



CHATBOTS AND BEYOND

Artificial Intelligence in Libraries

What librarians need to know now



Welcome to the future...by which we mean the present.

The use of artificial intelligence (AI) has expanded so much so quickly in the past two to three years alone that it sometimes feels as if we are indeed living in the future. In fact, it's a safe bet you interact with some form of AI every day. The core premise of AI is simple: machines solving problems or performing tasks that would typically require human intelligence.

Any machine that imitates some function of the human brain — such as perception, reasoning, problem-solving, language interaction or creative design — can be said to be a form of AI.

The pace with which artificial intelligence has entered just about every aspect of modern life is cause for caution, certainly, but it is also a reason to be optimistic about the future of librarianship in both the public and academic spheres.

In this report, we will be taking a look at the topic from all sides. We'll explore the ethical and technical ramifications of AI, but also its potential to transform the library experience for patrons, researchers and information professionals like you.

Table of Contents

The library of the 21st century	1 – 2
AI in academic libraries	3 – 4
AI in public libraries	5
The power of automation	6
Ethical considerations in AI adoption	7 – 8
Privacy and cybersecurity	8 – 9
Robots are not coming to replace you	10

The library of the 21st century

Before we dive in, it's worth acknowledging that 21st-century libraries are also exploring other innovative ways to integrate technology into their services. To meet the evolving needs of their communities, many libraries have expanded their collections to include digital books, audiobooks and other digital resources.

A growing number of libraries also offer digital news platforms such as [PressReader](#), which empowers curious minds by giving them access to thousands of newspapers and magazines from around the world.

How does artificial intelligence work?

Just as the average driver doesn't need to know all the ins and outs of an internal combustion engine (or hybrid synergy drive) before they get behind the steering wheel, you need not be an expert in large language models or machine learning in order to use AI tools at your library.

On the other hand, a grounding in the basics can't hurt.

Science fiction might have you believe otherwise but current AI systems don't think as humans do. Instead, they rely on pattern recognition, often rooted in machine learning, using algorithms that can be applied to data. We're talking about very, very large amounts of data.

Machine learning and pattern recognition

When an AI uses machine-learning algorithms, it isn't programmed to respond a certain way; instead, it analyzes its training data to recognize patterns. Whatever this data includes — images, math equations or even the writing style of a famous author — AI begins to predict how certain aspects are combined so it can respond in a way that makes sense.

For example, if the AI is shown thousands of pictures of different dog breeds, it begins to pinpoint certain factors that make it easier to recognize; when shown a picture of a cat, the AI can recognize that this is not the same thing.

Artificial intelligence thrives on data; the more it has, the more connections it can begin to identify. As it processes more and more information, the more patterns it creates.

The rise of ChatGPT was a major milestone

One of the biggest milestones in the development of artificial intelligence is the launch of OpenAI's [ChatGPT](#) program on November 30, 2022.

Though chatbots have been used for years, ChatGPT was more advanced than anything previously available to the public; it could be used for anything ranging from computer coding to advanced writing. The simplest summary of how ChatGPT works is that it generates text based on user prompts.

By January 2023, ChatGPT had become what was then the fastest-growing consumer software application in history, accelerating the trend of AI being incorporated into almost every industry worldwide.

Engineers, creative writers, artists, personal assistants — AI applications can be used to boost productivity, innovation and accessibility by professionals in just about every sector, including librarianship.

Librarians are uniquely positioned

The fact is, though, that most librarians had already been employing AI applications for years — whether they realized it or not. As the Association of College and Research Libraries (ACRL) observed in the introduction to its 2022 publication, [The Rise of AI](#):

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Some academic librarians might say they lack a foundational knowledge of AI or that they are ill-equipped to speak on the subject, and yet they have likely been interacting with AI through the different types of software applications they support. At the very least, they have encountered and mastered the art of the search algorithm.

AI in academic libraries

The use of artificial intelligence at colleges and universities has not been entirely free of controversy, but AI and related technologies such as machine learning and natural language processing have a number of practical applications in academic libraries.

For example, students and academic researchers can make very effective use of chatbots, as Mary Ellen Bates points out in a recent [Springer Nature blog post](#):

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Generative AI is particularly useful during the initial phase of a project, when the searcher may not yet know the scope and depth of the existing research in that area. Virtual research assistants like Elicit.com, Scite and Consensus are trained on peer-reviewed articles and can help searchers navigate scientific literature, identify, and evaluate relevant papers, and generate insights and summaries.

