DIGITALIZATION OF REGIONAL CHILDREN'S LIBRARIES THROUGH ARTIFICIAL INTELLIGENCE TECHNOLOGIES

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Abstract. *This article examines the issues related to the digitalization of regional children's libraries through artificial intelligence technologies. The study analyzes the major challenges existing in traditional library systems, including manual cataloguing processes, insufficient electronic resources, and the absence of intelligent recommendation systems for users. Furthermore, the paper highlights the significance of AI-based automatic cataloguing, OCR technologies, intelligent recommendation systems, and chatbot services in improving library operations and user experience. Based on international practices, a conceptual "Smart Children's Library" model adapted to the conditions of Uzbekistan is proposed. The findings demonstrate that artificial intelligence technologies can significantly enhance the efficiency of library services, provide personalized user support, and contribute to the development of children's reading culture.*

Keywords: *artificial intelligence, digitalization, children's libraries, electronic catalogues, OCR technology, intelligent recommendation systems, chatbots, digital libraries, information technologies, Smart Children Library, electronic resources, library management.*

Introduction

The rapid development of information technologies worldwide has significantly transformed the fields of education, culture, and library-information systems. In particular, the integration of artificial intelligence technologies into library activities has created new opportunities for managing information resources, improving user services, and developing electronic databases. In the Republic of Uzbekistan, large-scale reforms aimed at digital transformation are being implemented within the framework of the "Digital Uzbekistan–2030" strategy. In this context, the modernization of regional children's libraries through advanced technological solutions and the implementation of artificial intelligence technologies have become highly important priorities. The partial digitalization of library collections is currently one of the main issues facing local children's libraries. Traditional card catalogue systems are still used to organize volumes in many libraries, making it challenging for patrons to find the required literature. The lengthy search procedure lowers the overall quality of library services, and the antiquated cataloguing system restricts the speed and effectiveness of information retrieval. Additionally, traditional library services can no longer adequately meet the educational and informational demands of children and teenagers as their interest in digital technologies grows. Children's involvement in library activities has also decreased due to a lack of interactive books, audio materials, and technological resources. Another important issue is the absence of intelligent recommendation systems in children's libraries. Existing systems are generally unable to recommend books according to readers' age categories, interests, or previous reading experiences. As a result, children often encounter difficulties in selecting suitable literature or repeatedly choose similar books. In addition, librarians experience excessive workloads due to manual cataloging,

registration, and user service processes. These challenges demonstrate the necessity of introducing modern artificial intelligence technologies into library management systems.

Artificial intelligence technologies have the potential to greatly enhance both operational efficiency and service quality in libraries. Automatic cataloguing, user interest analysis, intelligent recommendation creation, and electronic resource management are all possible with AI-based solutions. Based on metadata, annotations, or textual content, machine learning algorithms can automatically recognize book titles, authors, genres, age groups, and keywords. This speeds up information processing and significantly lessens the effort for librarians.

In recent years, Uzbekistan has undertaken several initiatives aimed at modernizing information-library centers. Significant progress has been observed in the introduction of electronic catalog systems and the expansion of internet infrastructure. According to analytical observations, the proportion of libraries equipped with electronic catalogs increased from approximately 38% in 2022 to 61% in 2024. The share of digitized children’s literature rose from 22% to 47%, while the proportion of libraries connected to internet networks increased from 56% to 83%. However, the implementation of AI-based search systems remains limited, accounting for only 12% in 2024. These figures indicate that further technological development and investment are still required in this field.

Experience from throughout the world shows that artificial intelligence technology can significantly increase library systems' effectiveness. AI-based recommendation algorithms that evaluate readers' preferences and automatically suggest pertinent books are widely used in Finland's public and children's libraries. These platforms have enhanced access to educational resources and raised children's reading engagement. Libraries in South Korea use robotics and AI-powered information kiosks that offer multilingual assistance, automated guidance, and book search services. The National Library Board of Singapore has put in place machine learning technologies that can analyze user behaviour and forecast future reading needs. Similar to this, a number of US libraries assist patrons in finding scholarly and literary materials by utilizing AI chatbots and natural language processing technologies.

