provide relevant responses. (Bharti et al., 2020). Chatbots can be divided into two categories: those relying on rules and those using machine learning. Using predetermined rules and responses, rule-based chatbots produce responses to user inquiries. They are simple and easy to build but limited in understanding complex inputs and generating natural-sounding responses. Conversely, chatbots that are based on machine learning employ algorithms to gain knowledge from user interactions and enhance their responses over time (Rajabi, George, & Kumar, 2024). They need a lot of training data and are more difficult to construct. But they can also offer more tailored and precise solutions, which are getting increasingly well-liked across a range of sectors, such as healthcare, e-commerce, and customer service. They can help businesses automate customer support, improve response times, and provide personalized assistance to customers (Maher, Bhable, Lahase, & Nimbhore, 2022). For example, chatbots help patients schedule appointments, receive medication reminders, and provide information about symptoms and treatments (Palanica, Flaschner, Thommandram, Li, & Fossat, 2019). The use of chatbots in mental health interventions is a promising area of research, with evidence suggesting that they can provide adequate support and therapy for various mental health concerns (Boucher et al., 2021).

Healthcare and psychology are interrelated fields crucial for promoting and maintaining physical and mental health (Abdul, Adeghe, Adegoke, Adegoke, & Udedeh, 2024; Gruber et al., 2021). Healthcare involves preventing, diagnosing, and treating illnesses and medical conditions, while psychology is the scientific study of human behavior and mental processes. Psychology is an essential component of healthcare because it helps healthcare professionals understand how patients think, feel, and behave (Ho, Chee, & Ho, 2020). It can inform the development of effective treatments and interventions that address not only the physical symptoms of an illness but also the emotional and psychological effects it may have on patients. For instance, mindfulness-based interventions and cognitive-behavioural therapy (CBT) are psychological therapies that are useful in treating a variety of mental health issues, including depression, anxiety, and post-traumatic stress disorder (Apolinário-Hagen, Drüge, & Fritsche, 2020). In addition, understanding the psychological factors that influence health behaviors, such as diet and exercise, can help healthcare professionals develop interventions that promote healthy habits and prevent chronic diseases (Abdurahmonova, 2024; Tabrizi et al., 2024).

However, the dynamic and multidisciplinary nature of AIHCP necessitates a systematic approach to understanding emerging trends and research priorities. Identifying trends in AIHCP is crucial for several reasons. First, it enables researchers and practitioners to recognize key areas of innovation and their practical implications. Second, it provides insights into existing challenges and research gaps, guiding future studies toward impactful discoveries. Finally, tracking these trends helps policymakers and stakeholders align technological advancements with societal needs, ensuring ethical and equitable AI applications. Bibliometric analysis is particularly well-suited for studying AIHCP trends due to its ability to quantitatively assess large volumes of academic literature. By analyzing citation patterns, keyword occurrences, and collaborative networks, this approach provides a comprehensive overview of the field's evolution. Moreover, bibliometric methods facilitate the identification of influential works, authors, and institutions, highlighting the global distribution of research efforts. This study addresses the following research questions:

1. What are the emerging trends in AI applications in healthcare and psychology?

2. How do these trends inform future research priorities and practical implementations?

3. What thematic clusters can be identified through bibliometric analysis, and what do they reveal about the field's current state and future direction?

By exploring these questions, the study aims to contribute to a deeper understanding of AIHCP and its transformative potential in healthcare and psychology.

Literature Review

Several recent studies have explored the use of AI in healthcare, including machine learning and deep learning algorithms. For example, a study by Kim et al. (2020) used deep learning algorithms to predict patient outcomes based on electronic health record data. The study found that the algorithm could predict patient outcomes with high accuracy, demonstrating the potential of AI in improving patient care. Another study by Zhu et al. (2021) used a machine learning algorithm to predict sepsis in patients based on vital signs and laboratory data. The algorithm could accurately predict sepsis several hours before it was clinically diagnosed, allowing for earlier intervention and treatment. AI has also been used in diagnostic imaging, including radiology and pathology. For example, a study by Lotter et al. (2021) used a deep learning algorithm to accurately detect breast cancer on mammograms, demonstrating the potential of AI in improving the accuracy and efficiency of a cancer diagnosis. AI is also increasingly used in psychology, particularly in developing mental health interventions and digital therapies. For example, the study found that the chatbot intervention effectively reduced symptoms of depression and anxiety, demonstrating the potential of AI in delivering accessible and effective mental health care. AI is also used to develop digital therapies for various mental health conditions. For example, a study by Chekroud et al. (2021) used a machine learning algorithm to develop a personalized digital therapy for depression, which was found to be effective in reducing symptoms of depression in patients. AI is also used to improve the accuracy of psychological assessments and diagnoses. For example, a study by Vakadkar, Purkayastha, and Krishnan (2021) used a machine learning algorithm to accurately predict the diagnosis of autism spectrum disorder in children based on standardized assessments, demonstrating the potential of AI in improving the accuracy and efficiency of psychological evaluation. AI in healthcare and psychology can transform these fields by improving diagnosis, treatment, and patient outcomes.

Metric studies refer to the quantitative analysis and measurement of various phenomena using standardized methods and instruments(Wu et al., 2023). These studies involve collecting and analyzing data to determine a particular phenomenon or behaviour's magnitude, frequency, and distribution. Metrics are commonly used in many fields, including business, economics, health, social sciences, and technology. For example, health metrics are used to me outcomes, such as life expectancy, mortality rates, disease prevalence, and risk factors (Lelieveld et al., 2020). Metric studies play a crucial role in decision-making, planning, and evaluation in many fields, helping to provide valuable insights and improve performance (Schildkamp, 2019). Bibliometrics is a study involving quantitative analysis of academic literature, including books, articles, and other forms of research output (Kirtil & Aşkun, 2021). It has become an increasingly popular method for evaluating research impact, identifying trends and patterns in scholarly communication, and informing research funding decisions. The field is based on key concepts, including citation analysis, impact factor, and h-index. In addition, it employs data collection and analysis methods, such as Web of Science, Scopus, and Google Scholar. Bibliometrics has numerous applications in academia and beyond, including research evaluation, knowledge discovery, and policy making. However, the field has also been subject to criticisms and limitations, such as the potential influence of self-citations, editorial policies, and publication biases on bibliometric indicators. Despite these challenges, bibliometrics remains a valuable tool for understanding the complex dynamics of academic publishing and the impact of research on society. Ongoing developments in the field, such as integrating metrics and social media metrics, will likely continue to shape the future of bibliometrics and its applications in research and policymaking.

