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Applications, Awareness and Assessment of Artificial Intelligence in Central Library of Banaras Hindu University to Enhancing Smart Library towards Automated Library Systems: A study of Users' Attitudes

Santosh Kumar Kannaujia, Dr. Madhu Patel

Department of Library & Information Science, Mahatma Gandhi Central University, Motihari, Bihar- 845401, India

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Abstract

Purpose: The purpose of this article is to explore the users' knowledge about artificial intelligence in an automated scenario of central library of Banaras Hindu University.

According to the study, user awareness is still moderate even though AI is improving cataloguing, resource access, and user services at the Central Library.

Scope: This study explores the users' awareness of Central Library of Banaras Hindu University in intelligent environment as well as the automation of this academic library utilizing AI.

Methodology: For this study, a total of 100 questionnaires were distributed, and 85 BHU users answered. The data was analysed using Microsoft Excel to understand user perspectives and experiences, as well as to investigate the impact of AI on library automation.

Findings: Of those surveyed, just 45.88% were aware of chatbots and other AI tools. 56.47% of them visited daily, despite this. According to a survey, 64.71% of Central Library patrons are aware of automation. The report highlights how artificial intelligence (AI) is transforming traditional library operations by enhancing services and user engagement through intelligent technology. Results demonstrate that AI improves productivity and customization, satisfying the changing requirements of scholars, teachers, and students.

Keywords: Smart Library, AI Technology, Artificial Intelligence, Automated Library Systems, Central Library, Digital Libraries.

I. Introduction of the Study

Libraries are quickly changing from static information repositories to dynamic, tech-driven smart libraries in the digital age. This change is mostly due to artificial intelligence (AI), which has brought about intelligent automation, individualized user experiences, and effective information retrieval technologies. Implementing AI technologies such as predictive analytics, automated cataloguing, and virtual assistance can enhance libraries' operational effectiveness and meet the diverse needs of their patrons. Academic Libraries are not exempt from the technology revolution that has swept through traditional institutions in the twenty-first century. This introduction explores the significance of AI in reshaping library functions and sets the stage for analyzing its specific applications and impacts within the Central Library of Banaras Hindu University (BHU). Using AI technologies, the library is set to introduce innovative services and resources that will greatly enhance the library experience for all users. These forthcoming developments are expected to transform users' engagement with information and the community.

II. Review of related Literature

Moghe, Nagarkar, and Pradhan (2024) explored the critical evaluation of the KOHA Open-LMS (Library Management System) implementation is provided in this study for each of the 13 libraries of higher education institutions in Pune, Maharashtra's Maharshi Karve Stree Shikshan Sanstha (MKSSS). **Manjunatha and Kumar (2024)** studied postgraduate Library and Information Science (LIS) students in South Indian universities are asked to consider their knowledge of and use of automation, digitization, and reference management systems. **Park and Doo (2024)** reviewed the developments in artificial intelligence (AI) technology offered chances to create more dynamic and varied blended learning as it transitioned into a new phase during the COVID-19 pandemic. **Wingström, Hautala and Lundman (2024)** studied the creativity has been impacted by artificial intelligence (AI). The usual definitions of creativity, which have historically included five components—actor, process, outcome, domain, and space—are called into question by the developments of creative AI systems. **Bozkurt and Sharma (2023)** analysed the given the permanence of generative AI, we must investigate the possible applications of these technologies in online and remote learning, considering both the advantages and disadvantages. **Echedom and Okounghae (2021)** examined the characteristics of artificial intelligence (AI), its application to library operations, instances of academic libraries in Sub-Saharan Africa that have implemented AI technologies, the necessity of AI in libraries, and the difficulties in implementing AI in libraries were all covered in this study.

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Objectives of the Study

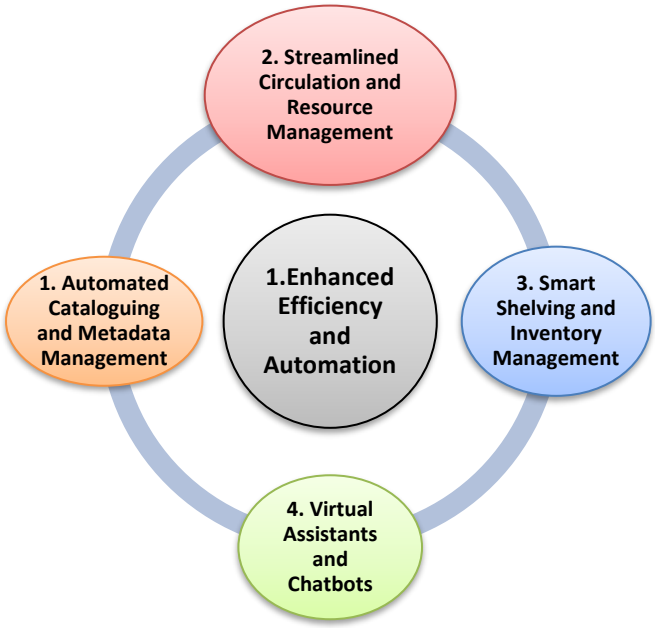
- To identify and analyse the key applications of Artificial Intelligence (AI) in modern library systems.
- To assess the awareness, adoption, and utilization of AI tools among library professionals and users.
- To find out the benefits and challenges associated with implementing AI in library environments.
- To study the impact of AI on the efficiency, personalization, and accessibility of library services.