Artificial intelligence technologies not only increase the effectiveness of library management but also turn libraries into interactive learning environments, according to the examination of international practices. These experiences are especially pertinent to Uzbekistan since local children's libraries are currently changing from traditional information centres to online learning environments. However, local constraints, such as financial resources, linguistic resources, and technology infrastructure, must be taken into account when adapting international techniques. Many remote libraries in Uzbekistan still struggle with poor internet access, limited electronic collections, and a lack of experts who can run AI systems, in contrast to technologically advanced nations. As a result, the implementation process ought to be progressive and tailored to the needs of the country.

Automatic cataloguing is one of the most significant uses of artificial intelligence in libraries. Bibliographic records are manually input into older systems, which takes a lot of time and frequently results in human error. By analyzing a book's cover, annotation, or textual content, artificial intelligence (AI) technologies allow for the automatic identification of a book's subject, genre, and target age group. These methods can improve data accuracy and speed up cataloguing several times. Additionally, intelligent suggestion systems are essential for boosting kids' enthusiasm for reading. In order to suggest appropriate books, these algorithms examine users' prior reading habits, preferred genres, and age groups, much like Netflix and YouTube. Children's

motivation to read rises as a result, and their engagement with library materials becomes more dynamic and tailored. Another crucial element of digitalizing libraries is OCR (Optical Character Recognition) technologies. Old printed books can be automatically scanned and transformed into electronic formats like PDFs or searchable text materials using OCR technologies. When it comes to conserving rare children's books and incorporating them into digital library collections, this technology is particularly crucial. OCR technologies can guarantee long-term preservation and broader accessibility of educational resources in regional libraries where many valuable books exist in restricted editions. Chatbots with AI capabilities also help to enhance library services. For instance, the chatbot can deliver a selection of appropriate novels right away when a user asks, “Recommend adventure books for a nine-year-old child.” This guarantees quick and effective user support while lessening the workload for librarians. Additionally, the development of accessible audio library systems is made possible by speech-to-text and text-to-speech technologies, which are especially helpful for children with visual impairments.

Methodology

Within the framework of this study, practical research was conducted in five regional children’s libraries. The research involved 50 librarians and 120 students through surveys and observational analysis. According to the survey results, 72% of respondents reported using electronic catalogs, while 91% emphasized the necessity of AI-based recommendation systems. Participants also highlighted the need for increasing electronic book collections, developing faster search systems, and introducing mobile library applications. As part of the practical research, a small-scale AI-based recommendation model was developed. The experimental system included a database of 100 children’s books and was tested among 20 students.

Results and Discussion

The results demonstrated that the AI recommendation system reduced the average time required to find suitable books by 40%. In addition, user satisfaction with library services increased by 35%. These findings confirm the practical effectiveness of artificial intelligence technologies in improving library performance and user experience. Based on the research findings, a conceptual “Smart Children Library” model was proposed. The model integrates AI-powered catalog systems, intelligent chatbots, OCR modules, audio book platforms, mobile applications, and recommendation algorithms into a unified digital ecosystem. The implementation of this model can automate library services, expand access to electronic resources, and strengthen children’s reading culture in Uzbekistan. The digitalization of regional children’s libraries through artificial intelligence technologies represents one of the most important contemporary tasks in the modernization of Uzbekistan’s library system. AI technologies can improve the efficiency and accessibility of library services, provide personalized user experiences, and reduce the workload of librarians. The implementation of electronic catalogs, intelligent recommendation systems, OCR technologies, and chatbot services can transform children’s libraries into modern educational and information centers. International experience demonstrates that artificial intelligence can significantly enhance library activities, and its adaptation to Uzbekistan’s educational and cultural environment offers promising opportunities for future development. Therefore, expanding AI integration into the national library system and conducting further scientific and practical research in this field remain highly important objectives.

Conclusion

The digitalization of regional children’s libraries through artificial intelligence technologies represents one of the most significant directions in the modernization of Uzbekistan’s

library system. The findings of the study indicate that the implementation of AI technologies improves the speed and quality of library services, ensures personalized support for users, and reduces the workload of librarians. Electronic catalogues, OCR systems, chatbots, and intelligent recommendation platforms have the potential to transform children's libraries into modern educational and information centers. International experience demonstrates that AI-based library systems are highly effective in promoting reading culture and improving access to educational resources. At the same time, the successful implementation of such technologies in Uzbekistan requires special attention to technical infrastructure, financial investment, and the preparation of qualified specialists. Therefore, the gradual integration of artificial intelligence technologies into the national library system, the expansion of electronic resource collections, and the continuation of scientific and practical research in this field remain essential priorities for future development.

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