Bibliometrics and artificial intelligence are increasingly being applied in health psychology better to understand the impact and dissemination of research findings. By utilizing advanced algorithms and natural language processing techniques, AI can analyze vast amounts of scholarly literature and identify patterns and trends in research. Bibliometric analysis can identify gaps in the literature, inform research priorities, and assess the impact of interventions and treatments. AI applications in bibliometrics can also help identify emerging research topics and potential collaborators, facilitating the development of multidisciplinary research teams. However, there are also challenges to implementing AI in these fields, including the need for large amounts of high-quality data and ethical considerations around data privacy and bias. Despite this noticeable application associated with the propagation of AI in health psychology, the research and progress on the topic are getting better and better, particularly with significantly improved effectiveness and latent likelihoods of profitability essential to the use of the technology in health care psychology.

Recent studies have significantly contributed to understanding AI's applications in healthcare and psychology. For instance, Gurung et al. (2022) conducted a bibliometric analysis using PubMed to assess health information disseminated through social media in the Indian context. Their findings highlighted the growing influence of digital platforms in public health awareness, offering valuable insights into the intersection of AI and health communication. The inclusion of Mukherjee, Kumar, and Jha (2022) strengthens the foundation of this study by illustrating the complementary role of bibliometric analyses across different datasets. While their work focused on social media, our study extends this analysis to explore thematic clusters in healthcare and psychology using Scopus. This broader scope allows for identifying global trends and innovations in AI applications, furthering the understanding of AI's transformative potential. Building upon existing literature, our study identifies thematic clusters such as healthcare security, psychological interventions, and AI technological capabilities, addressing gaps in previous works. By integrating findings from Mukherjee et al. (2022) and other recent studies, this analysis underscores the multidisciplinary impact of AI. It highlights opportunities for future research in areas such as policy development, ethical considerations, and cross-sectoral collaboration.

Methodology

Data Collection

This study employed the Scopus database for data collection, utilizing Boolean search operators with the keywords "artificial AND intelligence AND healthcare AND psychology" to explore the intersection of these domains. The selected terms aligned with the study's objectives of identifying emerging trends and thematic clusters in artificial intelligence applications. The search was restricted to documents published between 2013 and 2023, prioritizing English-language publications for consistency and accessibility. The initial search retrieved 1,499 documents relevant to the study's focus.

Filtering Process

A two-stage filtering process was applied to refine the dataset. In the first stage, abstracts were reviewed to exclude studies unrelated to AI applications in healthcare and psychology, narrowing the dataset to 1,362 relevant documents. The second stage focused on publications from 2018 to 2023, emphasizing recent advancements and trends. This process resulted in a final selection of 11 highly pertinent articles that provided significant insights into the study's objectives.

Text Mining

To analyze unstructured abstracts, text mining techniques were applied, including tokenization, stemming, stop-word removal, and noise handling. These preprocessing methods ensured data consistency and enhanced the reliability of the results. By cleaning and standardizing the textual data, the analysis could effectively identify key themes and patterns across the selected publications.

VOSviewer Parameters

Bibliometric analysis was conducted using VOSviewer (version 1.6.19) to visualize co-occurrence and clustering of keywords. A minimum keyword frequency of five was set as a threshold to ensure statistical significance. The Leiden algorithm was employed to identify thematic clusters, as it is recognized for capturing dense relationships within bibliometric data. These parameters were carefully chosen based on their relevance and reliability in similar bibliometric studies.

Framework for Analysis

The research methodology followed a structured framework that began with data retrieval from Scopus, proceeded through a rigorous filtering process, and utilized text mining to preprocess abstracts. Bibliometric analysis using VOSviewer then identified keyword co-occurrences and thematic clusters. The findings were interpreted within the context of existing literature, ensuring alignment with the study's objectives. This systematic approach provided a robust and replicable model for analyzing trends in AI applications within healthcare and psychology. The flowchart for this study is shown in Figure 1. The techniques implemented include:

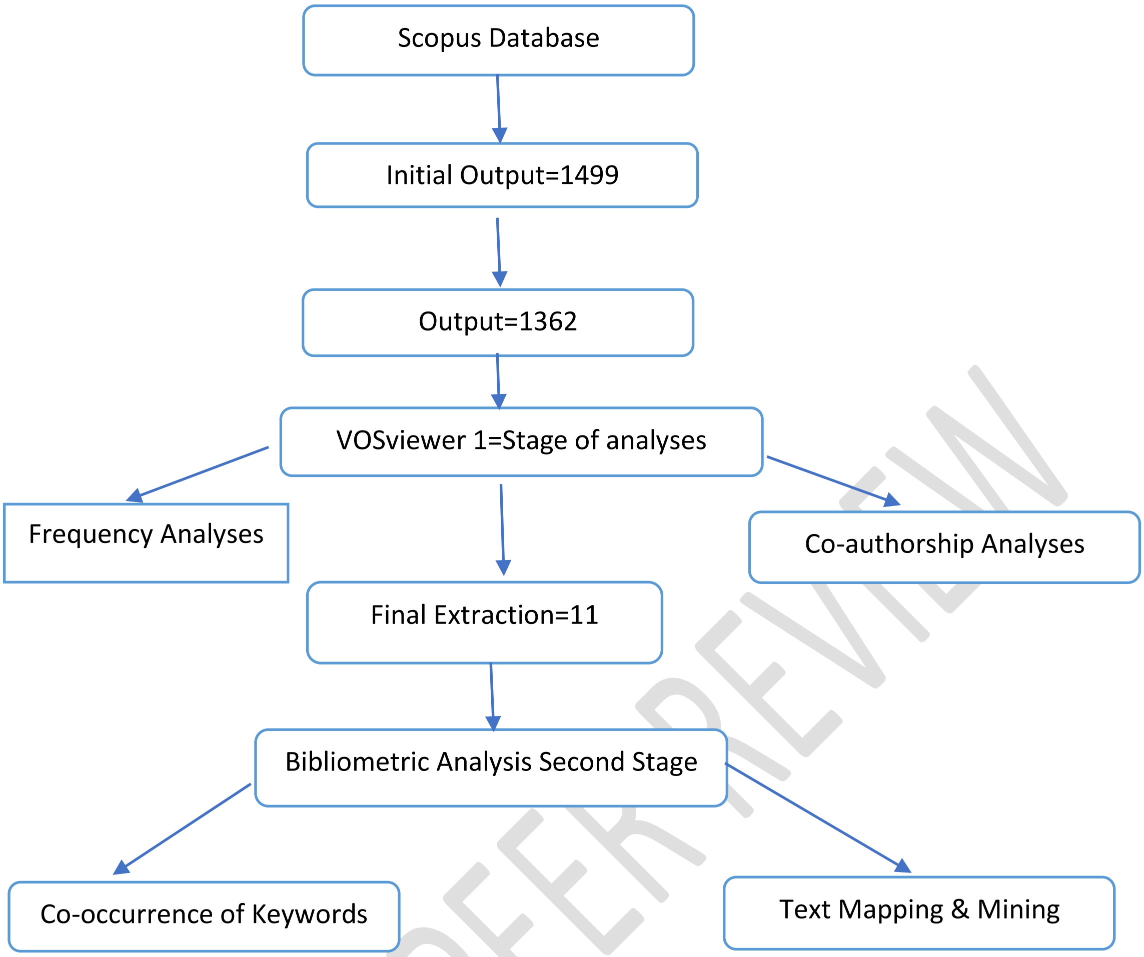

Figure 1: The flow chart of the research design.

