

## SCIENTOMETRIC PROFILING OF LITERATURE ON 'ARTIFICIAL INTELLIGENCE AND LIBRARIES' WITH REFERENCE TO SCOPUS BIBLIOGRAPHICAL DATABASE

Perumal Alagiri<sup>1</sup>, Kalaiyappan V<sup>2</sup>, Raja Thangiah<sup>3</sup>, Ramasamy K<sup>4</sup>

<sup>1</sup>Assistant Professor, Department of Library and Information Science, University of Madras, Chennai, Tamil Nadu, India. E-Mail: alaperumal@gmail.com

<sup>2</sup>University Librarian i/c, University of Madras, Chennai, Tamilnadu, E-Mail: kalai30566@gmail.com

<sup>3</sup>College Librarian (S.G), St. Xavier's College of Education (Autonomous), Palayamkottai, Tamil Nadu, India. E-Mail: rajathangiah@gmail.com

<sup>4</sup>College Librarian, M V Muthiah Government Arts College for Women, Dindigul, Tamil Nadu, India. Email: ramaamymay1975@gmail.com

---

**Abstract**—The purpose of this research paper is to explore the integration of Artificial Intelligence (AI) and Libraries which creates accelerated and sophisticated information system to bridge the gap between the user and their evolving information needs. In order adhere the core objectives, this Scientometric study collect the data only pertinent to AI and Libraries together palpable in the title of the source database. The extensive study and publication output on AI and its impact on industries over a decade put the scientific industries in abundance and ambiguity. In consideration of this circumstances, this study retrieve only filtered 140 records through systematic and advanced search strategies employed on the Scopus database through the search terms "Artificial Intelligence and Libraries". The Boolean Operator 'AND' employed to combine two words of Libraries and Artificial Intelligence in the title statement. BibExcel and Biblioshiny were used to analyse the output. The study's findings show that 2023 is the most productive year with 36 records. With five papers each, Asemi A and Fernandex P are the most prolific writers; 93.57% of the articles are in English, and Asemi A leads with 98 citations and an h-index of 3, followed by Thimm M with 68 citations and an h-index of 2. China has the most corresponding authors out of all the countries; only single-country cooperation papers are available for the USA, Italy, and Germany, but multi-country collaboration papers are available for China, India, Australia, and other countries; Bradford's Law test carried out to trace the preferred sources for publication.

**Keywords:** Artificial Intelligence and Libraries; Scientometrics, Biblioshiny, Bradford's Law, Factorial Analysis.

---

### INTRODUCTION

Libraries and Information Centers are much proactive in adopting evolving cutting-edge technologies time to time through realigning its men and machinery accordingly. Artificial Intelligence (AI) is the product and process of imbibing human conceptual skills through computational skills, and its subset machine learning becomes intruding technology in all walks of human life, enables data-driven decision making (Ali et al., 2023) through which sustainable and value added information product and services to the demanding user's needs according to the socio-economic development and growth. Present-day librarianship is embedded with global collaboration and local productivity through proactive and reactive information services, since the information society grows faster perceiving "science and social science knowledge"(Pasti, 2023) accordingly. The impact of Artificial Intelligence (AI) on Libraries explored with the vision of user friendly and technological enhanced smart library services (Yu & Jiang, 2019). So, as the orientation and implication of the "Save the time of the reader," the fourth law of Library science propounded by Dr. S. R. Ranganathan(Sharma, 1974) is well accorded. Artificial Intelligence (AI) is "the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence"(Mccarthy, 2004). So, simply AI is computer imitation of human mind in terms of simulation and emulation so that it can be called as Intellectual Imitates (II).

Libraries and Information Centers adopts this AI and its subsets such as machine learning and deep learning (Ajakaye, 2021) techniques to enhance its products and services, particularly information retrieval system progressively so as to better reach and reliability of the information service to the user community. Such enhanced services like BookBot; book-delivery system (Oname & Alex-Nmecha, 2019), information retrieval, automatic cataloguing and indexing, reference and referral tools, collection development and user profile based automatic information delivery (Document Delivery Services) etc. Furthermore, the fundamental reference service of any library also been provided through chatbot and conversational agents on the library web sites (Rubin et al., 2010). Bibliometrics is the quantitative study to measure research impact of any topic prospectively and retrospectively. Artificial Intelligence, again, is an emerging domain with lots of hope on applications and accolades in every walks of life, specifically in information science.

