ISSN 2707-0476 (Online)
University Library at a New Stage of Social Communications Development. Conference Proceedings, 2025, No. 10
UniLibNSD-2025

UDC 004.89:[027.7:378](045)

SHEVCHUK O. A.
Taras Shevchenko National University of Kyiv (Kyiv, Ukraine),
e-mail: rb.shevchuk@gmail.com, ORCID 0000-0001-7402-4337

SALTYKOVA A. A.
Borys Grinchenko Kyiv Metropolitan University (Kyiv, Ukraine),
e-mail: boyarin.work@gmail.com, ORCID 0009-0004-1390-3388

Digital Tools of the Academic Library: Automation of Publication Activity Monitoring

Objective. This publication studies the potential for using artificial intelligence and open APIs (Application Programming Interface) to automate publication activity monitoring. **Methods**. This study analyzes and experimentally tests the capabilities of open APIs and artificial intelligence in automating bibliographic data monitoring and processing. **Results**. The authors tested the potential of artificial intelligence to create an automated application that processes large volumes of bibliographic data, generates accurate bibliographic descriptions, and exports them in a tabular format. **Conclusions**. The developed prototype demonstrates that, when combined with open APIs, artificial intelligence can effectively automate the creation of bibliographic descriptions and the processing of publication data in academic libraries.

Keywords: academic libraries; digital tools; artificial intelligence; publication monitoring; open APIs; library automation

Introduction

Artificial intelligence (AI) is one of the key factors helping to transform modern librarianship. In recent years, numerous studies on the implementation of AI in library processes have appeared in scientific literature. These studies cover many different topics: creating chatbots based on intelligent algorithms, how to apply natural language processing technologies, and how to analyze and process large amounts of data. For example, the IFLA report "New Horizons in Artificial Intelligence in Libraries" describes many different ways to optimize library services, including catalog automation, recommendations, and personalized services for users. (Balnaves, Bultrini, Cox & Uzwyshyn, 2025).

Today, modern academic libraries are transforming into information centers. In addition to storing information, these centers provide academic support to students and faculty and create inclusive information spaces. Studies entitled "Improving Academic Library Services with Artificial Intelligence" (Omolabake Akinyem) and "Review of Artificial Intelligence Implementation in Academic Library Services" have demonstrated that AI integration significantly improves the efficiency of information and reference services. And can also improve the quality of cataloging, information circulation, and enhance interaction with visitors. However, researchers also note challenges related to a lack of expertise, limited infrastructure and financial resources, and ethical issues (Akinyemi, 2023; Zondi et al., 2024).

Artificial intelligence in the library sector is also being researched by Ukrainian scientists, but such work is often only analytical in nature. For example, the article "Intelligence in Academic Libraries: Foreign and Ukrainian Experience" examines the experience of libraries in implementing AI, but the main focus is on the use of individual services such as ChatGPT, Gemini, and image generation services such as Leonardo (Shemaieva, Kostyrko, & Prilutska, 2024). Possible areas of application for AI in public libraries are described in the work "Prospects for

https://doi.org/10.15802/unilib/2025_348033

Applying Artificial Intelligence Technologies by Public Libraries of Ukraine." However, attention is also paid to different versions of ChatGPT and other LLM models (Maranchak, 2024). Integrating AI into academic libraries provides opportunities for automating routine processes, personalizing services and recommendations for users, and analyzing large amounts of data to support management decision-making. It also improves the quality and speed of bibliographic description creation.

Currently, services that provide automated code writing or the development of web applications that work online are becoming increasingly popular. Usually, librarians choose free pricing plans because they allow them to create their own projects without high financial costs. This helps optimize internal processes and reduces the routine workload of library staff.

At universities, librarians help teachers and researchers keep track of their research activities. This work includes monitoring publication activity, collecting and verifying data on research results, and preparing statistical and analytical reports.

Due to the lack of widely available, convenient, and simple tools that help automatically obtain such data, librarians have to do most of the work manually. This increases the workload on staff, increases the possibility of errors, and significantly reduces the efficiency of organizational processes. In a context of limited funding, one promising way to automate these tasks and reduce the amount of routine work is to use artificial intelligence-based tools and open APIs.

Purpose. This work aims to investigate how the use of modern services based on artificial intelligence and open APIs can help automate the monitoring of publication activity.

Methods

The study was conducted at the M. Maksymovych Scientific Library at Taras Shevchenko National University of Kyiv (KNU) over a period of four months in 2025. It was an experimental project conducted in parallel with the library staff's main activities. Experimental modeling and synthesis methods were employed, including: 1) development of a modular architecture with three main components (ORCID, Scopus, and DOI Citation Processor); 2) use of AI services (Lovable, V0, and ChatGPT) for automatic code generation; 3) integration of open APIs (ORCID, Scopus, Crossref, DataCite, Google Sheets, and Zotero Web API) for processing bibliographic data; 4) synthesis of information from various sources to form a unified model; and 5) testing of the prototype on real datasets with evaluation of processing speed and accuracy.