- Publication frequency analyses by type of journal, territory/country, organizations/ institution, sponsor, subject area, year, and authors within ten years between 2013 and 2023.
- Co-author analyses that involve co-occurrence and indication of a collective link of authors enclosed in the analysis corpus.
- Co-occurrence of keywords estimation because it classifies the relationship and interrelations among related trends in literature. The co-occurrence of keywords was restricted to 2018-2023 to classify current movements with other related elimination measures.
- Text mapping/mining of abstracts of research manuscripts from Scopus, as they describe the material of the research organism, referred to in the papers. It goes beyond keywords to recognize names and related phrases of names, providing a better understanding of the evolution of research.

Due to the global nature of AI in health care and psychology and the keyword diversity, the Scopus database was chosen for this research because it offers high-quality data and can be used to improve search queries and strings. Furthermore, Scopus is also considered one of the world's most important analytical research and scientific citation platforms.

The Scopus collection was the subject of an on-line search and extraction. The database collection search and extract approach was implemented to produce strong and wide-ranging search items. First, a two-stage sort was done to screen the appropriate documents from the filtered results. The pre-selection process was established based on the criteria for excluding materials that were not published in book chapters, manuals, or editorials. After that, the co-occurrence of the filtered result was examined in light of the published documents' details, including the dates, the number of publications pertaining to a certain author, the nation, the kind of publication, and the publication's source. This research is imperative to assess and progress AI in Health care and psychology.

The initial search was completed, and 1362 items were retrieved over the 10 years since 2013. Keyword search was used to extract relevant records from the Scopus database (“artificial AND intelligent AND in AND healthcare”) was the string used to search the database. It later streamed to keyword search (“artificial AND intelligent AND in AND healthcare AND psychology”). A total of 11 documents were then re-claimed.

Tool selection required for analysis
Network analysis is a rapidly growing field with broad applications in many areas, including social science, computer science, biology, and engineering. Recent literature has focused on developing new methods and techniques for analyzing networks' structure, function, and evolution and exploring their practical applications. Some of the key themes in this literature include network analysis for understanding complex systems, developing dynamic network models, and integrating network analysis with other statistical and computational methods (Su, Lin, Chen, & Lai, 2020).

VOSviewer is a widely used and powerful software tool for constructing and visualizing bibliometric networks, providing a range of functionalities for network analysis and customization (McAllister, Lennertz, & Atencio Mojica, 2022). Its intuitive interface and user-friendly features make it accessible to researchers and practitioners. VOSviewer has contributed to advancing bibliometric research by enabling users to explore large datasets of scientific publications, identify patterns and trends in research fields, and generate insights into the structure and dynamics of research networks. Its popularity is evidenced by its frequent use in academic publications and the citation of its developers' work, demonstrating its value and impact in bibliometrics (Meng, Wen, Brewin, & Wu, 2020). The data analysed in this work were obtained from the database of Scopus. The work investigated co-authorship and co-occurrence analyses for keywords using VOSviewer version 1.6.19. In the VOSviewer results, circles and labels show the parts of the visualization network.

Frequency Analysis
Publication by journals
As illustrated in Table 1, of the 1362 publication sources found in the Scopus database, The top 10 most mentioned publication documents are shown with the number of articles published and the total number of various citations retrieved. The journals include “the Journal of Lecture Notes in Computer Science, which leads in the number of documents published overall, with 42 documents, followed by the Journal of Advance in Intelligent Systems and Computing with 41 documents, and Ceur Workshop Proceedings was the least on this list, with 12 documents”.

Table 1. Publication by journals.

No	Journal Source	Documents
1	Lecture Notes in Computer Science Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes In Bioinformatics	42
2	Advances in Intelligent Systems and Computing	41
3	IEEE Access	39
4	Communication in Computer and Information Science	20
5	Smart Innovation Systems and Technologies	16
6	Lecture Note in Network and Systems	15
7	Studies in Health Technology and Informatics	15
8	Procedia Computer Science	13
9	ACM International Conference Proceeding Series	12
10	Ceur Workshop Proceedings	12

Territory/country distribution

Figure 2 shows the country publication outline on research of AI in Health care and psychology across world regions. Five continents are considered to indicate active research and advance in research, namely Asia (China 207, South Korea 62, India 359, Saudi Arabia 89, and Pakistan 64) with a combined production of 781 publications, North America has a joint publication of 201 (USA 153 and Canada 48). A total of 176 documents from Italy 65 and the UK 111 are in Europe. Australia now has 55 papers in total. This is by no means a comprehensive list, but it does include all of the continents and nations where research has been actively published. There is no evidence of AI in health care and psychology research.

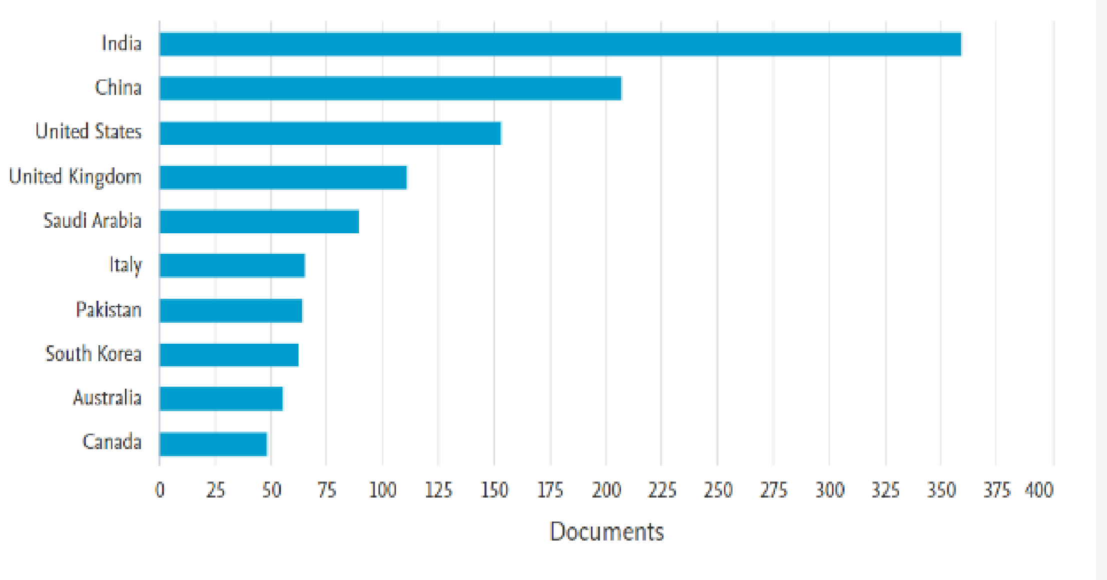

Figure 2: Document by country.

