DEVELOPMENT OF ALEXA BASED SMART LIBRARY WITH RFID DOOR LOCK AND BOOK FINDER SYSTEM USING ESP 32 AND ARDUINO UNO

ABSTRACT

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DISCIPLINE
Computer Science & Engineering

KEYWORDS
rfid door lock; smart library; book finder system; arduino uno; library automation; library security

ARTICLE ID
AASGBCPJMRA-B01179

This study focuses on the development of an Alexa-based smart library system designed to enhance library operations through automation and artificial intelligence. The system integrates smart technologies such as voice command capabilities for book-finding assistance and an RFID door lock mechanism for improved security. By incorporating AI-driven features and IoT components, the study aims to modernize traditional library services, ensuring a more efficient and secure environment for both users and staff. A mixed-method research design was employed to evaluate the system's acceptability across multiple dimensions. Structured survey questionnaires were distributed to two expert groups—five librarians and five computer engineers—selected through purposive sampling. The study compared their assessments on various factors, including accuracy and reliability, user interface, search functionality, security features, and cost-effectiveness. Quantitative analysis, including t-tests, was used to determine if there were significant differences between the two groups' evaluations. The results showed an overall mean score of 3.54 from librarians and 3.42 from computer engineers. The computed t-value of 0.615 was lower than the t-critical value of 2.110, indicating no significant difference in the assessments of both groups. Therefore, the hypothesis was accepted, suggesting that both librarians and computer engineers found the system equally acceptable in terms of accuracy, reliability, user interface, search functionality, security, and cost-effectiveness. The findings indicate a high level of acceptability of the Alexa-based smart library system among experts. Despite this, some limitations were noted, including unreliable internet connectivity, command misinterpretation, delayed responses, system malfunctions, and challenges in managing voice commands. Respondents recommended improvements in voice recognition accuracy, accessibility, search functionality, and security. Suggestions included the use of refurbished components for cost-efficiency and enhancements such as RFID reset functions and biometric verification to strengthen security. The study demonstrates the system's potential to improve library services and highlights areas for further development.

RECOMMENDED CITATION

Amemiya, R. D., Espineda, C. J., Evangelista, S., Fernandez, G. M., Gendrano, L. D., & Nidoy, J. R. (2025). Development of Alexa Based Smart Library with RFID Door Lock and Book Finder System Using ESP 32 and Arduino Uno. *Ascendens Asia Singapore – Bestlink College of the Philippines Journal of Multidisciplinary Research Abstracts, 7*(3), 20.