Results and Discussion

Employees of the M. Maksymovych Scientific Library at Taras Shevchenko National University of Kyiv monitor scientists' publication activity and prepare reporting documentation. Due to the high volume of data and the need for regular updates, it is necessary to automate as many processes as possible. This will reduce processing time and lower the likelihood of errors.

The appropriate application was developed using **Lovable** (https://lovable.dev/) and **v0** (https://v0.app/) services, and **ChatGPT** (https://chatgpt.com/) was used to check the code (if complex errors need to be corrected, technical solutions need to be advised, or information on free API capabilities is required). These services can create programs based on a given prompt and independently suggest or generate optimal solutions during the application development process. However, having a basic understanding of programming principles can significantly simplify and speed up this process.

https://doi.org/10.15802/unilib/2025_348033

The program was created using a modular architecture. All of the program code was generated using artificial intelligence. This sped up the development process and ensured that optimal solutions were selected based on the programming language, module specifics, and data processing logic. The artificial intelligence analyzed the tasks and determined the most effective implementation methods independently, which minimized the need for manual adjustments and contributed to more accurate results. To simplify working with information and avoid reloading files with even minimal changes, we chose to interact with Google Sheets. This approach ensures the fast integration of multiple tables and centralized access to data. To accomplish this, we created a project in Google Cloud Console and obtained access to the Google Sheets API. To ensure the system worked correctly, we defined column assignments, standardized sheet names, and configured access modes. The APIs of other services were either open or obtained through the official interfaces of the respective platforms.

Three main modules have been implemented at the current stage:

- ORCID:
- Scopus
- DOI Citation Processor.

The ORCID module was developed first because it automates the collection of publication data to a certain extent. The main technologies used during its development were the ORCID Public API and the Google Sheets API. The program is configured to retrieve information from tables stored on Google Drive. To this end, a special table with three columns was created: unique ORCID identifier, researcher's full name, and affiliation with a structural unit.

Access to the table is provided via the Google Sheet ID parameter. For user convenience, a separate input field has been implemented that automatically converts the full link to the table into the required identifier. This eliminates the need to enter the identifier directly into the program code. After accessing the table, the program automatically downloads data from each ORCID profile and generates a general list of publications with the following parameters:

- ORCID ID
- Title
- Type
- Journal
- Publication Date
- URL/DOI

The obtained data can be exported in a tabular format (CSV, XLS, or XLSX), allowing library staff to verify the information and use it for various reporting tasks.

Additionally, functionality for in-depth data processing has been implemented, including the ability to:

- Filtering publications by year or range of years;
- merging downloaded data with local tables by ORCID identifiers;
- filtering by departments;
- removing duplicates within a single profile (Fig.1)

Thanks to this feature, the module can flexibly process publication data and lay the groundwork for automating reporting processes further. To verify the module's functionality, ten random profiles were selected, and all the data was manually verified. In each case, the obtained publication data were correct and corresponded to the scientist's list and profile.

https://doi.org/10.15802/unilib/2025_348033

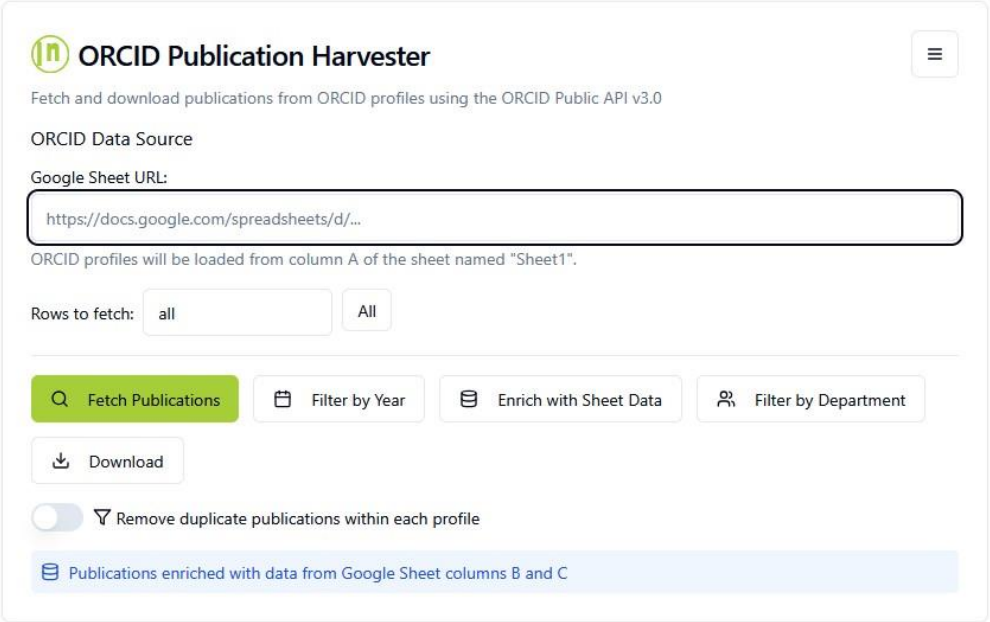

Fig. 1. ORCID module user interface

The Scopus module is based on the Scopus API, which offers many options for obtaining and processing scientific data. Access to the API is usually free for non-commercial use, making it suitable for libraries.