Publication per author and co-authorship network

Co-authorship network refers to the social network of authors who collaborate on scholarly publications. Each author is a node in the network, and their connections represent their co-authorship relationships (HabibAgahi, Kermani, & Maghsoudi, 2022). A network of co-authors was established on authors who make significant contributions to the research and trends of the AIHCP. Figure 3 highlights More influential authors and scientific contributions to research on AI in health care and psychology. A brief review of the most productive authors revealed that Tanwar, S. (8 documents), Gupta, R. (7 documents), Chatterjee, P. (6 documents), Machado, J. (6 documents), Abbasi, Q.H. (5 documents), Gulzani, M. (5 documents), Gupta, D (5 documents), Kadry, S. (5 documents), and Rodrigues, J.J. P.C. (5 documents) had had an extremely significant scientific impact in the area of research being studied. The impact of the research was calculated in terms of the number of documents.

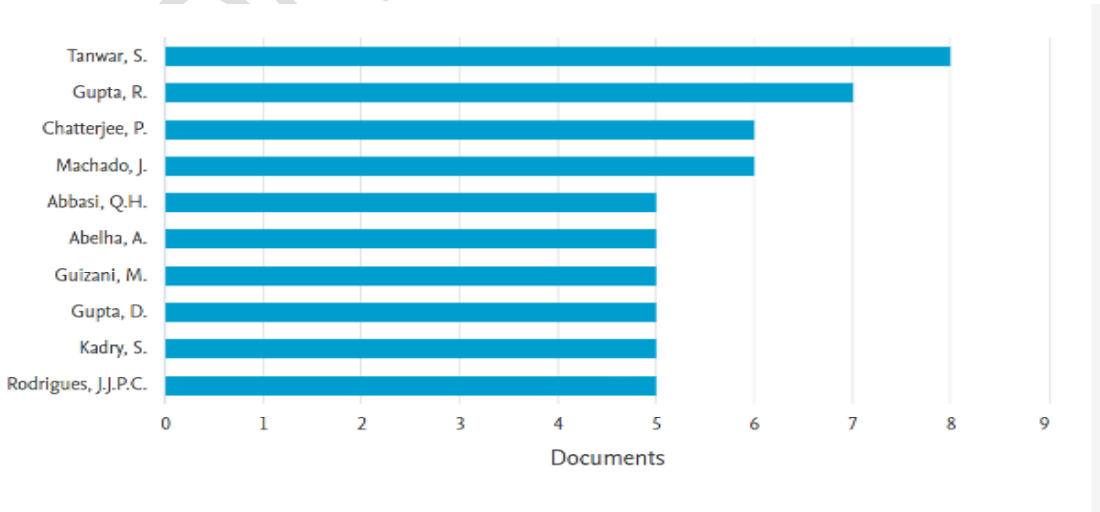

Figure 3: Document by Author.

Publications produced by organization/institution

This section contains a list of publications produced by organizations. The search results thus constituted the selection criteria. Figure 4 shows the volume of publications published by different organizations and universities since 2013.

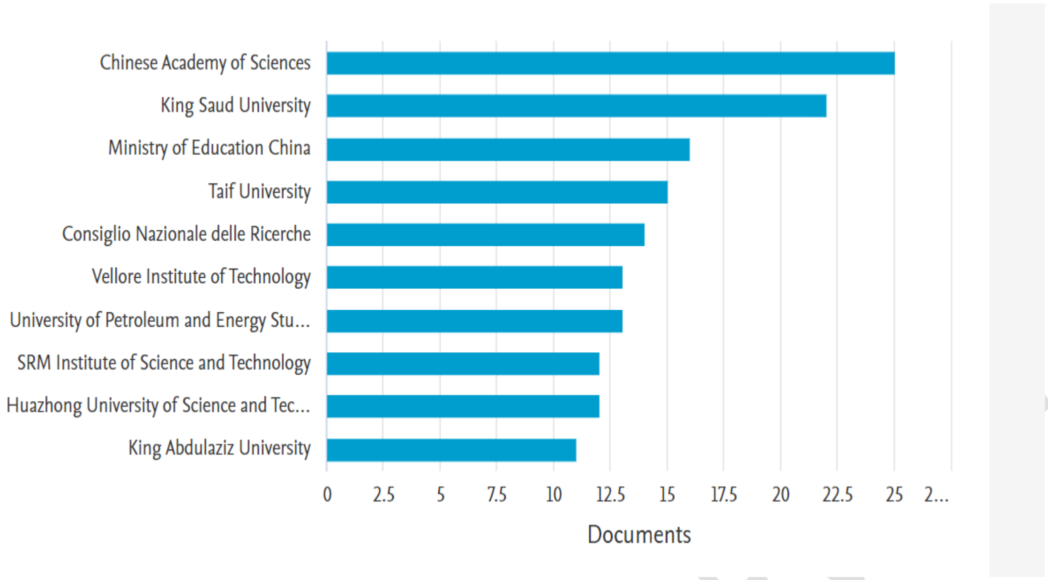

Figure 4: Document by Organization and University.

Publications produced by Sponsor

This section contains the list of the ten publications produced by the sponsor, which is also examined. The National Natural Science Foundation of China has the highest number of sponsors, with 87, followed by the National Key Research and Development Program of China, with 20, and the Horizon 2020 framework program, with 10 sponsors, as shown in Figure 5.

