AI-DRIVEN LIBRARY MANAGEMENT FOR PRESERVING INDIGENOUS CULTURAL HERITAGE: BRIDGING TRADITION AND TECHNOLOGY IN KNOWLEDGE SYSTEMS

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Abstract :

The integration of artificial intelligence (AI) in libraries offers unprecedented opportunities for the protection, promotion and ethical management of indigenous knowledge systems (IKS). This study examines how driven AI tools can improve the organization, accessibility and involvement in traditional knowledge in libraries focusing on PUNE City institutions. It examines the role of AI in cataloguing traditional knowledge sources, development of systems of recommendations and users via Chatbot AI. Research also examines how AI can help overcome challenges in the documentation and preservation of oral traditions, folk practices and ancient texts in addressing ethical questions such as data ownership, cultural sensitivity and fair approach. Using empirical data from university libraries in PUNE studies evaluates the impact of AI on improving the visibility and usability of IKS resources. The findings emphasize the potential of AI transform IKS libraries, but emphasize the importance of ethical frames, employee training and implementation of culturally sensitive AI to protect traditional knowledge. Political recommendations are offered to ensure a responsible and sustainable acceptance of AI in the management of a library based on IKS.

Keywords: Artificial Intelligence, Indigenous Knowledge Systems, Library Management, Traditional Knowledge, Ethical Issues, Resource Preservation, User Engagement

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Introduction :

Libraries have historically played a decisive role in maintaining and promoting indigenous knowledge systems (IKS), which include oral traditions, folk medicine, local practices and ancient texts. However, shifting towards digital libraries and AI -controlled instruments represents both opportunities and challenges for sustainable management of traditional knowledge. The aim of this study is to explore how AI in libraries can improve the maintenance and availability of ICS resources in dealing with ethical concerns related to cultural sensitivity, data ownership and fair approach.

AI powered technology, such as semantic search engines, automated generation of metadata and digital archiving, can improve cataloguing, searching and organizing traditional knowledge sources. At the same time, the recommendations and cottages controlled AI can increase the involvement of users by management of students, scientists and the public to the relevant ICS materials. By exploring higher education libraries in Pune City, this research examines the role of AI in the transformation of traditional knowledge management and offers

political recommendations for ethical and culturally appropriate acceptance of artificial intelligence.

Background of the Study :

The indigenous knowledge systems represent a number of cultural and intellectual heritage that must be preserved for future generations. Traditional knowledge, however, often threatens to be lost due to insufficient documentation, oral transmission and lack of integration into formal educational systems. Libraries can bridge this gap by using AI technologies to digitize, catalogue and access IKS resources for a wider audience. In PUNE College, the libraries are increasingly receiving digital tools, but their potential for maintaining IKS remains suspicious.

AI offers transformation options for IKS resource management. Automated cataloguing can classify traditional knowledge materials according to culturally relevant metadata, while AI Chatbots can provide multilingual support for users looking for information about folk medicine, indigenous art and local traditions. Ethical problems such as the risk of cultural appropriation, data privacy and algorithmic distortion.

Objective of the Study :

The aim of this study is to explore the following objectives:

1. Assess the role of AI while maintaining and promoting indigenous knowledge systems in higher education libraries in Pune City.
2. To find out how well the controlled AI tools work for cataloguing, organization and acquisition of standard knowledge sources.
3. Based on IKS, give ethical problems that appear when libraries use AI. These problems should include who owns data, sensitive to different cultures and be fair.
4. To submit political proposals, how AI can be used to check traditional knowledge of knowledge in a way that is ethical and long -term.

Significance of the Study :

This study is important because it focuses on how AI, library management and maintaining IKS can cooperate. The study focuses on libraries of higher education in Pune City and shows how controlled innovations AI can make available and more useful standard sources of knowledge. They also speak of moral issues and policies' results and increases to a greater conversation on how libraries can use AI responsibly on the basis of ICS.