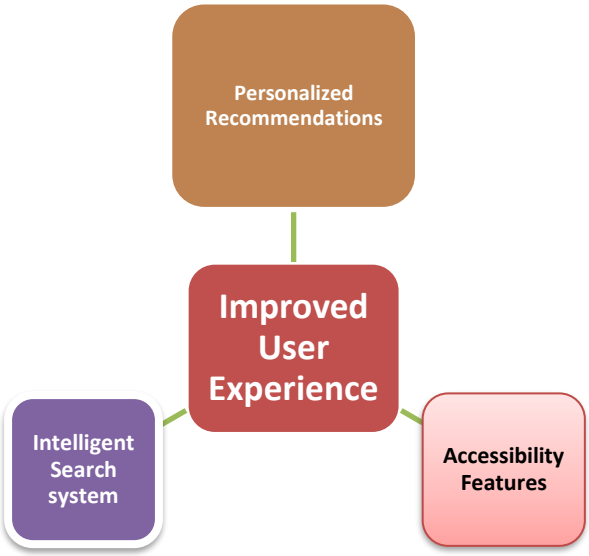
Limitations of the study

The study is limited to UG, PG and Research Scholars of BHU to investigate the awareness about role and AI applications in automated library environment.

Role of AI in Enhancing Smart Libraries in Automated Systems

AI is playing a vital role in transforming traditional libraries into "Smart Libraries" by enhancing efficiency, improving user experience, and optimizing resource management. AI-powered tools automate tasks like cataloguing, classification, and metadata generation, while also providing personalized recommendations and intelligent search systems. This shift allows librarians to focus on more complex tasks and community engagement, ultimately making libraries more accessible and responsive to user needs.





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The library is currently using AI applications to improve smart libraries.

Through a variety of applications, such as intelligent guiding, personalized suggestions, automated chores, and enhanced search capabilities, artificial intelligence is being applied in libraries to improve smart library functions. A crucial element is Natural Language Processing (NLP), which makes it possible for chatbots to assist users and analyse text data to gain insights. Algorithms for machine learning assist with tasks like recommendation systems and library operations optimization. Libraries may improve the whole library experience for patrons and employees by using these AI tools to create more effective, entertaining, and user-friendly spaces.

A closer study at AI applications in libraries can be found here:

1. Intelligent Guidance and Navigation

- ❖ Virtual Assistants/Chatbots
- ❖ Intelligent Sensing Spaces

2. Intelligent Navigation

- ❖ Better User Experience
- ❖ Personalized Suggestions
- ❖ Enhancements to Search Features

3. Summarizing the Content

- ❖ Automated Tasks and Operations
- ❖ Automated Cataloguing
- ❖ Intelligent Inventory Management

4. Data Analysis and Reporting

- ❖ Research and Learning Support
- ❖ Virtual Research Assistants

5. Citation Analysis

- ❖ AI Frameworks and Libraries
- ❖ Natural Language Processing
- ❖ Machine Learning
- ❖ Data Mining

Key barriers of AI Adoption

There are some following crucial barriers to adopting AI technology: Adoption of AI is trammel by a variety of factors, including organizational, ethical, and legal issues.

Technical Barriers:

Data Quality and Infrastructure Deficits: Large amounts of structured, high-quality data are necessary for AI systems to operate efficiently; inconsistent or subpar data might result in unreliable outputs and reduce performance. In addition, many libraries lack the solid IT infrastructure (such as a dependable power supply and powerful network access) required for smooth AI integration and growth, as well as antiquated legacy systems.

Financial Barriers:

High Implementation and Maintenance Costs: One of the biggest obstacles, particularly for underfunded schools, is the substantial upfront costs associated with hiring hardware, software, and AI expertise. Another significant, long-term financial burden is the continuing expenses for upkeep, updates, and retraining AI models.

Organizational Barriers:

Lack of Skilled Personnel and Training: One major obstacle is the severe lack of personnel with specific AI knowledge and data science abilities. Many employees find it difficult to use AI tools effectively due to a lack of professional development programs and the frequent need for extensive training for current personnel.

Ethical and Legal Barriers:

Privacy, Security, and Bias Concerns: AI applications frequently call for gathering and analysing large amounts of user data (such as borrowing history and others), which presents significant privacy and data protection concerns that run counter to the

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library profession's dedication to patron privacy. Due to imbalanced training data, algorithmic biases in AI models have the potential to reinforce social injustices and produce unfair or discriminating results in the provision of services.

Operational Barriers:

Interoperability and Customization Issues: It might be technically challenging and necessitate significant customisation to integrate AI technologies with current, frequently proprietary library management systems (LMS). It is particularly challenging to guarantee accountability and transparency in library operations due to the "black box" nature of some AI decision-making processes.

III. Research Methodology

This study examines the impact of Artificial Intelligence (AI) on the automation of libraries in the current scenario. I distributed 100 closed ended questionnaires to users to gather their experiences and perspectives on AI in an automated library environment, and received only 85 responses. The data was collected from the users of the Banaras Hindu University. Received data was processed and analysed using MS-Excel.

