Recent Reforms in Academic Libraries with the Advances of Artificial Intelligence

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Abstract: Recent advancement of technology i.e., a machine can think and act like human called as artificial Intelligence (AI) is applied almost all the domain of engineering, science and humanities throughout the globe. The smart programming technique with varying machine languages like Java, Python, Lisp, Prolong and R helps a machine to mimic as human. The usage of artificial intelligence is also practices in libraries of different Institutes of higher education in India and abroad. Expert systems for reference services, shelf-reading robots, virtual reality for immersive learning and future forecasting of advance resources etc. can be easily taken care with AI. The support of AI tools and its use in higher academic institute fetches as high as 93% and lowest of 49% as per the view of different level of experienced faculties of the varying institutes in Uttar Pradesh (UP). Whereas 70.9% of the students belief that libraries with artificial intelligence will serve the best for user services. Though, 61.3% library assisting personal possess negative attitude towards the application of AI in libraries and lagging of infrastructure support is also a major factor to adopt AI in higher educational libraries in India.
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Keywords: Artificial Intelligence, Library, Academics, Network, Information Technology.

I. INTRODUCTION

The advancement in teaching, learning and research in this digital age is possible due to some notable development of AI. Artificial Intelligence and different applications of it have been significantly impact on the educational library in India. Though the school education, especially private schools were quick enough to shift its whole affair to online platform than the higher education sector in India (Wadia, 2020). Administrators/ librarians of different academic institutes can manage data information through ICT (Information and Communication Technology) that could be accessed by the library personals, faculties and students through their mobile applications that to be used for their academic requirement (Mohan Lal Kaushal et al. 2022). In the period of eventualities distance learning and libraries took an essential role for the development of both students and teachers when both are physically separated and interconnect with each other by means various communicating technologies Ministry of Education of the Russian Federation (2020). In this context of education digital libraries take a key role (Lande and Barkova 2013) for the progress and output of education. The journey of up gradation initiated from last decades, before the COVID-19 pandemic and hence forth the leading role was playing by digital technology (Tait et al. 2016), that was consider as a disruptive force in the field of library and its service sector. But the literature revealed that the proportion of libraries that use remote-access channels was limited within 34% (Guo et al. 2020). Present invention of varying tools of AI such as, chatbots can efficiently monitor user inquiries and provide instant assistance, improving overall user satisfaction. Intelligent libraries equipped with AI technologies can streamline cataloging, classification, and recommendation processes, enabling efficient information access for patrons. The implementation of AI in libraries also possesses certain challenges and opportunities. (M K Manik et al.2021) reported that most of the students, near about 57.8% suffered at the time of online classes due to network issue and limited internet efficiency is the second major issue in this juncture. Most of the conventional Libraries changes with AI technologies to enhance human-centric values, improve ICT and work of libraries. The varying tools of AI improve the collaboration between libraries, researchers, and technology developers are crucial to advancing AI solutions tailored specifically to the needs of libraries and their diverse user base. Though, AI techniques in libraries-based literature is still limited, however a limited scholarly researchers are working in this area. However, there are emerging examples of libraries exploring the potential of AI, such as the US Library of Congress' LC Labs (Haffenden et al., 2023).

II. METHODOLOGY OF IMPROVED SEARCH AND RECOVERY

This research will provide comprehensive feedback of the application of AI in libraries and its initiation in different library operations. Based on the result of the Scopus database and other valuable resources the authors viewed a valuable insight towards integrity of AI technologies within the library context. The methodology is considered for this research is the direct feedback from faculties, students and library staff involving for different operations and culture in libraries. This research provides an in-depth understanding of different AI's tools and its application and challenges by exploring diverse topics such as AI chatbots, intelligent libraries, robots in libraries, and smart libraries. The past literature clearly reviewed that AI in libraries promptly effect on

digitalization and modernised information technique to serve all their stakeholders. Presently most of the AI-based library systems are acted on software reuse, collection of information to apply digital video library applications, and to provide multilingual access for library resources. Besides, this research also confers the suggestions of AI on libraries based on feedback and the potential growth, challenges and opportunities in future. Readers can search and share their materials through AI-powered search engines and recommended system. AI tools such as advanced algorithms and natural language processing enable users to find relevant materials very quickly and efficiently. The method also helps to understand user queries, recommend related resources, and adapt to user preferences. It offers direct employee and users' relationship, the need for regulations and ethical considerations of libraries to serve better in long run. The feedback also highlights the change of libraries for accepting AI technologies and helps lifelong learning opportunities to their people.

Application of Chatbots and virtual assistance: Most of the libraries in India presently use unified AI-driven chatbots and virtual assistants into their websites. This well-organized AI-powered supports can handle routine inquiries, guide their readers through available library resources, and provide prompt assistance in his/her academic, thus relieving the workload and valuable time of library staff.

Recommendation of valuable resources with Content Curation: Algorithmic support of AI is being taken to recommend academic resources, such as books, journals, articles of varying nature, and databases based on a user's search history, reading habits and their interests. This personalization improves the user skill, also encourages investigation to find out new materials as per user requirements. Automatic cataloging and organization of large volumes of a library can be possible with the help of AI in the present time, this can predominantly useful for handling very large digital collections. These practices also confirm that resources are labelled correctly and help for easy findings for future wants.