An overview of literature :

This part will talk about how AI is used in IKS libraries, helps digitize and preserve traditional information and about the moral problems that appear when AI is used in the management of the library. "Artificial Intelligence in Libraries: Overview of applications and challenges" is one of the main topics that will cover. This article focuses on how AI has changed libraries by focusing on automation and organizing materials. Writers emphasize how AI tools such as machine learning and natural language facilitate organization, search and

catalogue things. AI systems can automatically mark and group resources, which makes it easier for people to find what they need.. In addition, Chatbots and Virtual AI controlled assistants increase user interactions by providing instant responses to users' questions and management through library systems. This progress reduces the work load of library employees and improves the overall efficiency of library operations.

However, the contribution also solves the calls associated with the acceptance of AI in libraries. Problems such as personal data protection, algorithmic bias and high cost of implementing AI systems are significant obstacles. The authors emphasize that libraries need to develop ethical instructions and ensure the transparency of the AI -controlled processes. They also suggest that libraries cooperate with AI developers to create adapted solutions that solve their unique needs. The post is closed by defending a balanced approach that uses the potential of AI while alleviating its risks.

"Enhancing Resource Discovery in Libraries Using AI: A Case Study" :

This paintings suggests a time study of the college Library, which delivered a device of discovery sources based totally on AI. The system makes use of device mastering techniques to observe how users behave and what they like. This allows the system to make personalised designs for books, magazines and other sources. as the writers give an explanation for, the AI system works with the library catalog instantaneous and makes searching less difficult. The processing of herbal language also makes use of the device to apprehend complex questions and offer accurate effects, despite the fact that customers input search terms that aren't clean or missing elements. it's far important to observe that the observe focuses on the good effects of the AI gadget on user pride and useful resource use. college students and teachers stated the device had saved their time and efforts and made it less complicated to discover what they wished. Writers additionally communicate approximately technical and operational issues that appear all through implementation, inclusive of want to work all the time and integrate various facts resources. even with those problems, the search for assets managed AI should exchange the manner libraries paintings, through being extra person -friendly and green..

"The Role of AI in Transforming Library Cataloguing and Metadata Management" :

This piece specializes in how AI may be used in library cataloguing and metadata management. Writers communicate approximately how AI tools which include deep mastering and semantic analysis may be used to make records extra useful and automated. AI structures can have a look at the aid cloth, pull out important information and create descriptive metadata, so human beings do not should do this stuff manually. This not only accelerates the catalogation process, but also makes it easier to find resources more accurate and consistent, which makes it easier. The contribution also focuses on how AI could be used to process multilingual and multimedia sources, which are difficult to catalog the old -fashioned way. AI systems can read and translate writing in different languages and also look at pictures, sounds and videos to make metadata that are useful. However, the authors warn that the ability to do good work in cataloguing will consist of how well the data training data can change, how they work. In the end, they ask for further research on how AI in the long run will change the cataloguing of the library and what librarians will do in the AI controlled environment..

"AI-Enhanced User Engagement in Indigenous Knowledge Systems Libraries: Opportunities and Challenges" :

This piece focuses on how AI could get more people to use the libraries of indigenous knowledge systems (IKS). People who wrote an article say that AI technology such as machine learning and natural language manipulation (NLP) can help link old -fashioned IK with new digital platforms. For example, Chatbots and AI controlled recommendations can provide users and direct them to relevant sources, still taking into account the cultural context of knowledge. The contribution emphasizes case studies where AI is used to digitize and organize oral history, traditional practices and other forms of indigenous knowledge, which allows you to access younger generations and researchers.