Key uses for chatbots in academic libraries include:



24/7 assistance

Chatbots can provide round-the-clock support to students and faculty, answering frequently asked questions about library hours, locations of resources and basic research inquiries.



Resource navigation and personalized recommendations

Chatbots can assist users in locating specific books, journals, databases and other resources within the library's catalog. By analyzing user preferences and past interactions, chatbots can recommend books, articles and other resources that align with the user's interests and academic needs.



Library account management

Users can interact with chatbots to check their account status, renew borrowed items, place holds on materials and receive notifications about due dates or fines.



Technical support

Chatbots can offer troubleshooting assistance for common technical issues related to library services, such as accessing electronic resources, navigating the library website or using library equipment.



Accessibility

Chatbots can provide support for users with disabilities by offering alternative formats for information and assisting with navigation and resource access in a user-friendly manner.

Content indexing for research libraries

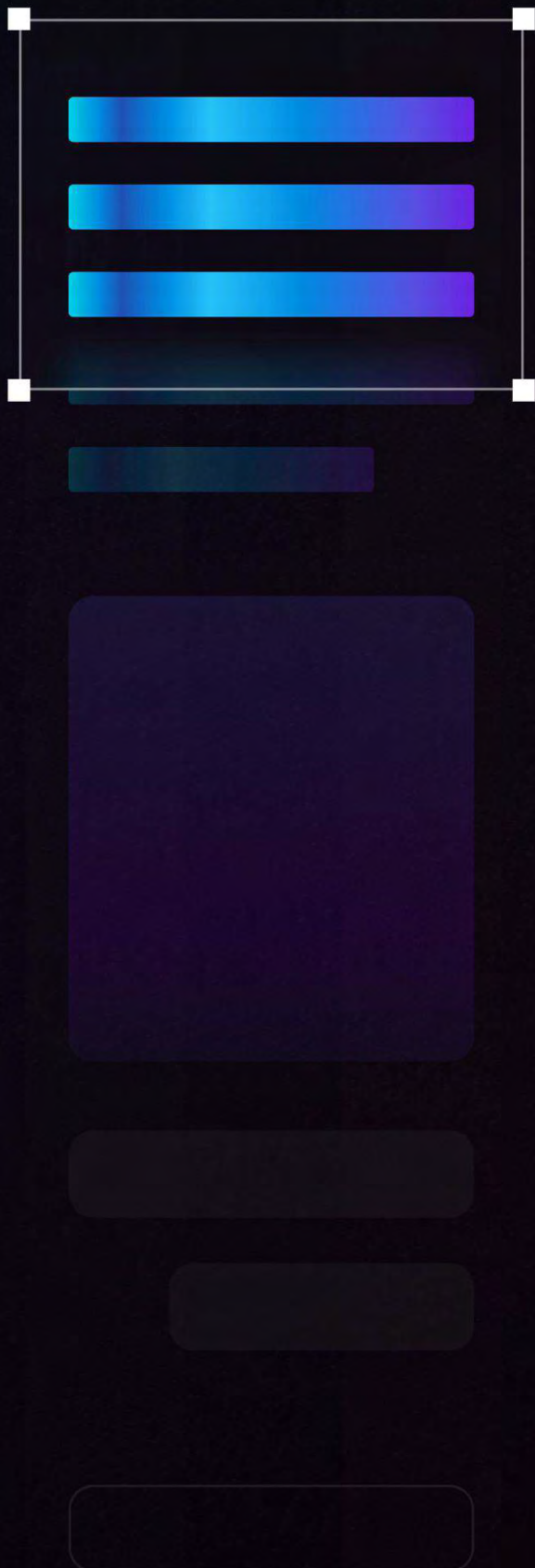
Another area in which AI can be employed in academic and research libraries is content indexing. As the UC Davis Library website [succinctly explains](#):

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The basic principle underlying the organization of any library is to describe the documents it contains so that they may be located. All libraries create sets of records which describe the documents in their collections. Catalogs are sets of records to documents that share a location. Indexes are sets of records to documents that share some other attribute (generally subject matter).