Easy to Metadata management: Automated metadata creation is possible with AI that helps maintenance and upkeeping huge library resources to create the cataloging process more efficient by reducing human error. AI is very crucial for managing extensive digital collections at present era. Optical Character Recognition (OCR) technology of AI can be utilized for making digitalization and searching premiere historical or rare manuscripts to fulfil user requirements.

Language Translation with Maintenance of Security: A robust security is very essential to protect digital library collections and control access of those materials are only possible through AI interaction and AI helping tools play very important role to do it. On the other hand AI driven translation tools effectively helps to bridge between the languages and create user friendly foreign language resources easily.

Virtual Reality (VR) and Augmented Reality (AR): Creation of immersive learning experience could be possible AI with Virtual Reality (VR) and Augmented Reality (AR) that allow users to explore virtual libraries or user may get additional information relating to physical resources through it. The present industrial revolution attempts to replace human activities/power by machine and the impact of AI with advances of fast computer enormously changes the work ideologies of libraries. Here a simple artificial network that generally deployed in different libraries in the area of study has been shown in fig.1. Artificial Neural Network (ANN) consists of different layers of nodes, the raw information is fed to input nodes and based on the instructions the datais being processed and move to the next layer of nodes, in the comimg layer again these partially process data further moves towards the require output by removing errors and finally suggested output comes out.
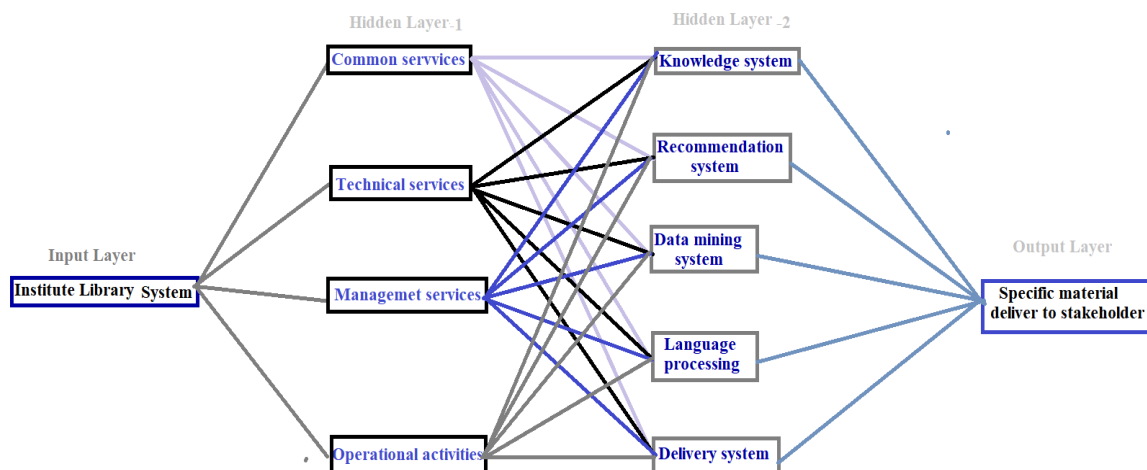

Fig.1 A simple network of artificial intelligence used in academic library to deliver information to their stakeholders

Machine learning is a process where a machine can think and imitate as human by training (training of machine can be done with or with out supervisor), finally it provide the result based of information and feedback based on raw data. Accelaration of this technology initiated from last decade and severe progresses have been done till this time. The global pandemic also opened up the different problems and accelerated this digital form of educational/institutional libraries (M K Manik et. al.2021). A simple network model of artificial intelligence is generally used in academic library that is shown in fig.1.
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III.   RESULT AND DISCUSSION

Academic survey has been carried out in sixty-eight (68) higher academic institutes of Uttar Pradesh. Feedback of two hundred seventy-two (272) faculties with experience of 1-10, 10-20 and 20-30 years respectively has been narrated their view of AI tool and its application for the functioning of Al in library. One thousand four hundred twelve (1412) research scholars of NET-JRF online examinees of different domains also put their opinion on the basis of percentage as AI is useful in academics as well as its necessary for library application that describes in fig.2 (a) & (b).
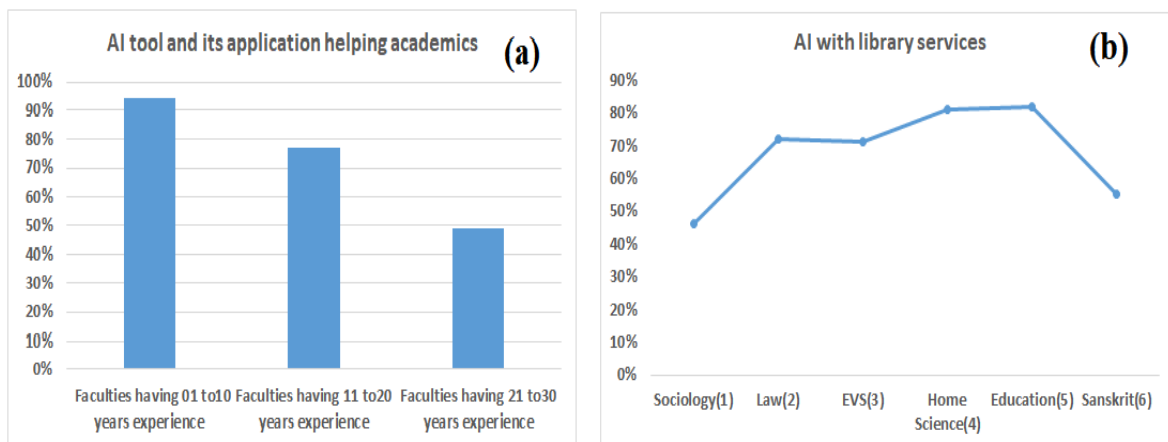