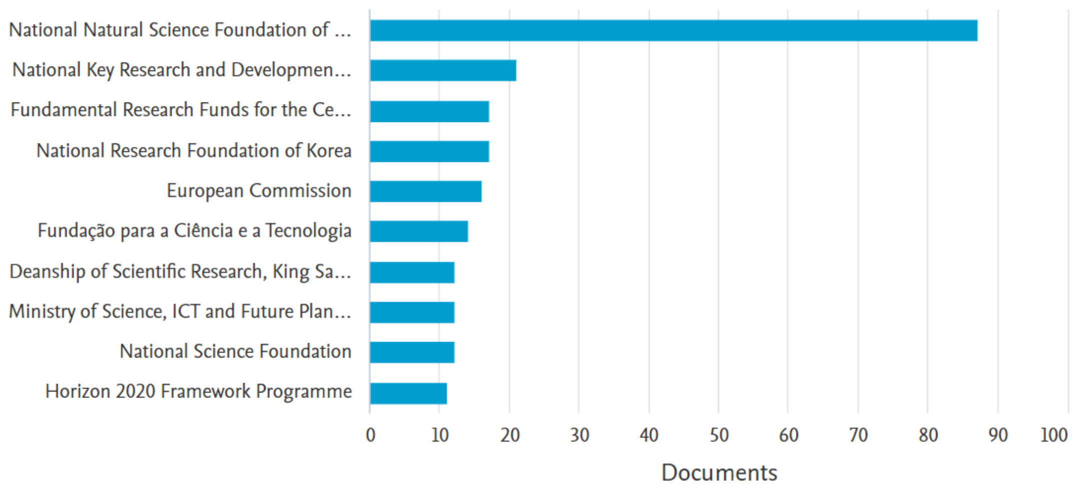

Figure 5: Document by Sponsor.

Publications produced by the Subject area

This section contains the list of publications produced by the subject area. Figure 6 shows that computer science has the highest percentage, 31.3%, followed by engineering with 20.3%, and the energy subject area has the least, 1.9%.

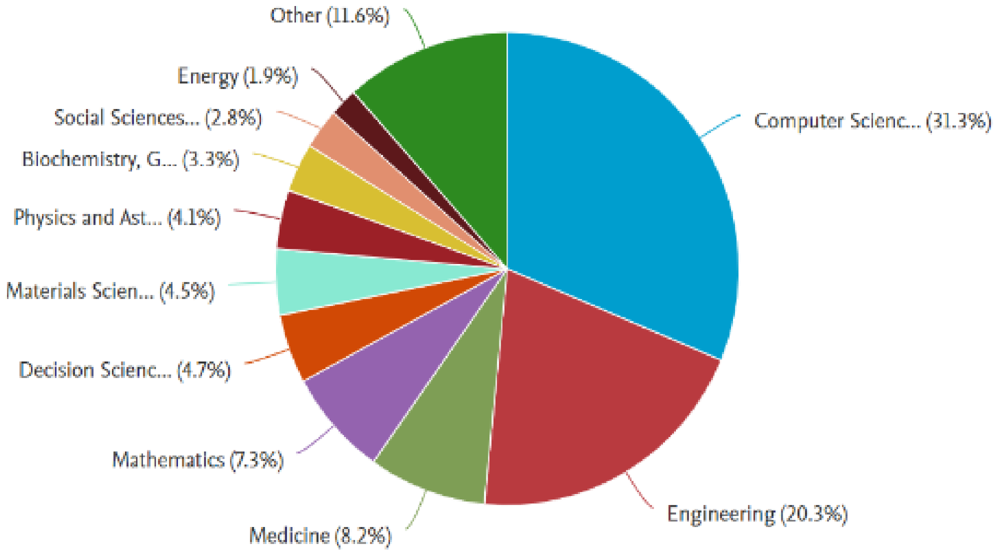

Figure 6: Document by Subject Area.

Publications produced by type

This section contains the list of the publications produced by type is also examined. The article has the highest percentage with 41.2%, followed by conference paper with 34.0%, and short survey has the lowest with 0.1%, as shown in Figure 7.

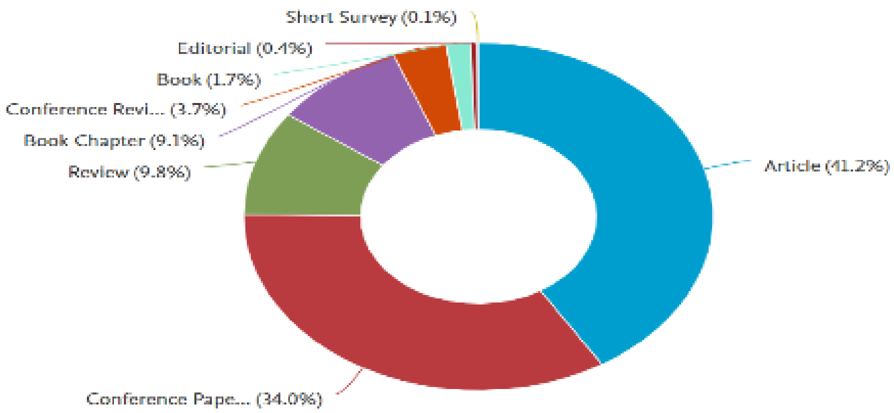

Figure 7: Document by type.

Publications produced by the Journal

This section contains the list of the publications produced by the journal is also examined. The computer science lecture notes, comprising the subseries lecture notes on AI and the bioinformation lecture notes, have the highest point that spread across the graph in red. The volume of publications published since 2013 by the journal is shown in Figure 8.

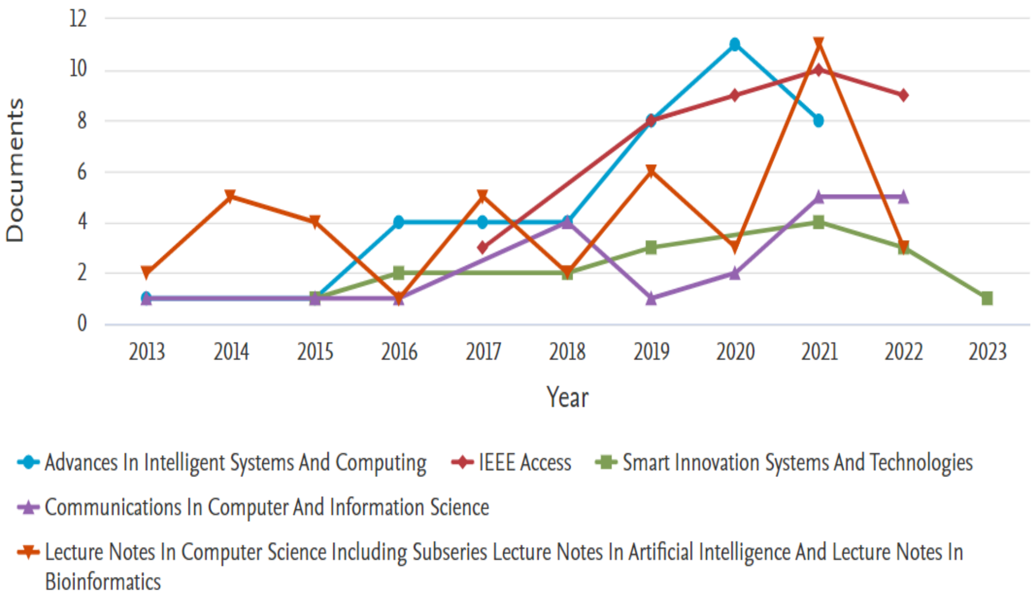

Figure 8: Document by Journal.