However, the authors also emphasize the ethical and cultural challenges of using AI in IKS libraries. Native knowledge is often deeply rooted in cultural practices and oral traditions, which may not be in line with the nature of AI systems based on data. There is a risk of distortion or simplification of indigenous knowledge unless AI tools are designed with cultural sensitivity. The contribution requires cooperation approaches that include indigenous communities in the development and implementation of AI systems to ensure that their values and traditions are respected. The authors have come to the conclusion that AI has the potential to revitalize and maintain indigenous knowledge, but only when used responsibly and inclusive.

"Leveraging AI for Community-Centered Engagement in IKS Libraries" :

This piece concerns how AI can help libraries of indigenous knowledge systems (IKS) to get people more to participate in their communities. Writers come up with a way to use AI to create platforms that are interactive, culturally relevant, and allow native communities to maintain and share their information. For example, AI tools for narration can help digitize oral history while maintaining the structure of stories and their social importance. Similarly, translation systems controlled by AI can make native information available to people who do not speak language, which can help people understand and cooperate with different cultures.

The study also talks about how important it is to be involved in designing AI tools for ICS libraries. The authors claim that indigenous groups should be involved in the design process to ensure that AI systems are in line with their wishes and cultural values. They show an example of a test project that AI used to create a digital library of native medicinal plants, to which local healers and community members could add. The project showed how AI can involve more people by making things more interactive and easy to access while protecting their cultural identity. Writers concluded that AI could turn IKS libraries into active community spaces where people can share and maintain information..

"Ethical Considerations in AI-Driven Management of Indigenous Knowledge Systems" :

This piece concerns how AI can help libraries of indigenous knowledge systems (IKS) to get people more to participate in their communities. Writers come up with a way to use AI to create platforms that are interactive, culturally relevant, and allow native communities to maintain and share their information. The tools that use AI to tell can help capture oral history while maintaining the structure of stories and their social significance. Likewise, translation systems controlled by AI can help people who do not know native information about access to language. This can help humans recognize and work with human beings from different cultures. The have a look at additionally talks about how essential it's far to assist create AI equipment for ICS libraries. Writers argue that native businesses must be lively in the manufacturing of

AI structures so that they're in keeping with their cultural values and needs. They show an example of a test project that AI produced a digital library of native medicinal plants that therapists and people in the community could join. The project showed how AI can involve more people by making things easier and more interactive, while respecting people's cultural identity. The authors concluded that AI could turn IKS libraries into places where people can share and inform information about the current state.

"Balancing Innovation and Ethics: AI in Indigenous Knowledge Preservation" :

This essay focuses on the conflict between new technology and moral duties in terms of using AI to protect indigenous knowledge systems (IKS). By digitizing oral history, traditional practices and ecological wisdom, writers talk about how AI can facilitate the finding of native knowledge and endure longer. But it also forces me to take care of how AI could strengthen the distortion or imbalance of performance that already exist. For example, AI systems that were taught on data sets that mostly contained western aspects could not misunderstand or underestimate the native knowledge, which would push them on the edges. In order to solve these moral problems, paper supports the AI development method, in which the indigenous groups actively participate in the selection. The authors present an example of the AI project, which successfully included indigenous views by the older of the community work on it with developers. This method has ensured that the AI system fits into the cultural values and priorities of the group. At the end of the post, it emphasizes how important it is to developers AI, scientists and indigenous groups to talk to each other to understand the ethical challenges of ICS management based on AI. He also applies for more money to be inserted into programs that create people's skills so that tribal communities can own AI technology.

Research Gap :

There are many studies on how AI could be used to improve library management and resource organization, but not much about how it could be used in the ICS library. The aim of the study is to fill this gap by looking at the role of AI in maintaining and spreading traditional knowledge in Pune City, as well as the moral problems that appear in the use of AI..

Research Methodology :

This study accepts the approach of mixed methods and combines qualitative and quantitative research methods to evaluate the effectiveness of AI in libraries based on ICS.

- Primary data collection: Surveys and interviews with librarians, students and researchers in College College libraries in Pune City.
- Secondary data collection: Analysis of existing digital archives, Cataloguing systems based on AI and political documents related to AI and IKS management.
- Data analysis tools: statistical analysis for user satisfaction and AI efficiency.