Data Analysis and Interpretation

Table 1: Gender Category of Respondents

Gender of the Respondents	Number of Respondents	Percentage of Respondents (%)	X	F	FX	Arithmetic Mean ($\bar{X}$)	Total 85 (100%)
1. Male	52	61.18%	52	1	52	42.5	
2. Female	33	38.82%	33	1	33		

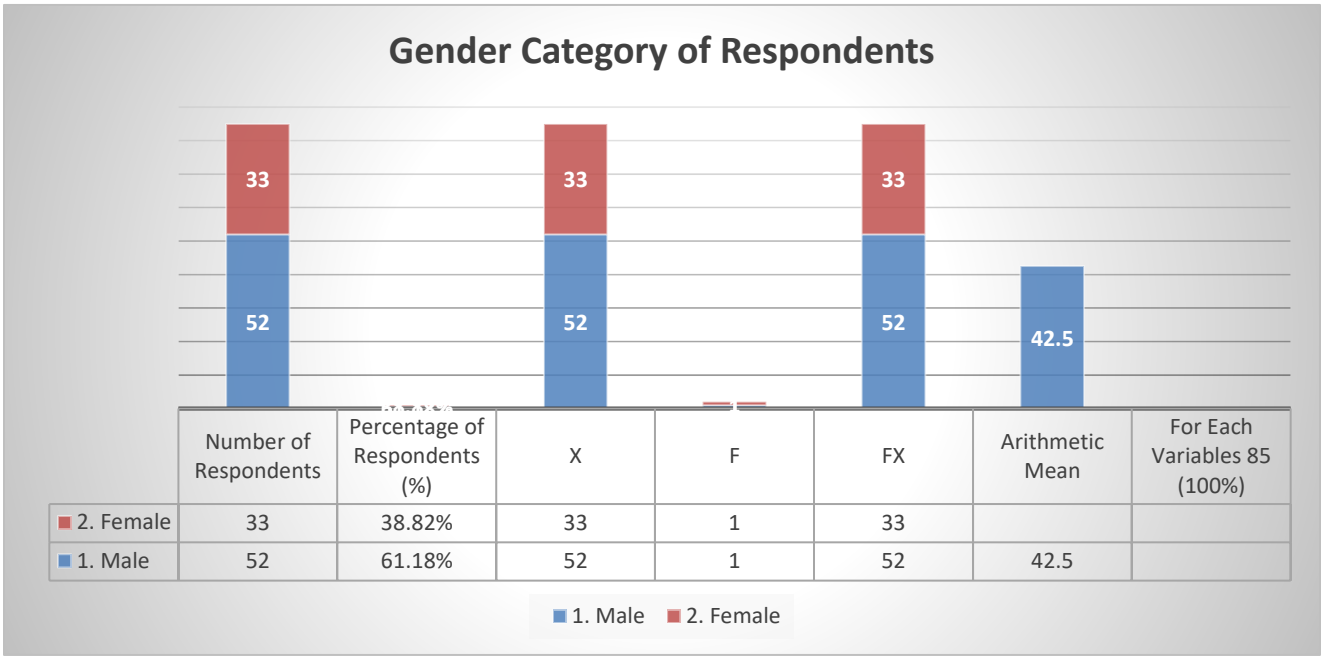

Table 1 illustrates the gender distribution of the respondents, out of 100 total 52 (61.18%) males and 33 (38.82%) females participating in the questionnaire.

Table 2: Category of the age of the respondents

Age of the Respondents	Number of Respondents	Percentage of Respondents (%)	X	F	FX	Arithmetic Mean ($\bar{X}$)	Total 85 (100%)
1. 18-25 yrs	82	96.47%	82	1	82	42.5	
2. 26-30 yrs	3	3.53%	3	1	3		

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According to the graph, the largest percentage of responders is between the ages of 18 and 25 of the replies to the questionnaire, 82 (96.47%) users are between the ages of 18 and 25, and 3 (3.53%) are between the ages of 26 and 30.