## REVIEW OF LITERATURE

**Ravichandran and Siva (2022)** analyzed artificial intelligence research output in India during the period of 2011-2020 based on Scopus database with the connotation of Scientometrics perspectives and they put forth the year-wise distribution, collaborative countries, Relative Growth Rate and Doubling Time. Significantly, the degree of collaboration found as 0.95 and the time series analysis predicts the publication out put on this topic will be 3887 for the year 2025 and 4912 for 2030 approximately. **Gupta and Dhawan (2018)** studied global output of 1,52,655 publications found in Scopus database for the period of 2007-16 in artificial intelligence, and India's contribution was 9730 publications which marks 27.45 percentage. Computer science was the largest discipline, followed by engineering, mathematics, and other disciplines. Anna University, Chennai is the top institution in this topic with 294 papers followed by Jadavpur University, Kolkata with 270 publications. **Praveena et al. (2021)** retrieved the data from Web of Science considering the period from 1999 to 2019 and a total of 21643 papers are published in the subject of Artificial Intelligence during this period. Histcite, VoS Viewer had been used for bibliometric analysis and the findings revealed that 2019 has the highest number of research documents 5853 (27.10%) and the Degree of Collaboration is determined to be 0.83. The major source journal was IEEE Access with 403 records. **Hussain and Ahmad (2023)** visualized the literature of artificial intelligence on academic libraries through Scopus Citation Database for the period of 2002 -2022 and the results found 373 research paper accordingly. The traditional bibliometric indicators was employed for the analyses and specifically VOS Viewer was utilized for the mapping of co-occurrence of authors keywords and only 26 keywords out of 898, met the threshold of minimum 5 occurrences. Huang (2024) studied the application of artificial intelligence in academic libraries through quantitative method of research by collecting data through questionnaire supplied to the libraries across Taiwan academic librarians and out of 1622 questionnaires were served only 472 valid questionnaires received and the study classify the respondent into tow categories as the libraries already implemented AI in their libraries and those who are interested to implement interestingly soon. The findings shows that guide robot for the libraries and intelligent data analysis for circulation management are much visible in academic libraries of Taiwan and automatic indexing and classification founds equal at implemented and to be implemented AI in future. Subaveerapandiyan A (2023) analyzed literature on AI and Libraries by simply downloading 66 articles from Scopus Database and only 65 are taken to the review by eliminating one duplicate. The study summarises the results as most used AI applications are AI Chatbots, Intelligent Libraries, robots etc. Furthermore, the study pointed out the challenges faced by libraries while implementing AI at libraries viz. equitable access, ethical concern, privacy issues and so on. Borgohain et al. (2024) was mapping literature on Application of Artificial Intelligence in Libraries (AAIL) through the window of Scientometric analysis. The objective of the research was to comprehend the chronological growth of the literature on the topic, prolific authors, co-authorship, correlation between h-index and z-index, fitness of the Lotka's Law and portraying trending topic and research hotspot through keyword analysis. Karl Pearson coefficient test was conducted to test the hypothesis of there is no significant correlation exit between h-index and z-index, and the result shows that there is a significant relationship exists ( $r=0.952$ ), so, null hypothesis was rejected and alternative hypothesis was accepted. Dwivedi et al. (2025) examined the Organic Chemistry literature output for the period of 2004-2013 form Web of Science and harvested 17,344 records and the analyses were based on classic bibliometric indicators viz. Total Number of Publication (TNP), Total Number of Citation (TNC), Prolific authors (Yadav, J, S on top with 544 papers), preferred journals (on top is Tetrahedron Letters with 3051 records) etc.

## OBJECTIVES OF THE STUDY

The study aims to achieve the following objectives:

1. To study chronological distribution of the literature
2. To analyse the citation and h-index strengths
3. To portray the language-wise output of the publications

4. To understand the collaboration networks and affiliations of authors
5. To explore the conceptual structure of the subjects with its sub-fields

## **METHODOLOGY**

This study aims to explore the research output on Artificial Intelligence and its application in Libraries. The Scopus Database was visited on 13<sup>th</sup> and 14<sup>th</sup> January 2024 (no increase or decrease in quantum) with advanced search techniques of Article Title field. The following terms were used at search document field: Artificial Intelligence and Libraries OR AI and Libraries OR Library and Artificial Intelligence OR Application of Artificial Intelligence in Libraries. The search term were adopted to get the results where both the terms (AI and Library) appear in the title so as to assure that only exact results retrieved to cope up with the objectives framed. Other subsets of Artificial Intelligence viz. Machine Learning, Deep Learning, Robotics, Neural Networks, NLP, and Genetic Algorithms were also avoided on the search term. The search retrieved 140 relevant records on Artificial Intelligence and Libraries which was used for further scientometric analyses carried out with the help of Biblioshiny; one of the trending bibliometric software based on R language Bibliometrix package and the standard BibExcel Software employed for the classical bibliometric analyses viz. Chronological studies, citation analysis and prolific authors and countries on this literature.

## **ANALYSIS AND INTERPRETATION**

In order to manifest the objectives of the study, the following data analyses are undertaken and they demonstrate the standard bibliometrics nuances.

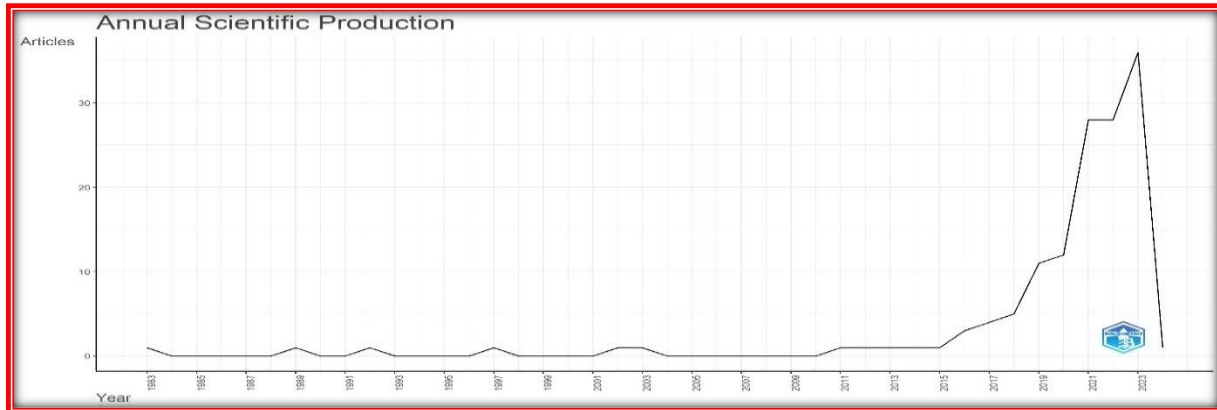
### **4.1 Details of the publications and its Chronological Distribution**