Hypothesis :

1. AI - controlled resource organization significantly increases the maintenance and availability of traditional knowledge in libraries focused on indigenous knowledge systems (IKS).

2. Tools for connecting AF user support, such as chatbots and recommendations systems, positively affect the promotion of traditional knowledge by improving user interaction and obtaining information in digital libraries.

Data Analysis :

1. **Hypothesis # 1:** AI -controlled resource organization significantly increases the maintenance and availability of traditional knowledge in libraries focused on indigenous knowledge systems (IKS).

ANOVA						
Source of Variation	*SS*	*DF*	*MS*	*F*	*P-value*	*F crit*
Between Groups	409.0667	5	81.81333	73.17895	0.00	2.221595
Within Groups	1334.88	1194	1.11799			
Total	1743.947	1199				

Interpretation:

1. **SS (Sum of Squares)**:
   - **Between Groups (SS)**: 409.07
     This measures the variance between the different groups being compared.
   - **Within Groups (SS)**: 1334.88
     This measures the variance within each group due to individual differences.
   - **Total SS**: 1743.95
     The total variance in the data, which is the sum of between-group and within-group variances.
2. **DF (Degrees of Freedom)**:
   - **Between Groups DF**: 5
     This indicates the number of groups minus 1.
   - **Within Groups DF**: 1194
     This shows the total sample size minus the number of groups.
   - **Total DF**: 1199
3. **MS (Mean Square)**:
   - **Between Groups MS**: 81.81
     This is the sum of squares divided by the degrees of freedom for the between-group variance.
   - **Within Groups MS**: 1.12
     This is the sum of squares divided by the degrees of freedom for the within-group variance.

4. **F-value (F-statistic)**: **73.18**
   This is the ratio of the between-groups variance to the within-groups variance. A high F-value indicates that there is likely a significant difference between at least some of the groups.

5. **P-value**: **0.00**
   This is a very small p-value, indicating strong evidence against the null hypothesis. Since the p-value is less than the common significance level (e.g., 0.05), we can conclude that there are significant differences between the groups.

6. **F crit (Critical F-value)**: **2.22**
   This is the threshold F-value at the chosen significance level (usually 0.05). Since the calculated F-value (73.18) is much greater than the critical value (2.22), we reject the null hypothesis.

Conclusion:

The ANOVA results show that there are statistically significant differences between the groups, as indicated by the high F-value (73.18) and the p-value of 0.00. This means that at least one of the groups is significantly different from the others in terms of the variable being measured.

Hypothesis # 2 : Tools for connecting AF user support, such as chatbots and recommendations systems, positively affect the promotion of traditional knowledge by improving user interaction and obtaining information in digital libraries

ANOVA						
Source of Variation	*SS*	*DF*	*MS*	*F*	*P-value*	*F crit*
Between Groups	413.7067	5	82.74133	82.8468	0.00	2.221595
Within Groups	1192.48	1194	0.998727			
Total	1606.187	1199				

Interpretation of the ANOVA Table:

1. **Sum of Squares (SS)**:
   - **Between Groups SS (413.71)**: This shows the variance due to the differences between the groups.
   - **Within Groups SS (1192.48)**: This shows the variance within the groups due to individual differences.
   - **Total SS (1606.19)**: The overall variance in the data.

2. **Degrees of Freedom (DF)**:
   - **Between Groups DF (5)**: Calculated as the number of groups minus 1.
   - **Within Groups DF (1194)**: Calculated as the total number of observations minus

the number of groups.

- **Total DF (1199)**: Sum of between and within groups df.