Publications produced by Year

This section contains a list of publications produced by year. The graph shows an increment in documents by year from 2013 to 2020. This indicates that this area of research is receiving the attention of authors and researchers. The volume of publications published by the journal since 2013 is shown in Figure 9.

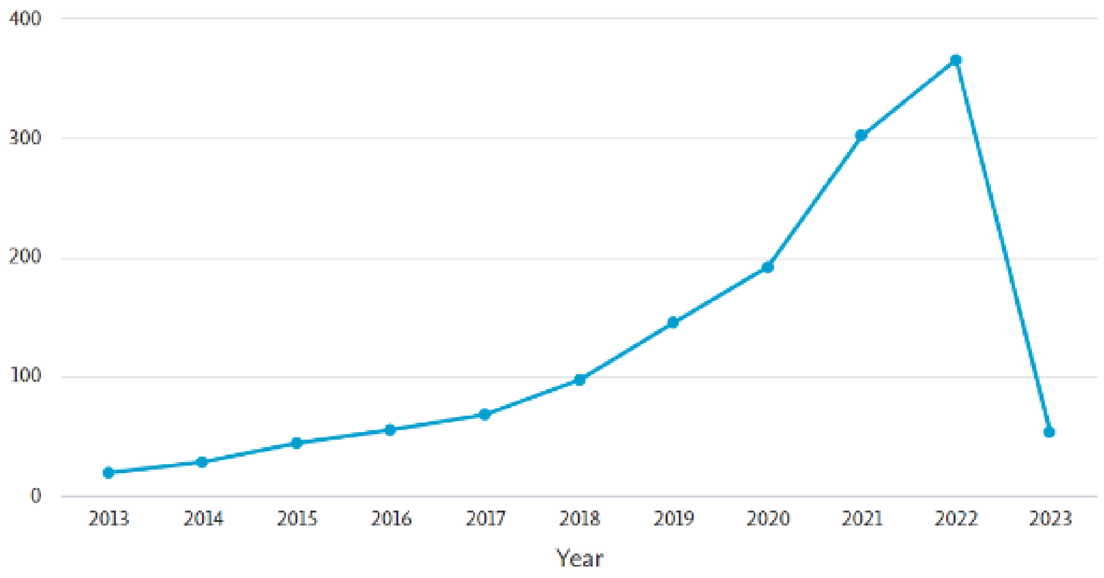

Figure 9: Document by Year.

The final stage of bibliometric analysis.

Fifty of the 5021 authors fulfil the requirements. The overall strength of co-authorship ties with other writers for each of the 50 authors was computed. The writers that have the strongest overall strength link are chosen. As can be seen in the network visualization in Figure 10, seven co-author clusters with 33 network items were found, and 133 total link strengths were produced along with the authors. There were 109 links between researchers. The clusters detected reflect active teamwork among scholars, particularly within the clusters of authors such as Wang S, Chen J, Wang J, Yang J, LH J, and Zhang H. The release timelines also reveal that the research results were incremental from 2013 to 2023.

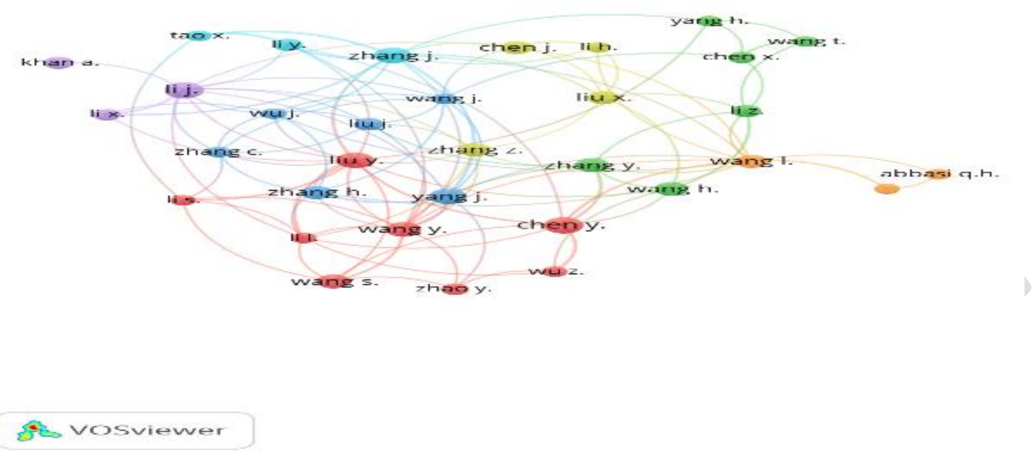

Figure 10: Network visualization for co-author map**.**

Co-occurring network of keywords

Keywords are phrases, terms and names which signify the heart of a publication. Co-occurrence is the familiar presence or closeness of similar keywords. As shown in Figure 11, the co-occurrence network was progressive from an entire volume of 1054 keywords using the VOSviewer software. The minimum inclusion standard for the selection of a keyword was 5. Of the 10549 keywords, 873 words met this threshold, and seven (7) clusters were identified. The total link strength of 103547, links 53027, and 873 items. The identified clusters are charted as shown in Figure 11. Due to large clusters of keywords, Common words previously associated generally with AI in health care and psychology will not be very relevant as the study and discussions will focus on innovations and trends.