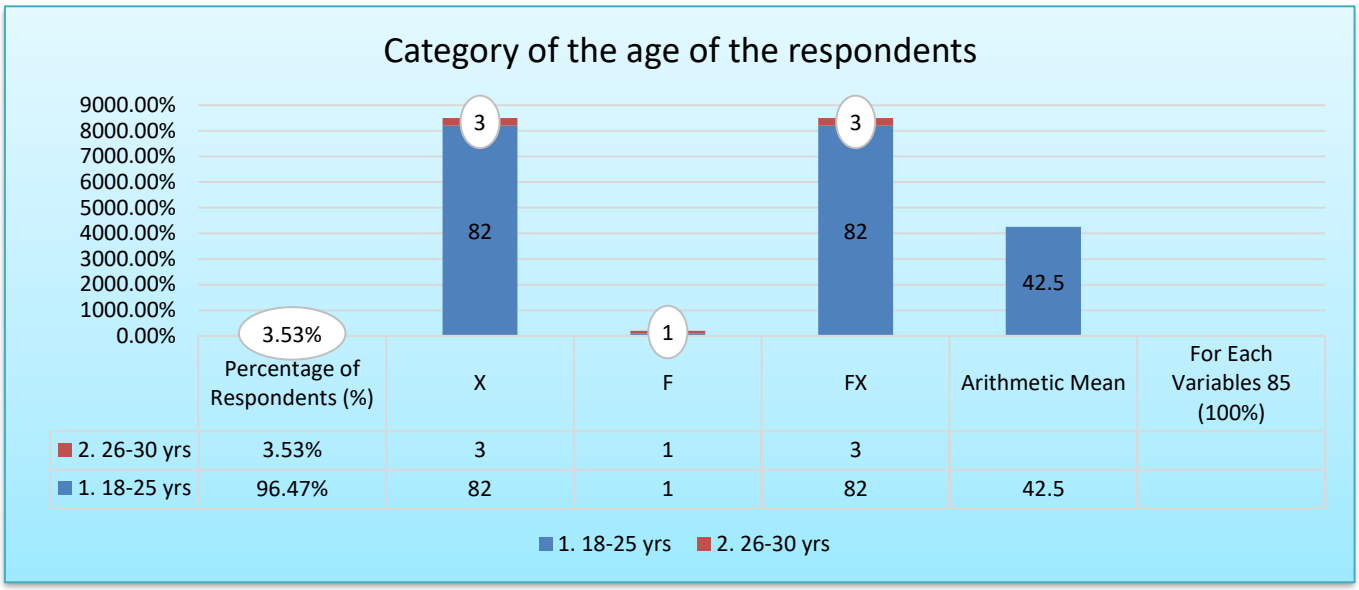

Table 3: Category of Educational Qualification of the Respondents

Category of Educational Qualification of the Respondents	Number of Respondents	Percentage of Respondents (%)	X	F	FX	Arithmetic Mean ($\bar{X}$)	Total 85 (100%)
1. UG	50	58.82%	50	1	50	28.33	
2. PG	23	27.06%	23	1	23		
3. Research Scholar	12	14.12%	12	1	12		

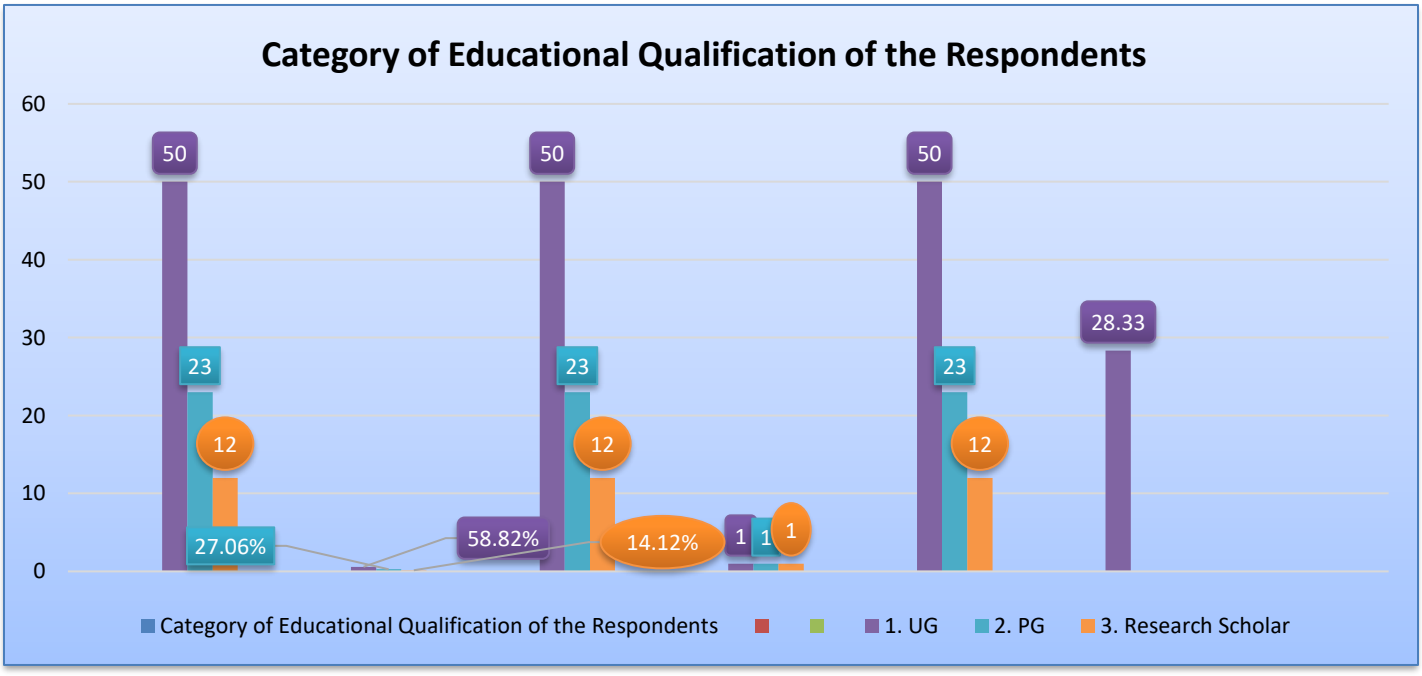

Table 3 shows that there are 50(58.82%) users are under-graduate followed by 23(27.06%) users are post-graduate and 12(14.12%) users are research scholars who responded the distributed questionnaire as per the received data.