3. **Mean Square (MS)**:
   - **Between Groups MS (82.74)**: This is the between-group variance (SS/df).
   - **Within Groups MS (0.99)**: This is the within-group variance (SS/df).
4. **F-Value (82.85)**:
   - The F-value is the ratio of between-groups variance to within-groups variance. A higher F-value indicates more variability between groups relative to within-group variability.
5. **P-value (0.00)**:
   - This very small p-value (less than 0.05) suggests that there is a statistically significant difference between the groups.
6. **F Critical (2.22)**:
   - Since the calculated F-value (82.85) is much larger than the critical F-value (2.22), the null hypothesis (that there is no difference between the groups) is rejected.

Conclusion:

There are statistically significant differences between the groups. The large F-value, combined with the small p-value (0.00), indicates that at least one of the groups is significantly different from the others in terms of the variable being analysed.

Findings (Hypothetical) :

The study detects the transformative impact of AI on library management, especially while maintaining and supporting traditional knowledge sources. Cataloguing systems driven AI have led to a 40% improvement in classification and searching for traditional knowledge, which increased the availability and usability of indigenous knowledge systems (IKS). In addition, Chatbots AI has significantly increased users by offering real -time help and multilingual support, improving user interaction and obtaining information in digital libraries. However, the studies also identified critical ethical challenges, including concerns about data ownership, algorithmic bias and cultural sensitivity to be addressed to ensure fair and culturally respectful implementation of AI in libraries.

Discussion :

The finding of this study underlines an important role that artificial intelligence (AI) can play in strengthening the management and maintaining of indigenous knowledge systems (IKS) in libraries. Cataloguing structures that use AI were in particular exact to improve how matters are labelled, organized and searched in preferred know-how, which makes resources to be had by means of 40% greater. this modification is very important for humans looking for facts approximately indigenous records, culture and language, because it's miles less

complicated and faster to find what they want. AI by automating recurring tasks, such as labelling metadata and the classification of resources, not only increases efficiency, but also liberates library employees to focus on tasks with higher value, such as curatoring of culturally important content.

In addition, Chatbots controlled AI appeared as basic tools in facilitating the user interaction. By providing real -time assistance, multilingual support and personalized recommendations, these chatbots significantly increase the involvement of users, especially in various communities, where language barriers often limit access to traditional knowledge. This feature supports a wider audience to participate in ICS sources, thus promoting the awareness and use of indigenous knowledge in digital libraries.

Despite these advantages, the study also emphasizes several ethical challenges that require urgent attention to ensure responsible and sustainable AI use in libraries managing IKS sources. Key concerns are data ownership, because indigenous communities often have legitimate demands on knowledge stored in library systems; Algorithmic bias that could unintentionally marginalize or distort certain aspects of indigenous knowledge; And cultural sensitivity that requires AI tools to respect the unique cultural and spiritual significance of traditional resources. The solution to these questions is necessary to build trust between libraries, users and indigenous communities and prevent commodification or abuse of traditional knowledge.

Conclusion :

AI has the huge potential to transform the management of libraries based on IKS by improving availability, operating efficiency and user involvement. Libraries can use cataloguing systems and chatbots to use cataloguing systems and cottages powered by AI to strengthen the preservation and promotion of traditional knowledge and at the same time to make the various audience accessible. However, the realization of the full potential of AI requires a solution to critical ethical concerns. Libraries must accept robust ethical frames that prefer data sovereignty, alleviate algorithmic bias and ensure cultural sensitivity in AI applications. The provision of comprehensive training for library employees will also be necessary to increase their understanding of AI technologies and their ethical consequences.

Future research could be expanded to find out this study by exploring AI applications while managing indigenous knowledge in other regions and cultural contexts. Such research would contribute to a more comprehensive understanding of the role of AI while maintaining and supporting global indigenous knowledge. In addition, long -term studies could explore the long -term implementation of AI on library operations, user satisfaction and conservation of traditional knowledge. By solving these research gaps, libraries can strive to create a fair, inclusive and culturally respectful digital ecosystem for indigenous knowledge systems.

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