ABSTRACT

Explanatory note size – 128 pages, contains 4 illustrations, 48 tables, 5 applications, 15 references.

Topicality. The study addresses the problem of improving the efficiency of information retrieval in large library databases. Despite the availability of electronic catalogs, modern library systems primarily operate based on exact word matches in titles or author names, without considering the content of the query or the user's context. This often leads to irrelevant results or failure to find the required material. There is a need to develop a flexible and efficient search method that considers query content, provides personalized recommendations, and improves both speed and accuracy of search in library systems.

The aim of the study. The main aim is to enhance the speed and accuracy of thematic literature search in library information systems through the development of a method and a software tool for search optimization.

The object of research: the process of information retrieval in large library databases.

The subject of research: methods for improving the accuracy, speed, and relevance of information retrieval results.

To achieve this goal, the **following tasks** were formulated:
- to analyze the subject area of library systems and identify their shortcomings;
- to investigate modern algorithmic solutions applied for search and recommendations;
- to identify methods capable of providing intelligent search; to develop a method that combines classical approaches with optimization for the specifics of library systems;
- to create a software tool implementing the proposed method.

The scientific novelty of the results of the master's dissertation lies in the development of a hybrid search method that combines multiple levels of query relevance assessment and adapts to the user. The proposed approach integrates classical formal search with fuzzy search and semantic analysis, enhancing the

accuracy and relevance of results while considering the content of queries and user behavior. The developed method demonstrates the possibility of practical implementation of an intelligent search in library systems through a software tool, which serves as an example of successful application of the approach.

The practical value of the obtained results is that the developed method and software tool provide fast, accurate, and context-sensitive search in large library databases. The results showed an improvement in search accuracy by more than 15% compared to classical vector search, with an average query response time of about 7 seconds. The proposed solution allows libraries to implement a more intelligent tool that considers user behavior, provides relevant recommendations, and can be applied to various library systems – from small university libraries to large national databases.

Relationship with working with scientific programs, plans, topics. Work was performed at the Department of Informatics and Software Engineering of the National Technical University of Ukraine «Kyiv Polytechnic Institute. Igor Sikorsky».

Approbation. The scientific provisions of the dissertation were tested at the IX International Scientific and Practical Conference of Young Scientists and Students "Software Engineering and Advanced Information Technologies" (SoftTech-2025).

Publications. The scientific provisions of the dissertation were published in:

1) Konovalchuk A.V., Likhouzova T.A. Analysis of Services for Library Support // System Technologies, vol. 5(154), 2024 – pp. 47-55. https://doi.org/10.34185/1562-9945-5-154-2024-06.

2) Konovalchuk A.V., Likhousova T.A. Method and software tool for increasing the productivity of search library systems // IX International Scientific and Practical Conference of Young Scientists and Students "Software Engineering and Advanced Information Technologies" (SoftTech-2025). Conference materials. November 26-28, 2025 Kyiv.