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Table 4: Status of daily visit the library

Status of daily visit the library	Number of Respondents	Percentage of Respondents (%)	X	F	FX	Arithmetic Mean ($\bar{X}$)	Total 85 (100%)
1. Yes	55	64.71%	55	1	55	21.25	
2. No	9	10.59%	9	1	9		
3. Sometimes	20	23.53%	20	1	20		
4. Rarely	1	1.18%	1	1	1		

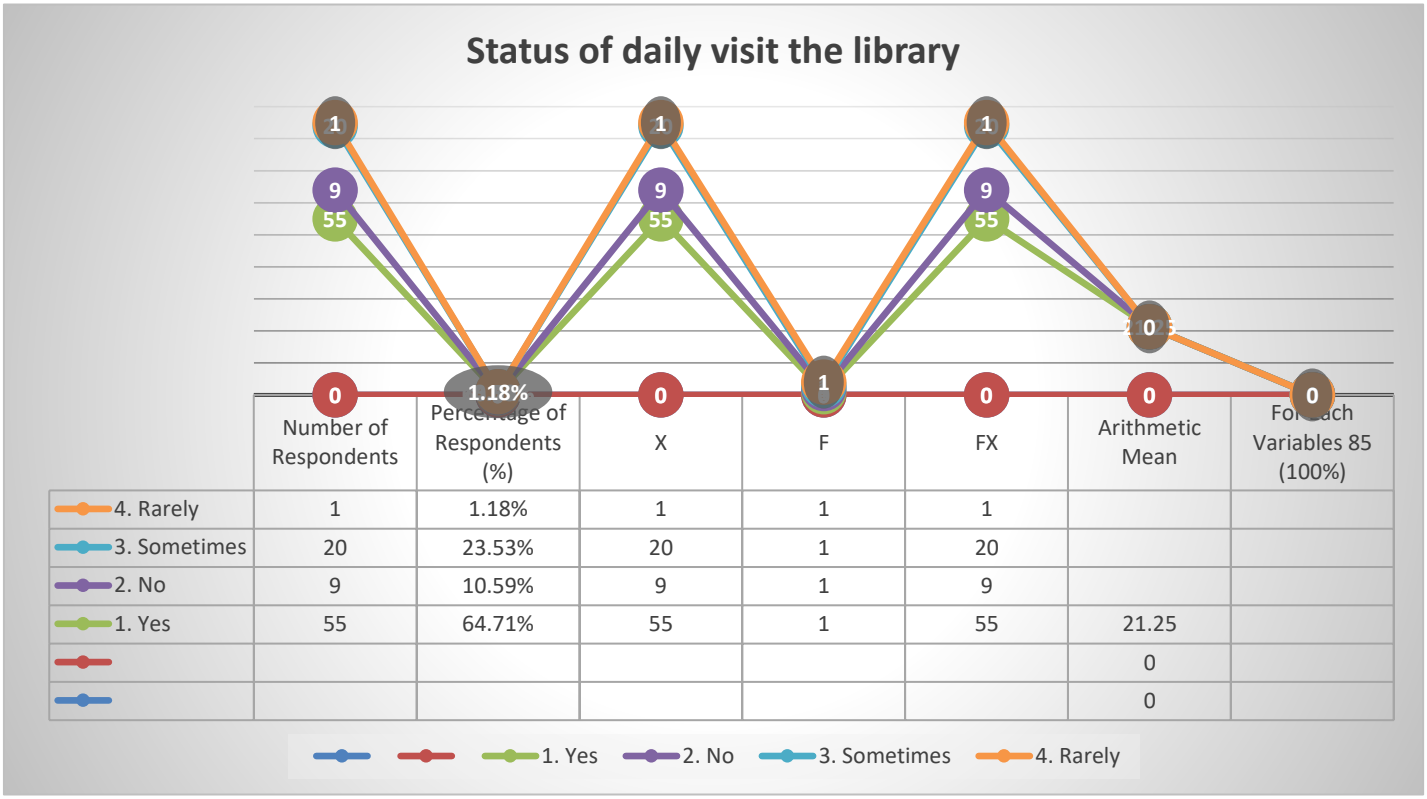

Table 4 shows the information about library among respondents. Out of the participants, 55 (64.71%) indicated that they visit the library regularly. In contrast, 9 (10.59%) reported that they do not visit the library, while 20 (23.53%) mentioned that they visit sometimes. Additionally, 1 (1.18%) stated that they rarely visit the library based on the responses received.

Table 5: Frequency of visit the central library by the users

Frequency of visit the central library by the users	Number of Respondents	Percentage of Respondents (%)	X	F	FX	Arithmetic Mean ($\bar{X}$)	Total 85 (100%)
1. Per day/Daily	48	56.47%	48	1	48	17	
2. Twice in a week	3	3.53%	3	1	3		
3. Thrice in a week	7	8.23%	7	1	7		
4. Once in a week	3	3.53%	3	1	3		
5. Whenever needed	24	28.23%	24	1	24		