**Table 1**

| <i>S.No</i> | <i>Year</i> | <i>Record</i> | <i>Percentage</i> |
|-------------|-------------|---------------|-------------------|
| 1           | 1983        | 1             | 0.71              |
| 2           | 1989        | 1             | 0.71              |
| 3           | 1992        | 1             | 0.71              |
| 4           | 1997        | 1             | 0.71              |
| 5           | 2002        | 1             | 0.71              |
| 6           | 2003        | 1             | 0.71              |
| 7           | 2011        | 1             | 0.71              |
| 8           | 2012        | 1             | 0.71              |
| 9           | 2013        | 1             | 0.71              |
| 10          | 2014        | 1             | 0.71              |
| 11          | 2015        | 1             | 0.71              |
| 12          | 2016        | 3             | 2.14              |
| 13          | 2017        | 4             | 2.86              |
| 14          | 2018        | 5             | 3.57              |
| 15          | 2019        | 12            | 8.57              |
| 16          | 2020        | 12            | 8.57              |
| 17          | 2021        | 28            | 20.00             |
| 18          | 2022        | 28            | 20.00             |

|       |      |     |        |
|-------|------|-----|--------|
| 19    | 2023 | 36  | 25.71  |
| 20    | 2024 | 1   | 0.71   |
| Total |      | 140 | 100.00 |

Table 1 and figure 1 demonstrates that out of the total 140 articles, 2023 is the most productive year with 36 articles (26.71%). The next two fruitful years are 2022 and 2021, with 28 records each (20%) each. Year 2019 and 2020 contributed 12 records each (8.57%). The least productive years are 2018–2016, with 5, 4, 3 records, respectively. After the year 2016, there have been very less (each one) records on artificial intelligence and libraries over the years (2015–1989). Since the search term employed to retrieve the pinpointed documents on AI and Libraries together occurrences, the same has to be analyzed with intensive nature of application of AI tools upon libraries.



**Figure 1: Annual Scientific Production (Source Biblioshiny)**

## 1.2 Prolific Authors with their Publication Count

**Table 2**

| S.No | Authors     | Records | Percentage | Articles Fractionalized |
|------|-------------|---------|------------|-------------------------|
| 1    | Asemi A     | 5       | 1.51       | 2.33                    |
| 2    | Fernandez P | 5       | 1.51       | 5.00                    |
| 3    | Liu J       | 3       | 0.91       | 1.00                    |
| 4    | Anna Nev    | 3       | 0.91       | 0.73                    |
| 5    | Bhatti R    | 2       | 0.60       | 0.58                    |
| 6    | Thimm M     | 2       | 0.60       | 2.00                    |
| 7    | Oladokun Bd | 2       | 0.60       | 0.75                    |
| 8    | Kautonen H  | 2       | 0.60       | 1.00                    |
| 9    | Wang H      | 2       | 0.60       | ---                     |
| 10   | Wang C      | 2       | 0.60       | 0.48                    |
| 11   | Noorazizina | 2       | 0.60       | 0.40                    |
| 12   | Putrite     | 2       | 0.60       | 0.40                    |
| 13   | Han T       | 2       | 0.60       | 1.00                    |
| 14   | Firdaus Aa  | 2       | 0.60       | 0.40                    |
| 15   | Gasparini A | 2       | 0.60       | 1.00                    |

|    |             |   |      |      |
|----|-------------|---|------|------|
| 16 | Harisanty D | 2 | 0.60 | 0.40 |
| 17 | Hussain A   | 2 | 0.60 | 1.50 |
| 18 | Osman Nee   | 2 | 0.60 | 1.00 |
| 19 | Cox Am      | 2 | 0.60 | 0.67 |
| 20 | Cox A       | 2 | 0.60 | 1.33 |
| 21 | Naeem SB    | 2 | 0.60 | 0.58 |
| 22 | Ali MY      | 2 | 0.60 | 0.58 |
| 23 | Lyu L       | 2 | 0.60 | 1.00 |
| 24 | Li J        | 2 | 0.60 | 1.50 |
| 25 | Al Aamri JH | 2 | 0.60 | 1.00 |

Table 2 shows the top 25 productive authors in the field. Asemi A and Fernandez P have published 5 records each, followed by Liu J and Anna Nev with 3 records each and all the other authors have each two records respectively. The Articles Fractionalized score is the highest for Fernandez P is 5 (5 records) followed by Asemi A (2.33) with 5 records.

### 1.3 Citation and h-index analysis

**Table 3**

| S.No | Unit        | Citation sum within h-core | All citations | All articles | h-index |
|------|-------------|----------------------------|---------------|--------------|---------|
| 1    | Anna NEV    | 35                         | 35            | 3            | 3       |
| 2    | Asemi A     | 92                         | 98            | 5            | 3       |
| 3    | Putri TE    | 29                         | 29            | 2            | 2       |
| 4    | Ali MY      | 7                          | 7             | 2            | 2       |
| 5    | Noor ANA    | 29                         | 29            | 2            | 2       |
| 6    | Harisanty D | 29                         | 29            | 2            | 2       |
| 7    | Wang C      | 27                         | 27            | 2            | 2       |
| 8    | Fernandez P | 25                         | 25            | 5            | 2       |
| 9    | Firdaus AA  | 29                         | 29            | 2            | 2       |
| 10   | Bhatti R    | 7                          | 7             | 2            | 2       |
| 11   | Thimm M     | 68                         | 68            | 2            | 2       |
| 12   | Naeem SB    | 7                          | 7             | 2            | 2       |
| 13   | Luca E      | 1                          | 1             | 1            | 1       |
| 14   | Liu W       | 1                          | 1             | 1            | 1       |
| 15   | Mikhail S   | 1                          | 1             | 1            | 1       |
| 16   | Miao Z      | 25                         | 25            | 1            | 1       |
| 17   | Lund BD     | 25                         | 25            | 1            | 1       |
| 18   | Tian Z      | 1                          | 1             | 1            | 1       |
| 19   | Lindgren P  | 6                          | 6             | 1            | 1       |
| 20   | Morriello R | 4                          | 4             | 1            | 1       |
| 21   | Liu J       | 1                          | 2             | 3            | 1       |
| 22   | Mishra P    | 5                          | 5             | 1            | 1       |
| 23   | Massis B    | 35                         | 35            | 1            | 1       |

|    |              |   |   |   |   |
|----|--------------|---|---|---|---|
| 24 | Mathabela NN | 3 | 3 | 1 | 1 |
| 25 | Maksim B     | 1 | 1 | 1 | 1 |