The module's main functionality involves obtaining publication data using Scopus Author ID, entered into a special program field, or batch processing through Google Sheets integration.

Similar to the ORCID module, the results are exported in CSV, XLS, and XLSX formats. The bibliographic descriptions are generated in APA 7th edition style and comply with international citation standards. In order to minimize errors in complex bibliographic records, an additional file has been integrated. It contains formatting rules in Citation Style Language (CSL).

In addition, another promising feature is currently being tested — the ability to obtain a complete list of publications associated with a specific institution over a given period of time. For this purpose, the Register of Research Organizations (ROR) was used as the institution identifier. Additionally, there is an option to use filters, particularly by publication type, to increase the accuracy and relevance of the obtained data. During testing, the program demonstrated its ability to generate complete lists of publications.

The DOI Citation Processor module is designed for the batch creation of bibliographic descriptions and can export the results in tabular format. Similar to previous solutions, the module's workflow involves taking basic information about publications from Google Sheets and processing DOIs located in a predefined column.

Several open APIs are used to generate bibliographic records. The primary source of metadata is the Crossref API. The DataCite API and Zotero Web API are additional sources that help reduce the likelihood of errors and ensure more complete and accurate data reproduction. The module can process a large number of identifiers simultaneously, allowing a table with over 1,500 records to be processed in less than a minute. The module's overall data processing accuracy was 87.8% (1,317 out of 1,500 rows were correctly recognized). Errors mainly occurred due to extra spaces in tables, incorrectly submitted DOIs, or unregistered identifiers.

https://doi.org/10.15802/unilib/2025_348033

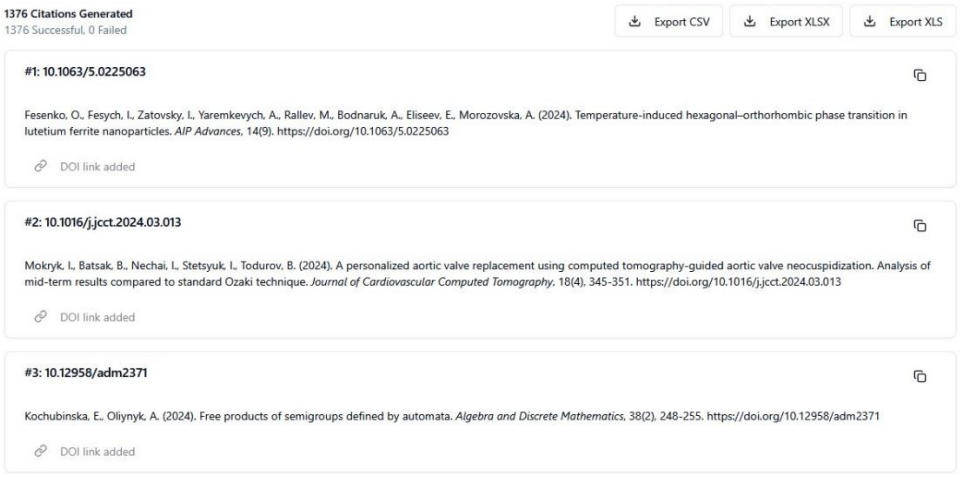

Fig. 2. Examples of automatically generated bibliographic descriptions

Since the program contains APIs registered to personal accounts, storing them in the code is dangerous. To solve this problem, the simplest method was chosen: creating fields for entering API keys. To reduce the risk of confidential information leaks and make the application more secure, API keys are automatically deleted after the end of an active session. In addition to ensuring the protection of researchers' personal data, it is also important to pay attention to dependence on third-party service policies and the possibility of changes in the API structure, as this can lead to application malfunctions. Therefore, one of the next areas of work is to create mechanisms that will ensure data backup and adapt to changes in external sources. Librarians working with these tools must also follow basic cyber hygiene rules: use complex passwords, regularly update account data, restrict access to confidential information, and do not store keys in plain text.