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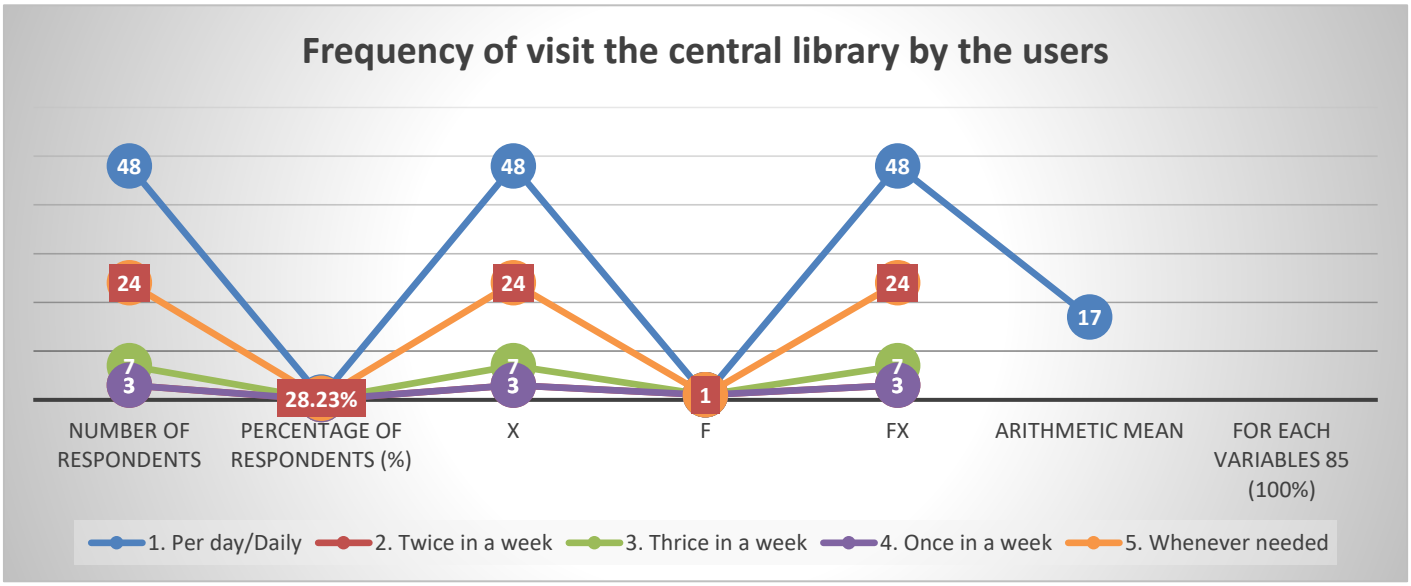

Table 5 examines the frequency with which users visit the central library. The largest group, comprising 48 users (56.47%), visits the library daily. Following this, 3 users (3.53%) reported visiting the library only twice a week, while 7 users (8.23%) visit three times a week. Additionally, 3 users (3.53%) visit the library just once a week, and 24 users (28.23%) visit the library as needed.

Table 6: Users' awareness about library automation

Users' awareness about library automation	Number of Respondents	Percentage of Respondents (%)	X	F	FX	Arithmetic Mean ($\bar{X}$)	Total 85 (100%)
1. Yes	53	62.35%	53	1	53	42.5	
2. No	32	37.65%	32	1	32		