Table 3 shows the top 25 authors showing their h-index, citations and citation sum within h-core. Two authors namely Anna Nev and Asemi A have got the highest h-index scores (3) followed by 10 authors with a h-index of 2 each. In terms of total citations obtained by the authors, Asemi A leads with 98 citations followed by Thimm M with 68 citations and Anna Nev and Massis B with 35 citations each. There are eight other authors with the citation scores ranging from 25-29. If we analyze the citations required by the authors to reach their h-index, it is understood that Asemi A has got 92 citations to get a h-index of 3 and the remaining 6 citations are attributed to his other two papers. Asemi A got 92 citations to achieve a h-index of 3 while Anna Nev was able to get a h-index of 3 just with 35 citations.

#### 1.4 Language-wise analysis of Research Productivity

Table 4

| S.No | Language | Record | Percentage |
|------|----------|--------|------------|
| 1    | English  | 131    | 93.57      |
| 2    | Chinese  | 7      | 5.00       |
| 3    | Turkish  | 1      | 0.71       |
| 4    | Italian  | 1      | 0.71       |
|      | Total    | 140    | 100        |

Table 4 shows that out of 140 records, 93.57% (131) of the records are published in English language followed by 5% (7) of the records in Chinese language while just 1 record each was published in Turkish and Italian languages. Thus, English is the most preferred language of the researchers.

#### 4.5 Most Relevant Affiliation Analysis

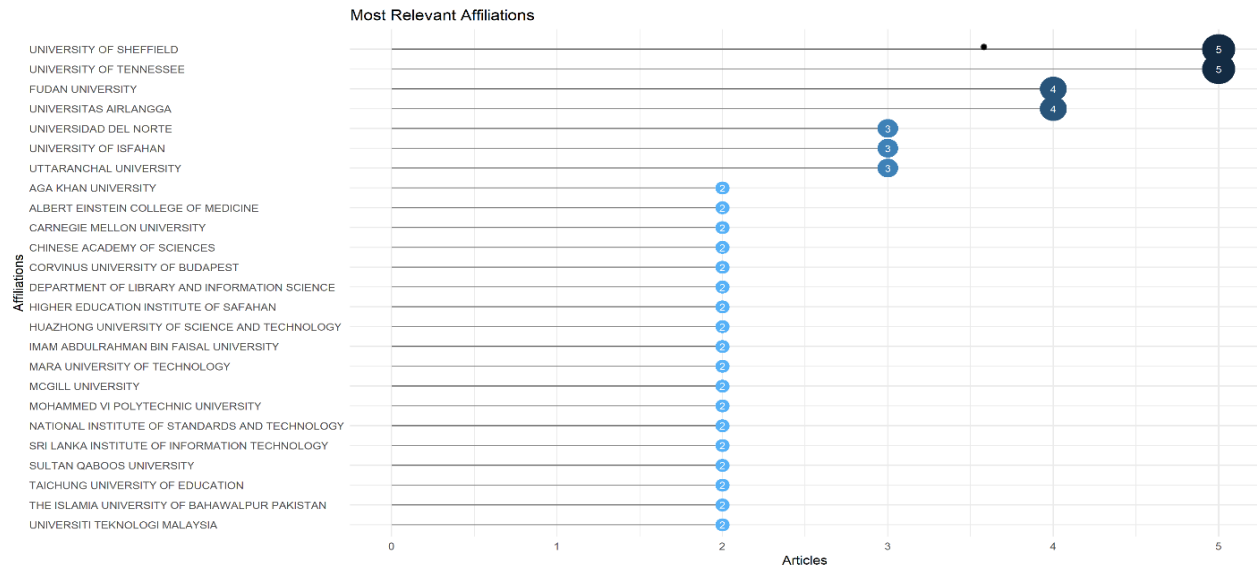
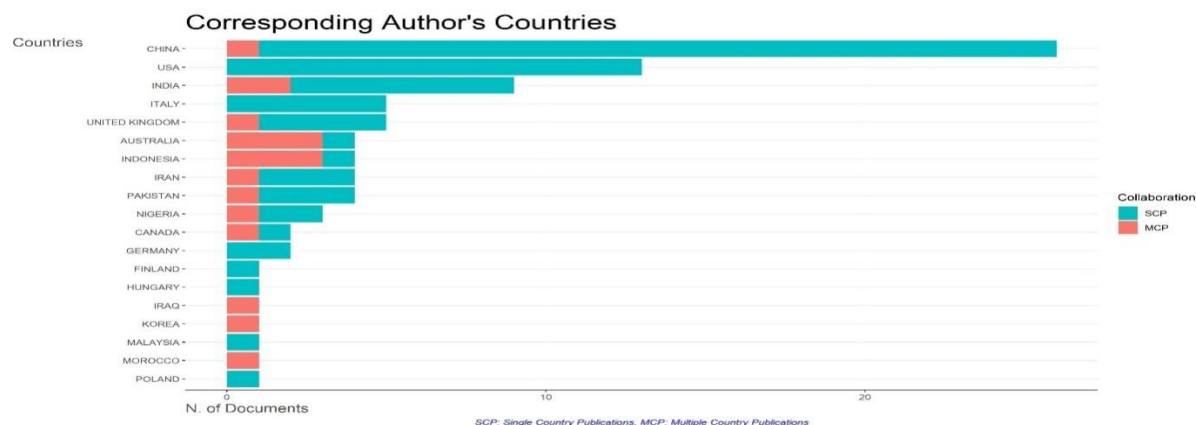