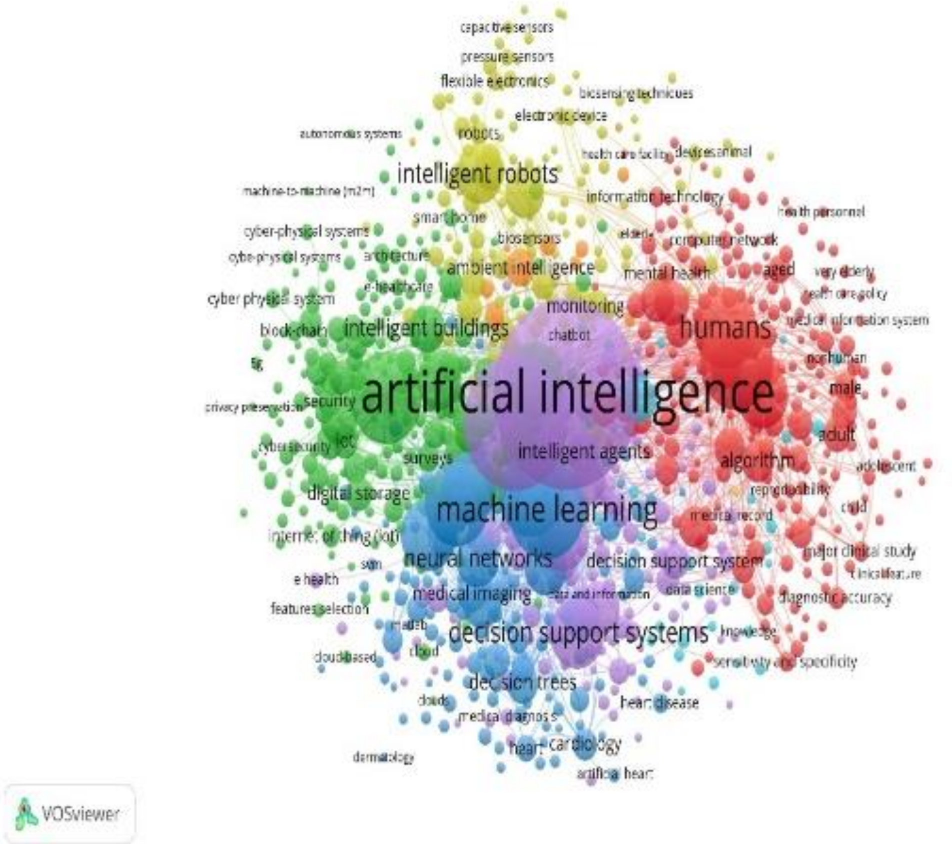

Figure 11: Co-occurrence overlay visualization.

Cluster #1 is marked with red as shown in Figure 11. There are 217 keyword combinations. with this cluster. Keywords include algorithms, computer network, health personnel, health key policy, medical information system, reproducibility, diagnostic accuracy, adolescent, health personnel, health care delivery, child, age, male, and clinical features. This can be further summarize as project team optimization about the proposed project.

Cluster #2 is marked with green also with 215 keywords and contains unique keywords such as blockchain, cyber security, digital storage, privacy preservation, security, cyber-physical system, e-health care, autonomous systems, machine to machine, internet of things (IoT), feature selection, and smart home. This cluster identifies the security features in AI to health psychology.

Cluster #3 is marked in blue with 138 keywords in it. The cluster contains unique keywords such as machine learning medical imaging, neural network, decision tree, medical diagnosis, heart diseases, cloud, hear, cardiology, and decision support system. This cluster identifies AI's technological capabilities in health care and psychology.

Cluster #4 is marked pale yellow with 136 keywords in it. The cluster contains unique keywords such as robots, capacity sensors, pressure sensors, flexible electronics, electronic devices, biosensing techniques, and intelligent robots. This cluster identifies the technological capabilities of AI in health pschology.

Cluster #5 is marked purple with 121 keywords in it. The cluster contains unique keywords such as artificial intelligence, intelligent agents, monitoring, data and information, monitoring diagnosis, health care provider, and e-health. This cluster identified with computer systems for AI in health care and psychology.

Cluster #6 is marked light blue with 32 keywords in the cluster. Unique keywords include non-human, drug discovery, drug development, perception, sars-cov-2, statistics, decision-making computer-assisted, electronic health record, receiver operating characteristics, diagnosis imaging, epidemics, and world heath organisation. This cluster comprises words necessary for the process essentials of AI in health care and psychology.

Cluster #7 is marked orange color with 14 keywords in the cluster. Unique keywords include ambient intelligence, ambient assisted living, sensor network, ubiquitous computing, technological development, intelligent environment, and intelligent environment. This cluster comprises intelligent information for the process essentials of AI in health care and psychology.

Text mapping/mining

Text mining, also known as text analytics or natural language processing, is extracting useful information and insights from unstructured textual data. This data can come from various sources, such as emails, social media posts, customer reviews, news articles, and more. lt involves several steps, including data collection, pre-processing, analysis, and interpretation. During the pre-processing step, the text data is cleaned, formatted, and transformed into a structured format that machine learning algorithms can analyze. The analysis involves applying various techniques such as sentiment analysis, topic modeling, and entity recognition to uncover patterns, trends, and insights within the text data. The analysis results are then interpreted to gain insights and make informed decisions. Text mining has numerous applications across industries, such as customer experience management, market research, fraud detection, and sentiment analysis. With the explosion of data in recent years, text mining has become an increasingly important tool for organizations looking to gain insights from their unstructured data.

In coloring and visualization as illustrated in Figure 12, Purple signifies the least represented cluster, followed by yellow and then light yellow as preset defaults. In contrast, red signifies the most cited cluster. Using VOSviewer for text mapping, abstracts of the 521 documents were digitized and the text has been undermined based on the occurrences and relevance of active names in the body of the text. Words with an occurrence of at least 10 were extracted, and the software calculated the relevancy of these words. Of the 31512 words listed, 869 words met the threshold. Relevance was then computed on 60% of default parameters and sorting options, such as removing word texts and abbreviations.