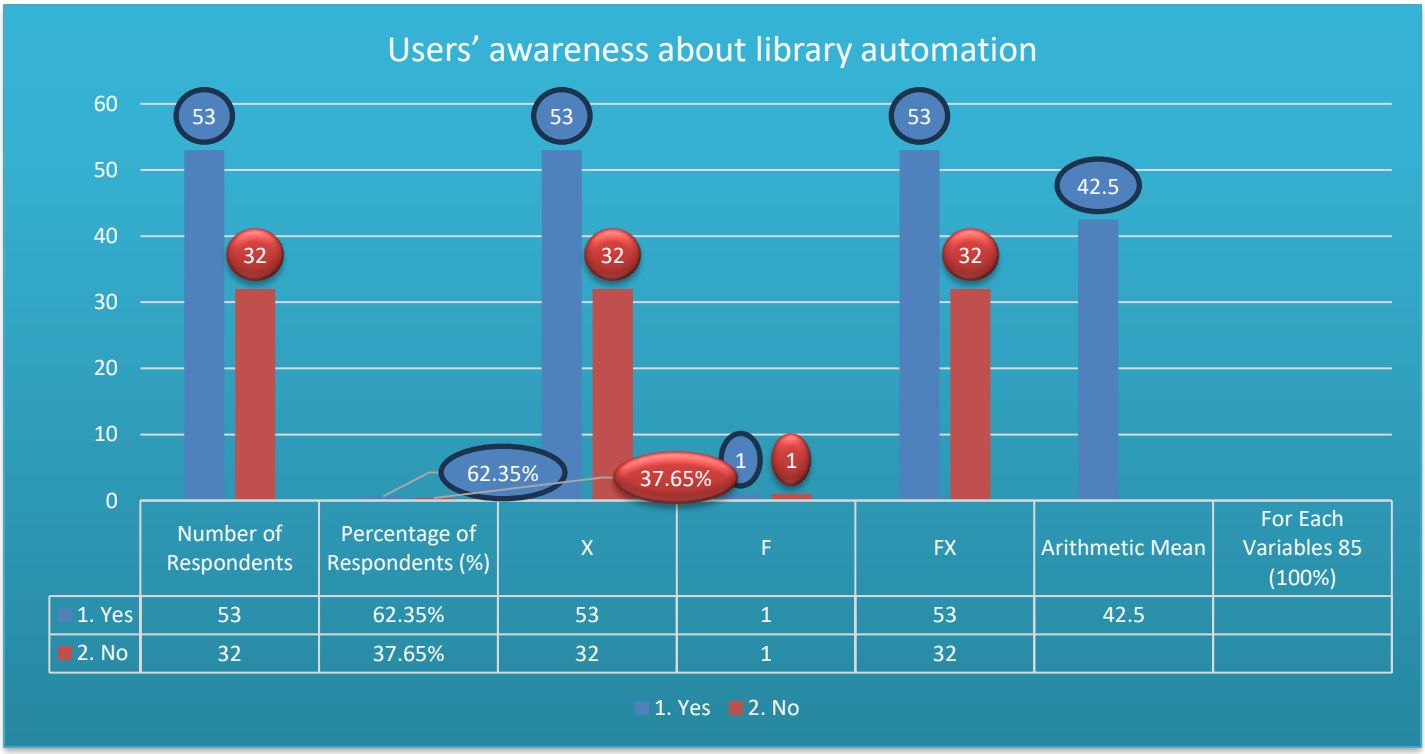

Table 6 shows majority 53(62.35%) of users admit that they are aware about automation of library whereas 32(37.65%) users were not aware about library automation in the central library as per the received responses.

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Table 7: Status of automation in the library

Opinion of Users on automated library	Number of Respondents	Percentage of Respondents (%)	X	F	FX	Arithmetic Mean ($\bar{X}$)	Total 85 (100%)
1. Fully automated	27	31.76%	27	1	27	28.33	
2. Semi-automated	39	45.88%	39	1	39		
3. Partially automated	19	22.35%	19	1	19		

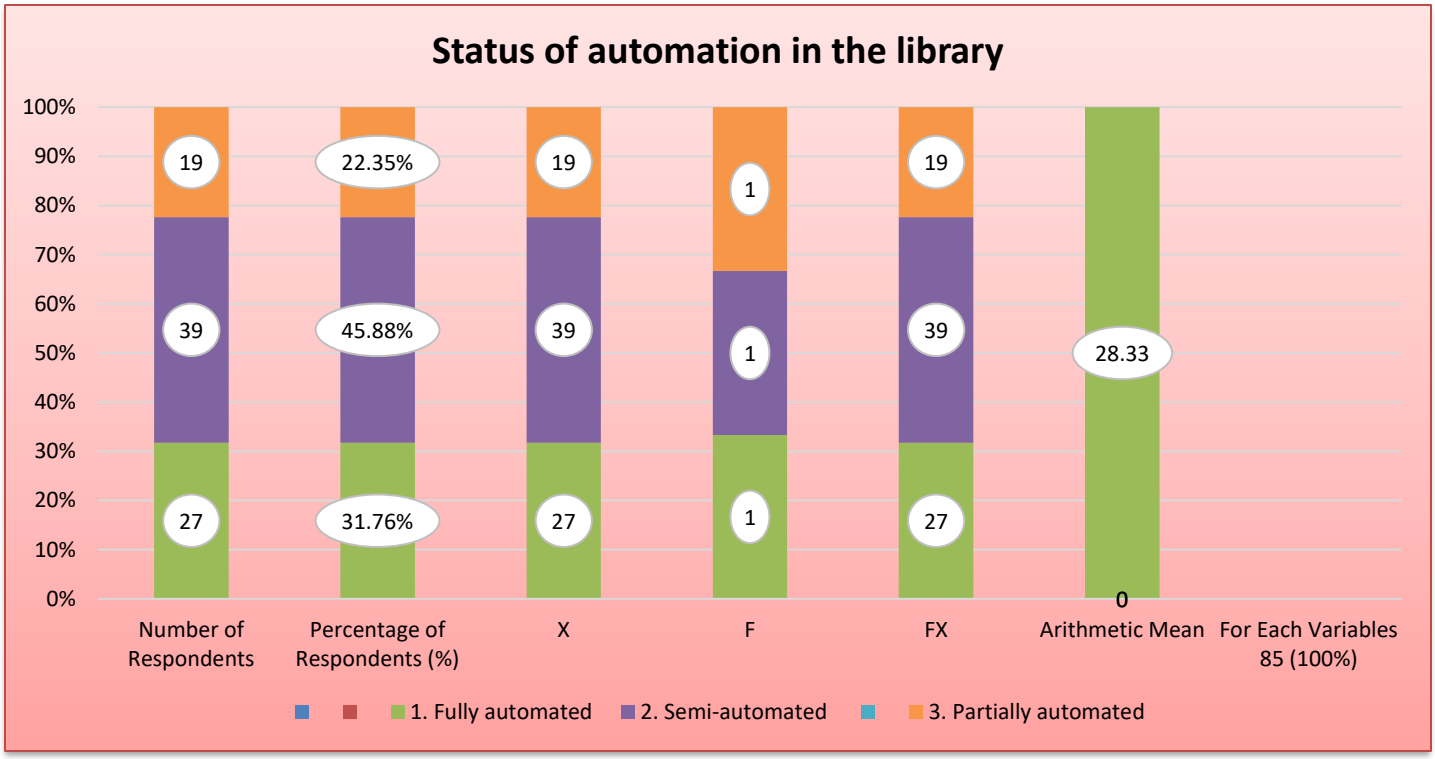

Table 7 shows that the highest proportion of respondents, 39 individuals (45.88%), indicated that their library is semi-automated. Additionally, 27 respondents (31.76%) reported that their library is fully automated, reflecting a positive trend toward the adoption of complete digital systems in library services. Whereas, 19 respondents (22.35%) stated that their library is partially automated.