Figure 2. Most relevant affiliation of the authors and their respective affiliation based on Biblioshiny

Figure 2 represents the most active affiliations of authors which signifies with five publications each of University of Sheffield and University of Tennessee out of 140 publications, following to this, Fudan University and Universitas Airlangga contributes 4 papers each. Overall, 177 affiliations found for 219 counts (relative not absolute), out of which, three publications by another three institutions, and two publications from 25 affiliations and one each from 145 affiliations.

#### 4.6 Countries productivity analysis



**Figure 3. Country-wise dispensation of publications**

Figure 3 shows the country of origin of the corresponding authors of 140 documents on Artificial Intelligence and Libraries. China has the maximum number of corresponding authors followed by USA. India stands in the third position in terms of number of corresponding authors followed by Italy and United Kingdom. Authors of a few countries namely USA, Italy, Germany, Finland, Hungary, Malaysia and Poland have only single country publications. Authors of all other countries have multi-country publications.

#### 4.7 World Collaboration analysis

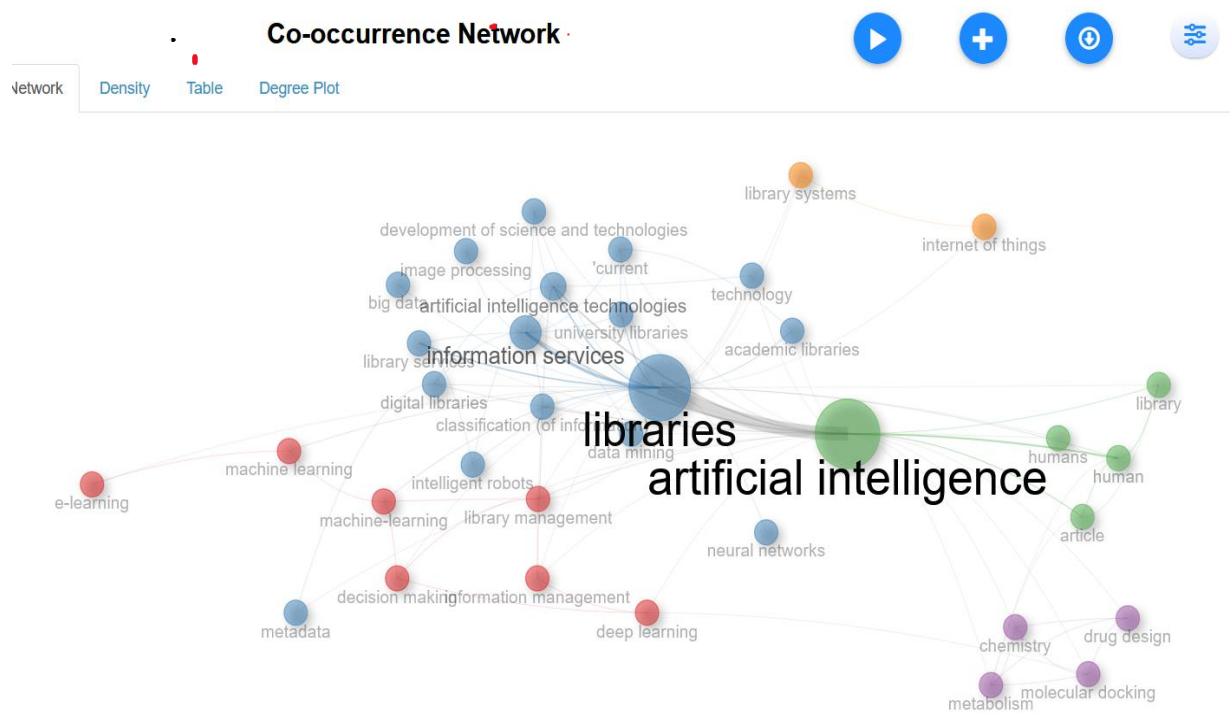
**Table 5**

| S.No | From           | To             | Frequency |
|------|----------------|----------------|-----------|
| 1    | Nigeria        | South Africa   | 4         |
| 2    | Indonesia      | Malaysia       | 3         |
| 3    | Finland        | Norway         | 2         |
| 4    | India          | Saudi Arabia   | 2         |
| 5    | USA            | Canada         | 2         |
| 6    | Australia      | Germany        | 1         |
| 7    | Canada         | Morocco        | 1         |
| 8    | China          | Australia      | 1         |
| 9    | China          | Denmark        | 1         |
| 10   | China          | Ireland        | 1         |
| 11   | China          | United Kingdom | 1         |
| 12   | India          | Iraq           | 1         |
| 13   | India          | Japan          | 1         |
| 14   | Iran           | Hungary        | 1         |
| 15   | Pakistan       | Australia      | 1         |
| 16   | Saudi Arabia   | Iraq           | 1         |
| 17   | United Kingdom | Australia      | 1         |

|    |                |         |    |
|----|----------------|---------|----|
| 18 | United Kingdom | Ireland | 1  |
| 19 | USA            | India   | 1  |
| 20 | USA            | Japan   | 1  |
| 21 | USA            | Korea   | 1  |
| 22 | USA            | Nigeria | 1  |
|    | Total          |         | 30 |

Table 5 shows that the most collaborative countries of the research output of AI and Libraries. Nigeria and South Africa collaborated for four times and Indonesia and Malaysia joined hands in three times. Finland and Norway, Indian and Saudi Arabia and, USA and Canada shows their rapport two times each. China and USA further connection with four countries each in terms of collaboration in this topic and put forth.