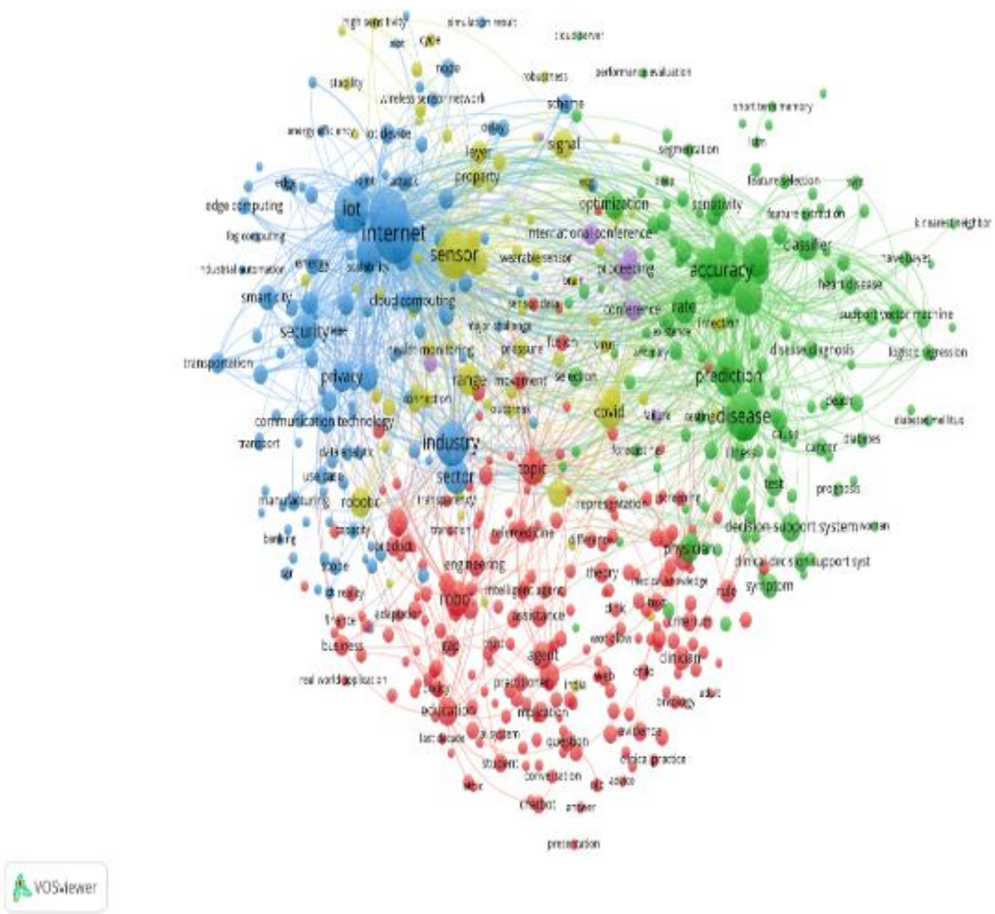

Figure 12: Network visualization map of text mining data.

Figure 12 provides a network visualization map of the most effective specific words related to the text mining activity. A total of 521 words were chosen based on program relevance; six clusters were recognized as visualized in Figure 12. The most active cluster comprised 180 items and concentrated on AI applications and healthcare professionals. AI application concerns include AI technology, chatbots, ambient intelligence, and intelligent machines. Healthcare professionals such as public health, patient care, medical knowledge, human health, and health care providers are also highlighted in Cluster 1 (red). The green cluster is the second most pertinent identified cluster, with 140 items. Artificial neural networks and diseases such as prediction, diabetes, cancer, infection, heart diseases, prognosis, system, and feature extraction are contained in cluster 2. Cluster 3 (blue) with 129 items classify with the internet and security, such as IoT devices, digitization, intelligent service, security, wireless sensor networks, privacy, data security, and drones. Cluster 4 (pale yellow), with 60 items, concentrates on words such as sensor, signal, innovative healthcare system, health rate, and temperature. Cluster 5 (yellow), with 8 items, concentrates on words such as COVID-19, infection, spread, virus, outbreak, and pandemic. Cluster 6 (purple) with four items, focusing on conference proceedings and visualization.

Discussion and outcomes from this study

The findings of this study align with existing research on AI applications in healthcare and psychology but also highlight unique contributions. For instance, while Mukherjee et al. (2022) emphasized the role of social media in disseminating health information, this study broadens the scope by identifying thematic clusters such as healthcare security and psychological interventions. Additionally, the integration of bibliometric analysis with text mining offers a novel approach to uncovering nuanced trends that may not be evident through traditional methods. This study also builds upon the work of Lotter et al. (2021) and Chekroud et al. (2021) by providing a comprehensive overview of collaborative networks and keyword co-occurrences, revealing emerging priorities in AIHCP research. For example, the prominence of terms like "chatbots" and "machine learning" reflects the increasing focus on accessible and personalized healthcare solutions, which complements earlier studies' findings. It also identified geographical areas of AIHCP innovation trends. While a significant volume of research trends has been relaunched in Asia, North America, Europe, and Australia, the research corpus does not include African and South American countries. The findings of this analysis also show that the challenges found in the literature are being progressively adopted through the efficiency and enhancement of AI in health care and psychological research. In addition, the connections between AI in health care and psychology are evidenced by the co-occurrence of keywords and the exploration of text mining. This study found relevant and current improvements in AI health care and psychological research. It linked existing AI innovations and challenges in health care and psychology use, which should streamline literal terms, recognize trends, and enable a better perception of recent developments.

The interpretation of the findings in this study is enriched by a detailed exploration of the emerging themes and trends identified through bibliometric analysis and text mining. The thematic clusters, such as chatbots, psychological interventions, and healthcare security, reflect the dynamic evolution of artificial intelligence in healthcare and psychology. These clusters highlight how AI technologies are addressing critical challenges, such as the growing demand for accessible mental health services and the need for robust data security in healthcare systems. For example, the prominence of chatbots underscores their increasing role in providing personalized mental health support and improving patient engagement through natural language processing. Similarly, the emphasis on healthcare security reflects the rising importance of safeguarding patient data in a rapidly digitizing healthcare landscape.

Geographical trends reveal that research outputs are concentrated in regions like Asia and North America, attributed to factors such as strong technological infrastructures, significant investments in AI research, and well-established academic and industrial collaborations. The concentration of research in these regions demonstrates their leadership in driving AI innovation while also indicating a potential gap in contributions from underrepresented areas, such as Africa and South America.

By linking these findings to real-world applications, the study emphasizes the practical implications of identified trends. For instance, the growing focus on psychological interventions highlights AI's ability to bridge gaps in mental healthcare delivery, especially in underserved populations. Furthermore, the clusters related to AI technologies, such as machine learning and neural networks, underscore the potential for enhanced diagnostic precision and personalized treatment plans in clinical settings.

These insights not only provide a nuanced understanding of the evolving role of AI but also align with the study's objectives of identifying emerging priorities and guiding future research. The interpretations are grounded in socio-technical contexts, offering a holistic perspective that bridges academic analysis with practical relevance.

Conclusion

AI in health care and psychological research has attracted international attention. With innovative disruptions in the related domains of informatics, public health, and psychology. Additional research will continue to seek to enhance global AI in health care and psychological delivery. The study reviewed bibliometric evidence from relevant publications on AI in healthcare research and psychology. The publications have been exported from Scopus' core collection of indexed search papers from various countries. The first phase of the analysis includes journal type, territory/country, organizations/institution, sponsor, subject area, year, authors, co-authors, and collaborations. Due to the objective of capturing relevant health care and psychological trends, a five-year publication duration was estimated from 2018 to 2023. An analysis of the co-occurrence of keywords has led to the identification of seven clusters of keywords in recent research that were analyzed. Mapping/text mining was also conducted on the unstructured textual data contained in the abstract of relevant publications to reveal other ideas relevant to the trends. This study only took records from Scopus' main collection of indexed articles and future work may focus on a report relating various databases.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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