Table 8: Users Awareness about Artificial Intelligence

Users Awareness about Applications of Artificial Intelligence	Number of Respondents	Percentage of Respondents (%)	X	F	FX	Arithmetic Mean ($\bar{X}$)	Total 85 (100%)
1. Yes	39	45.88%	39	1	39	28.33	
2. No	21	24.70%	21	1	21		
3. Not Sure	25	29.41%	25	1	25		

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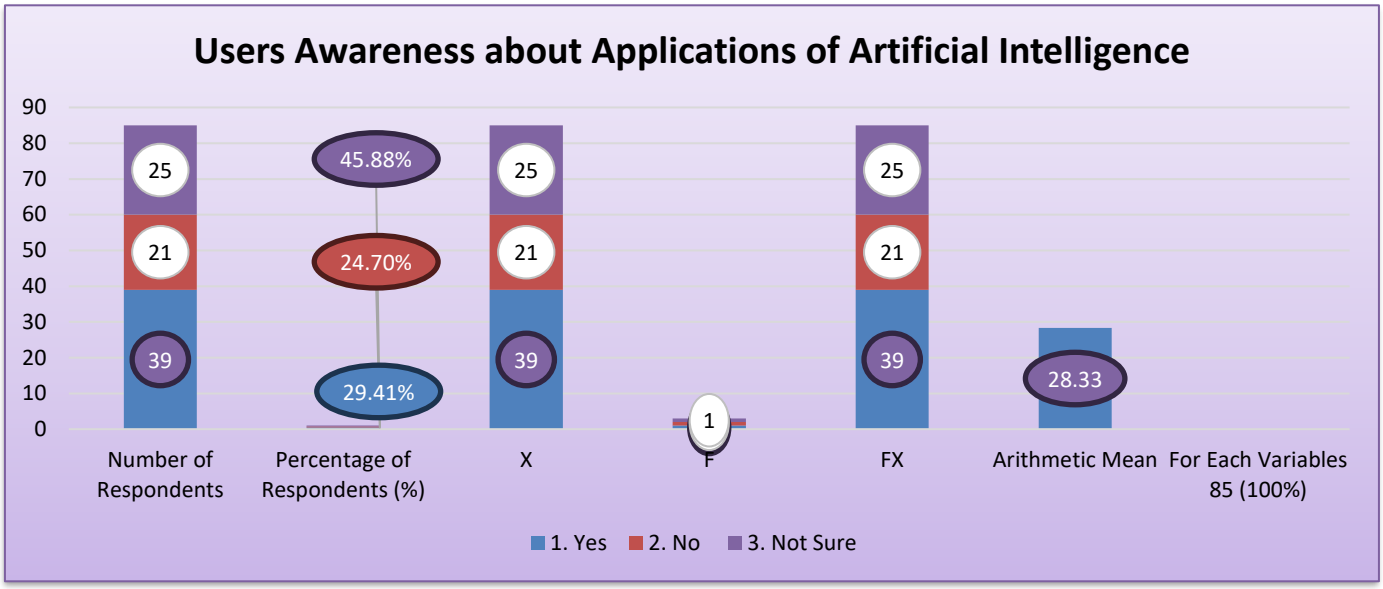

Table 8 indicates that 39 users (45.88%), representing a significant majority of the respondents, reported that they were aware of AI applications. In contrast, 21 participants (24.70%) stated that they were unaware of such applications. Additionally, 25 respondents (29.41%) selected the "Not Sure" option, reflecting uncertainty or confusion regarding the use of AI applications.

IV. Findings of the Study

There were 52 (61.18%) male and 33 (38.82%) female respondents contributed for the study. There were 82(96.47%) majority of users are lies between the age category of 18 to 25 years old. There were found maximum 82 (96.47%) users got between 18 to 25 yrs. who responded the questionnaire. These statements show that 50(58.82%) users were under-graduate there after 23(27.06%) respondents were post-graduate and 12(14.12%) respondents were research scholars. There were maximum 55(64.71%) respondents admit that they are visiting the library at regular basis and 20(23.53%) users visit the library sometimes. 48(56.47%) users daily visit the library for their study purposes whereas 24 (28.23%) users visit the library when they needed. There were upmost 53(62.35%) users aware that their library is automated. The maximum 39(45.88%) respondents were aware about artificial intelligence (AI) applications in the library.

V. Conclusion

A revolutionary change in how libraries function, provide services, and engage with patrons is represented by the incorporation of Artificial Intelligence (AI) into library systems. The ways that intelligent systems are redefining conventional library functions were highlighted in this study, which examined the many roles and applications of AI in the context of smart libraries. This study investigated and found almost 64.71% respondent visited library daily and 62.35% shows users' awareness about library automation. This study also reflected that 45.88% respondents aware of AI's applications useful for users in libraries.

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