#### 4.8 Co-occurrence analysis



**Figure 4. Visualizing Co-occurrence keywords of authors**

Figure 4 explains the co-occurrences of keywords in the topic of “Artificial Intelligence and Libraries”. This conceptual structure analysis extracted from Biblioshiny software under Network Approach and which envisaged the active occurrences of keywords accordingly. Internet of Things and Library System show 5 clusters and 0.013 closeness each, whereas Artificial Intelligence and Libraries show 3 and 2 clusters but, 0.023 closeness respectively.

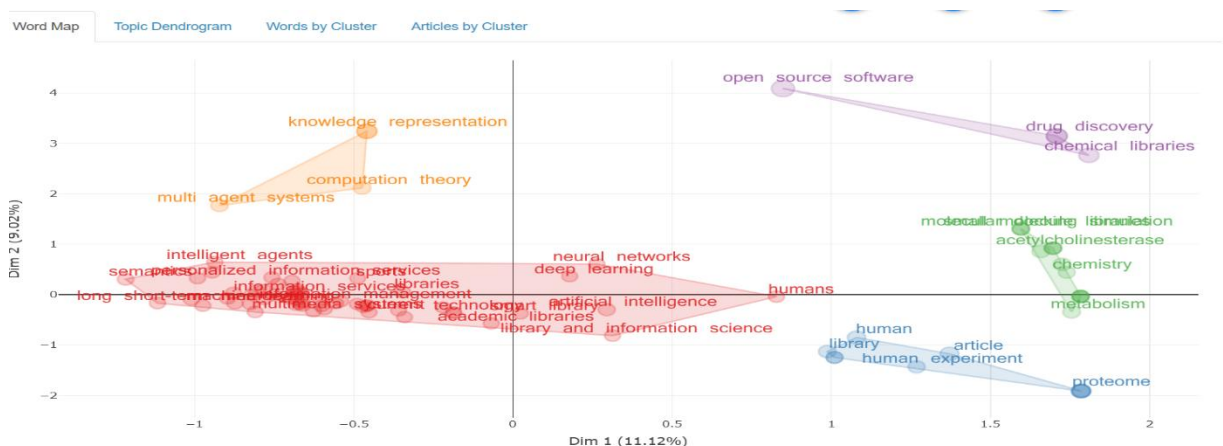
#### 4.9 Factorial Analysis

Figure 5 and 6 displays the hierarchical relationships of the topic with its sub-field of the research topic so as to put forth the correlations and cohesiveness of the related subject fields. Factorial Analysis is a conceptual structure analysis through which the word cluster occurrence can be studied based on its topic relationships and again, the dendrogram in statistical analysis is a diagram to show the relationships of the topic in a hierarchical way. Biblioshiny enables three methods of factorial analysis viz. 1. Correspondence Analysis, 2. Multiple Correspondence Analysis, and 3. Multiple Scaling (Iman et al., 2023).

## Scientometric Profiling of Literature on 'Artificial Intelligence and Libraries' with reference to Scopus Bibliographical Database



**Figure 5. Factorial analysis through topic dendrogram**



**Figure 6. Factorial analysis-word map**

These figure 5 and 6 has been arrived by Correspondence method Analysis with field of Keywords Plus, number of terms 50 and no. of Cluster 5 so that there are five prominent clusters are visible in two figures and they are: 1. Knowledge Representation, 2. Open Source Software, 3, Humans, 4. Proteome and 5. Metabolism. It is obvious the first cluster, knowledge representation is having three sub-fields like knowledge representation formalism, computation theory, multi-agent systems, whereas, the second cluster, Open Source Software consists, chemical libraries, drug discovery and virtual screening. Out of five clusters, cluster humans portrays high density with multiple related terms including library and information science.

#### 4.10 Bradford's Distribution analysis for top ten journals

Table 6

| S.No | Source                                                        | Rank | Freq | cumFreq | Zone   | Total Records | Total Journals |
|------|---------------------------------------------------------------|------|------|---------|--------|---------------|----------------|
| 1    | Library Hi Tech News                                          | 1    | 16   | 16      | Zone 1 |               |                |
| 2    | Library Hi Tech                                               | 2    | 10   | 26      | Zone 1 |               |                |
| 3    | Journal of Physics: Conference Series                         | 3    | 6    | 32      | Zone 1 |               |                |
| 4    | Journal of Library and Information Science In Agriculture     | 4    | 5    | 37      | Zone 1 |               |                |
| 5    | Library Philosophy and Practice                               | 5    | 4    | 41      | Zone 1 |               |                |
| 6    | Information Technology and Libraries                          | 6    | 3    | 44      | Zone 1 |               |                |
| 7    | Journal of the Australian Library and Information Association | 7    | 3    | 47      | Zone 1 | 47            | 7              |
| 8    | Ceur Workshop Proceedings                                     | 8    | 2    | 49      | Zone 2 | 47            | 38             |
| 9    | Computers In Libraries                                        | 9    | 2    | 51      | Zone 2 | 46            | 45             |
| 10   | Journal of Academic Librarianship                             | 10   | 2    | 53      | Zone 2 | 140           | 90             |



Figure 7 Bradford's Law plot diagram

Table 6 and diagram 7 describes the distribution of the “Artificial Intelligence and Libraires” topic on various journals, out of 90 journal, the chosen literature is scattered and it is well fit to the Bradford's rule of  $1: n: n^2$ . If the periodicals arranged in a decreasing order, the core journals would be found in the first zone, the allied and related journals would be at second and third zone. This study found that the values are 7:38:45 ( $n=7$ ) against 7:49:343. So, the Bradford's Law of Scattering is well fit with the research topic investigated.