Fig. 2 (a) & (b) depicted that AI tool is applicable in higher academics and it's also helpful in institutional libraries

In the fig.2 (a) & (b) depicted that the support for the need of AI tools and its use in higher academic institute fetches as high as 93% and lowest of 49% as per different level of experienced faculties of different institutes whereas 70.9% of the students belief that libraries with artificial intelligence will serve the best for user services.

Direct survey from nineteen libraries of Uttar Pradesh express the varying challenges to use AI tools in libraries. In most cases the management reported that the initial price is very high to established AI in libraries. Near about 69% hurdles faced by librarian to get fund to manage AI supported library. Vender support at the initial stages was very horrible as per view of library staff but this issue is gradual resolved and most of the colleges/institutes serve with good vendor support.
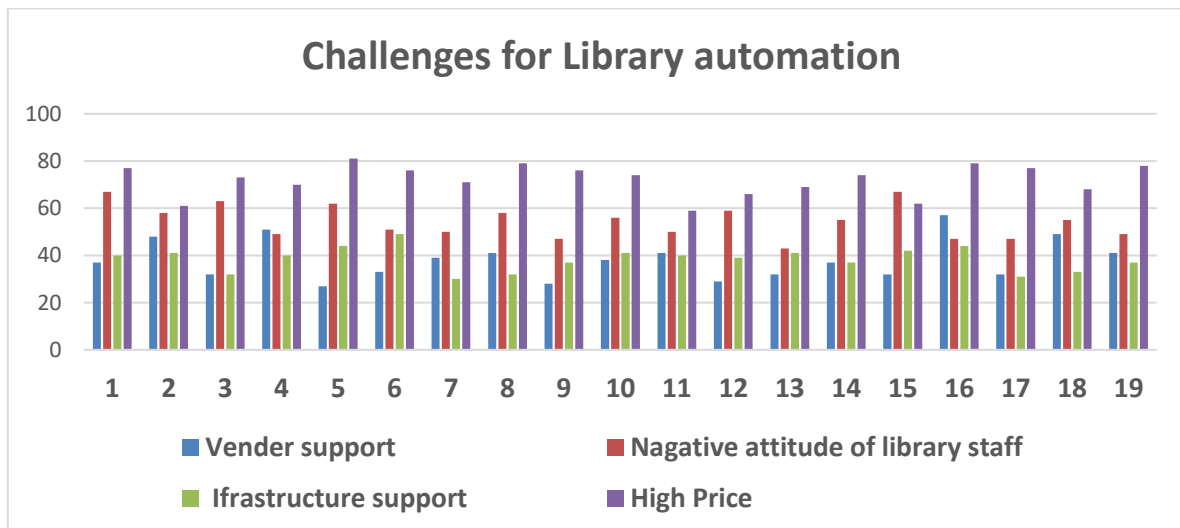

Fig. 3 Different challenges to use AI tools in higher academics institutional libraries

Negative attitude of library staff was reported 61.3% as a whole that clearly indicated the training is very essential to upgrade and motivate the library staff towards the application of AI in libraries. Infrastructure support is also lagging in most of higher educational libraries to work with AI; this is also a key concerned to apply AI tools in different libraries.

IV. CONCLUSION

Present libraries with Artificial Intelligence (AI) embraces immense potential to upkeep library operations for satisfying versatile requirement of user. The research is highlighted the varying tools of AI technologies such as AI chatbots, intelligent libraries, robots has employed in different libraries to serve their stakeholders requirements. The user feedback clearly narrated that AI can I help collection and retrieval of information, it can accomplish automated routine tasks, prompt user interactions, offer innovative ideas for better customer services etc. Based on the feedback and the views of varying library personal the following conclusions are made as follows.

As a whole AI is very essential for all the stockholders of educational/public libraries.

The support for the need of AI tools and its use in higher academic institute fetches as high as 93% and lowest of 49% as per view of different level of experienced faculties of the institutes in the varying part of Uttar Pradesh.

Whereas 70.9% of the students belief that libraries with artificial intelligence will serve the best for user services.

Though 61.3% library assisting personal possess negative attitude towards the application of AI in libraries.

Feedback reported that infrastructure support is also lagging in most of higher educational libraries to work with AI.

Work to carried out by taking large numbers of libraries from the different states of India and abroad to get the best and more accurate result.

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