In the future, it is planned that the modules will have deeper integration. Using unique identifiers to combine several functions could potentially simplify the process of obtaining necessary data to just a few clicks. For instance, publications downloaded using ORCID can be automatically checked for affiliations in Scopus. Then, bibliographic descriptions will be generated in the required citation style. This approach allows us to view development as a holistic ecosystem that provides a complete cycle of work with scientific publications rather than as a set of separate modules.

Testing of the prototype has shown that partial automation has a tangible effect: it reduces the time required to process large data sets, decreases the number of technical errors, and facilitates report generation. For the sake of high-quality program development, in the future, it will be possible to expand the range of supported APIs, integrate tools for visualizing statistics, and create customized dashboards for different user groups.

Conclusions

The developed prototype clearly demonstrates that developing a specialized library tool based on open APIs and artificial intelligence services does not require large financial investments or a significant amount of time. The platforms used for rapid code generation significantly reduced certain stages of development and allowed for free testing of working solutions.

The advantage of this approach is the ability to create a tool without in-depth knowledge of coding and web development. A basic understanding of programming principles and knowledge

https://doi.org/10.15802/unilib/2025_348033

of the programs that can be used is sufficient to create your own unique solutions, even with a small team.

Another important factor in the development of this area is the constant monitoring of new services and programs, as it is possible to find suitable offers and favorable terms for libraries to use these platforms free of charge. This significantly expands the potential and opportunities for libraries that do not have the funding to pay for such resources but need these tools.

Another important condition is online access to the developed programs. This makes it more convenient to work with them: access from any workplace, anywhere in the world, and simultaneous use by several employees ensures flexibility and speed of processes.

Even in the early stages of implementation, the proposed solution has significantly improved library efficiency, reduced the number of routine operations, and established a foundation for future growth.

REFERENCES

Akinyemi, O. (2023). Enhancing academic library service delivery using artificial intelligence (AI). *Library Philosophy and Practice (e-journal)*, 8042. Retrieved from https://digitalcommons.unl.edu/libphilprac/8042 (in English)

Balnaves, E., Bultrini, L., Cox, A. & Uzwyshyn, R. (Eds.). (2025). *New horizons in artificial intelligence in libraries*. Berlin; Boston, MA: De Gruyter Saur. doi: https://doi.org/10.1515/9783111336435 (in English)

Maranchak, M. (2024). Perspektyvy zastosuvannia publichnymy bibliotekamy Ukrainy tekhnolohii shtuchnoho intelektu [Prospects for applying artificial intelligence technologies by public libraries of Ukraine]. *Ukrainian Journal on Library and Information Science, 13*, 61-71. doi: https://doi.org/10.31866/2616-7654.13.2024.307118 (in Ukrainian)

Shemaieva, H. V., Kostyrko, T. M., & Prilutska, A. E. (2024). Artificial Intelligence in Academic Libraries: Foreign and Ukrainian Experience. *University Library at a New Stage of Social Communications Development. Conference Proceedings, 9,* 316-324. doi: https://doi.org/10.15802/unilib/2024_318411 (in English)

Zondi, N. P., Epizitone, A., Nkomo, N., Mthalane, P. P., Moyane, S., Luthuli, M., … Phokoye, S. (2024). A review of artificial intelligence implementation in academic library services. *South African Journal of Library and Information Science, 90*(2). doi: https://doi.org/10.7553/90-2-2399 (in English)

SHEVCHUK O. A.
Київський національний університет імені Тараса Шевченка (Київ, Україна),
e-mail: rb.shevchuk@gmail.com, ORCID 0000-0001-7402-4337

SALTYKOVA A. A.
Київський столичний університет імені Бориса Грінченка (Київ, Україна),
e-mail: boyarin.work@gmail.com, ORCID 0009-0004-1390-3388

Цифрові інструменти академічної бібліотеки: автоматизація моніторингу публікаційної діяльності

Мета. Метою публікації є вивчення можливостей застосування штучного інтелекту та відкритих API (інтерфейс програмування застосунків) для автоматизації моніторингу публікаційної діяльності. **Методика**. У дослідженні проаналізовано та експериментально перевірено можливості відкритих API та штучного інтелекту для автоматизації процесів моніторингу й обробки бібліографічних даних. **Результати**. Перевірено

https://doi.org/10.15802/unilib/2025_348033

можливості штучного інтелекту для автоматизованого створення застосунку, який обробляє великі обсяги бібліографічних даних, формує коректні бібліографічні описи та забезпечує їх експорт у табличному форматі. **Висновки**. Розроблений прототип демонструє, що штучний інтелект у поєднанні з відкритими API може ефективно автоматизувати створення бібліографічних описів та обробку публікаційних даних у академічних бібліотеках.

Keywords: академічні бібліотеки; цифрові інструменти; штучний інтелект; моніторинг публікацій; відкриті API; автоматизація бібліотек

Received: 29.08.2025

Accepted: 15.12.2025

https://doi.org/10.15802/unilib/2025_348033