#### 4.11 Lotka's Law analysis

**Table 7**

| Documents written | N. of Authors | Proportion of Authors observed (%) | Expected Valus (%) |
|-------------------|---------------|------------------------------------|--------------------|
| 1                 | 270           | 91.2                               | 60                 |
| 2                 | 22            | 7.4                                | 25                 |
| 3                 | 2             | 0.7                                | 11.10              |
| 5                 | 2             | 0.7                                | 6,3                |

**Figure 8 Lotka's law analysis**

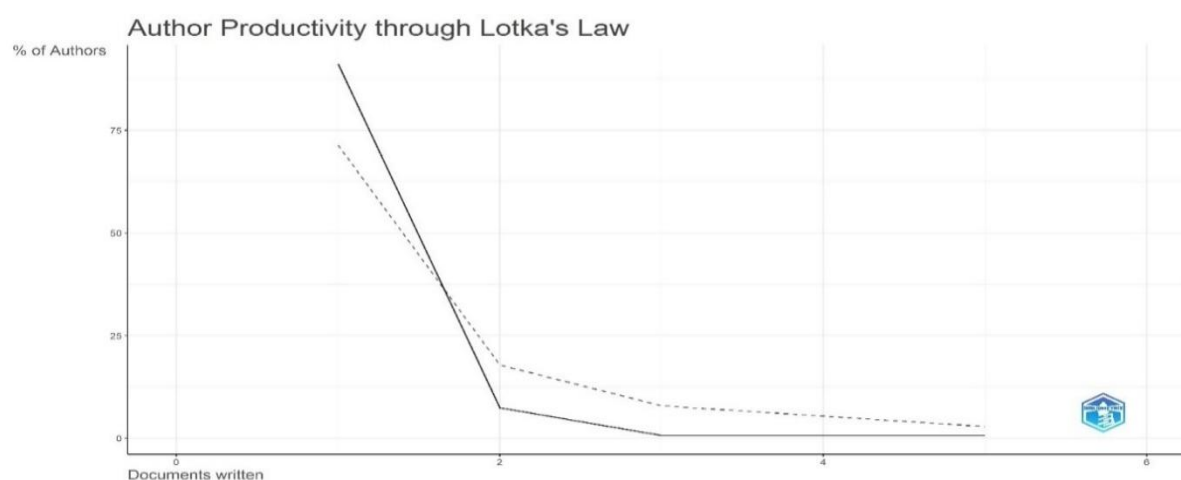


Table 7 and figure 8 depicts the authors productivity upon Lotka's law of inverse square law of scientific productivity with the formula of  $1/n^2$ . Any given given subjects author's productivity can be mapped as 60% as single authored, 25% are double authored, 11,1% of triple authored and 6.3% are more than three authored. It means, in a specific literature, 60 percent of the papers are new authors and they are started to explore the said topic as scholarly publication and so forth. This particular study is not correlated with the Lotka's Law, because, 91% of the papers are written by single authors and 7.4% by double authors and so on.

#### FINDINGS AND FUTURE RESEARCH

The vital findings of the study upon the selected objectives are summarized below:

1. The publication productivity of the topic of Artificial Intelligence and Libraries with combined terms are growing in nature significantly.
2. A. Asemi from University of Isfahan, Isfahan, Iran and P. Fernandez from Research Services Agricultural Sciences And Natural Resources, University of Tennessee, Knoxville, United States are the two authors contributed five paper each on this topic.
3. N.E.V Anna from Faculty of Vocational Studies, Universitas Airlangga, Surabaya, Indonesia and A. Asemi sored h-index three each and all citation 35 and 98 respectively. The most cited paper of this topic is Materials Science In The Artificial Intelligence Age: High-Throughput Library Generation, Machine Learning, and a Pathway from Correlations to the Und with 103 citation on the retrieval date.

4. Out of 177 affiliation for 140 publications, University of Sheffield and University of Tennessee contributed 5 publications each, and Fudan University and Universitas Airlangga contributes 4 papers repetitively
5. Nigeria and South Africa are the countries collaborated actively on this topic area with four papers, following to that Indonesian and Malaysia were worked together for 3 papers.
6. Conceptual Analysis are significant investigation on this topic, where the active clusters of words (Artificial Intelligence, and Libraries), mapping of words with factorial analysis and relationships among the terms with hierarchical display has been done by dendrogram charts, so that the correlations of the subject fields and its sub-fields are studied.
7. The fundamental Bibliographic Classical Laws such as Bradford's Law and Lotka's Law also tested and it is well fit with Bradford's Law of Scattering of journal and its literature but not with Lotka's Law of authors productivity.

Scope for the future research: The results and findings insists that the trending research topic today is AI and its Subsets like machine learning and data mining which has been enthusiastically adapted by information professionals for their research in terms of Scientometric Analyses and User Studies so that importance of AI in Libraries are vastly studied. The gap is to explore more datasets like library records, reports, surveys on AI and Libraries to be scrutinized so that much more insight reached. Apart from the standard bibliometric tools, the data mining tools like Python, R and Orange could be employed for further depth retrieval and visualizations.

## CONCLUSION

Libraries endorsed the AI technology to upright and upliftment in terms of knowledge driven system to user centric information retrieval system. Upon this context and concept the metric studies facilitates the readers to understand the pattern and progress of the concern field and its literature output over a period. Scientometric and Bibliometric profiling of the literature pertinent to the topic enables the users and authorities aware of productivity and positions of the domain so that bridging the knowlwdge gap and making the appropriate decisions to build and sustain the information system ever. The chronological output, co-ocurance mapping, active authors and preferred sources for publication enlists the trend and techniques of the subject systematically. The two set Ven Diagram of A intersection B put forth AI and Libraries intact and the analyses of the data also simplified without noise and overload. Furthermore, Bibliometric tools like Biblioshiny and Bibexcel and Pajack made this mapping study more visualized and meaningful to the research aspirants to enunciate the nuances of Scientometric investigation of scholarly communication on the chosen field. Finally, this research suggest the ample avenues of AI technological implications at libraries, such as Chatbots, robots, automatic indexing, expert systems for classification and cataloguing and so on. Libraries stives as community information centers through proper adaptation of Artificial Intelligence technology and become a user friendly information system to generate and regenerate upgraded knowledge to the society.

## REFERENCES

- [1] Ajakaye, J. E. (2022). Applications of Artificial Intelligence (AI) in Libraries. In I. Ekoja, E. Ogbomo, & O. Okuonghae (Eds.), *Handbook of Research on Emerging Trends and Technologies in Librarianship* (pp. 73-90). IGI Global. <https://doi.org/10.4018/978-1-7998-9094-2.ch006>
- [2] Ali, S., Abuhmed, T., El-Sappagh, S., Muhammad, K., Alonso-Moral, J. M., Confalonieri, R., Guidotti, R., Del Ser, J., Díaz-Rodríguez, N., & Herrera, F. (2023). Explainable Artificial Intelligence (XAI): What we know and what is left to attain Trustworthy Artificial Intelligence. *Information Fusion*, 99. <https://doi.org/10.1016/j.inffus.2023.101805>
- [3] Borgohain, D. J., Bhardwaj, R. K., & Verma, M. K. (2024). Mapping the literature on the application of artificial intelligence in libraries (AAIL): a scientometric analysis. In *Library Hi Tech* (Vol. 42, Issue 1, pp. 149–179). Emerald Publishing. <https://doi.org/10.1108/LHT-07-2022-0331>
- [4] Dwivedi, S., Kumar, S., & Garg, K. C. (2015). Scientometric profile of organic chemistry research in India during 2004–2013. *Current Science*, 869-877.
- [5] Gupta, B. M., & Dhawan, S. M. (2018). Artificial Intelligence Research in India: A Scientometric Assessment of Publications Output during 2007-16. *DESIDOC Journal of Library & Information Technology*, 38(6), 416-422. <https://doi.org/10.14429/djlit.38.6.12309>
- [6] <https://graphite-note.com/a-comprehensive-guide-to-the-six-main-subsets-of-ai-exploring-machine-learning-nlp-and-beyond#:~:text=In%20conclusion%2C%20this%20comprehensive%20guide,potential%20to%20revolutionize%20industries%20worldwide>

- [7] Hussain, A., & Ahmad, S. (2024). Mapping the literature on artificial intelligence in academic libraries: A bibliometrics approach. *Science & Technology Libraries*, 43(2), 131-146.
- [8] Huang, Y. H. (2024). Exploring the implementation of artificial intelligence applications among academic libraries in Taiwan. *Library Hi Tech*, 42(3), 885–905. <https://doi.org/10.1108/LHT-03-2022-0159>
- [9] Iman, B., Yuadi, I., Sukoco, B. M., Purwono, R., & Hu, C. C. (2023). Mapping Research Trends with Factorial Analysis in Organizational Politics. *SAGE Open*, 13(4). <https://doi.org/10.1177/21582440231215984>
- [10] McCarthy, J. (2004). What is artificial intelligence? Available from (<http://jmc.stanford.edu/artificial-intelligence/what-is-ai/index.html>) Accessed 16.10.24.
- [11] Omame, I. M., & Alex-Nmecha, J. C. (2020). Artificial intelligence in libraries. In *Managing and Adapting Library Information Services for Future Users*. IGI Global. doi:10.4018/978-1-7998-1116-9.ch008
- [12] Pasti, V. (2023). Science and Social Knowledge, or What We Do Not Know About What We Believe We Know. *Studia Universitatis Babes-Bolyai- Sociologia*, 68(1), 5–24. <https://doi.org/10.2478/subbs-2023-0001>
- [13] Praveena, K., Veerakumar, R., & Rajeswari, S. (2021). Mapping of Artificial Intelligence Research Output : A Scientometric Study. *Library Philosophy and Practice*, 1 - 17.
- [14] Ravichandran, S., & Siva, N. (2022). Artificial Intelligence Research output in India from Scopus Database (2011-2020): A Scientometric Analysis. *International Journal of Research in Library Science (IJRLS)*, 8(2), 60-78. <https://doi.org/10.26761/IJRLS.8.2.2022.1537>
- [15] Rubin, V. L., Chen, Y., & Thorimbert, L. M. (2010). Artificially intelligent conversational agents in libraries. *Library Hi Tech*, 28(4), 496–522. <https://doi.org/10.1108/07378831011096196>
- [16] Sharma, R. N. (1974). S. R. Ranganathan: A Personal Tribute. In *Source: The Journal of Library History*, 14(1), 58-72, <https://about.jstor.org/terms>
- [17] Subaveerapandiyan A. (n.d.). *Application of Artificial Intelligence (AI) In Libraries and Its Impact Application of Artificial Intelligence (AI) In Libraries and Its Impact on Library Operations Review on Library Operations Review*. Yu, K., Gong, R., Sun, L. and Jiang, C. (2019), “The application of artificial intelligence in smart library”, *Proceedings of the 2019 International Conference on Organizational Innovation*, University of Ulsan. doi: 10.2991/icoi-19.2019.124.

\*\*\*\*\*