An AI-powered indexing tool can automatically assign keywords based on concepts it identifies in a text through content analysis and can help university library users discover new sources of information from different disciplines, allowing them to find more specific and accurate material to support their research.

Librarians like you have been integrating AI technology into their collections to enhance discoverability by using it to refine metadata for images, articles and theses, and this has had a significant role in improving the quality of university collections.



AI in public libraries

At public libraries, the integration of AI technologies can empower staff to provide more personalized, efficient and responsive services to their patrons. AI and machine-learning algorithms can help you curate and manage library collections through data-driven decision-making.

AI tools can analyze large volumes of data collected by libraries — such as circulation statistics, patron demographics and resource usage patterns — to generate insights that can help you better manage resources and improve services.

By analyzing usage patterns and user feedback, AI can help you make informed decisions about which materials to acquire, weed out outdated or irrelevant resources and optimize the allocation of library resources.

Library patrons, meanwhile, can benefit from the use of AI in public libraries in many of the same ways that users of academic libraries do, including personalized book recommendations, improved search and discovery and access to round-the-clock assistance.

The power of automation

Although there are distinctions between artificial intelligence and automation, the two are closely related. After all, both involve assigning a machine to perform certain tasks; the main difference is that automating processes does not necessarily require the machine to make its own decisions.

As technologies converge, however, more and more automation will involve AI's advanced capabilities and massive datasets. At present, public libraries make use of automation in various ways, including:

Cataloging and inventory management

Libraries can automate the process of adding books, digital resources and other materials to the library catalog.

Hold and reservation management

Patrons can reserve items online, and the system will notify them when the items are available.

Book reshelving and sorting

An automated sorting system can quickly and accurately sort returned materials back into their proper locations on the shelves.

Interlibrary loan requests

Libraries can use an automated system to request and receive materials from other libraries.

Acquisition and ordering

The process of ordering new materials can be streamlined through the automation of purchase requests, vendor communications and order tracking.

Security and access control

Libraries can implement automated access control systems, including card access and surveillance, to enhance security and protect library resources.

Staff and volunteer scheduling

Automating the scheduling of shifts for staff and volunteers can ensure adequate coverage during library hours.

Ethical considerations in AI adoption

Clearly, the use of AI-based technologies can be a boon to information professionals and library users alike, but we can't ignore that it also raises a number of issues.

Copyright infringement is one of these, as many AI datasets include intellectual property that is legally owned by third parties.

Another consideration is that training data might be biased or even incorrect, yet most AI programs still process it as though it were correct. Modern artificial intelligence has yet to reach a point where it can accurately determine when information is false. Instead, it associates it with the correct information, corrupting the machine-learned data so that the AI may no longer produce trustworthy results.

Discerning fact from fiction

As Melissa Heikkilä put it in an [MIT Technology Review article](#), large language models like GPT-3.5 and GPT-4 are incapable of discerning fact from fiction.

This is why developing AI literacy is so crucial; by learning the skills needed to critically evaluate AI technologies and analyze the information they provide, we get a step closer to recognizing when something is amiss.

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The magic — and danger — of these large language models lies in the illusion of correctness. The sentences they produce look right — they use the right kinds of words in the correct order. But the AI doesn't know what any of it means. These models work by predicting the most likely next word in a sentence. They haven't a clue whether something is correct or false, and they confidently present information as true even when it is not.

Libraries can provide trusted content

Critical thinking and media literacy are also more important than ever before; libraries can do their part by hosting workshops or simply by pointing patrons in the direction of trustworthy information.

In a February 2024 webinar co-hosted by PressReader and [Jisc](#), Andrew Cox — senior lecturer at the University of Sheffield's Information School — said, "Users are realizing that you can't trust everything, and maybe that's a good thing for us in the information world. It gives us that opportunity to talk about information literacy, really."

In addition to organizing workshops on how to detect AI-generated text, you can also provide complimentary access to [trusted journalism](#) with platforms like PressReader, which provide readers with digital editions of newspapers and magazines.

It's important for readers to engage with ideas and info from across the political spectrum, and it's equally crucial for them to be able to find the truth in a world rife with misinformation.

Privacy and cybersecurity

Privacy is another major concern when it comes to the use of AI in library settings. Why is this?

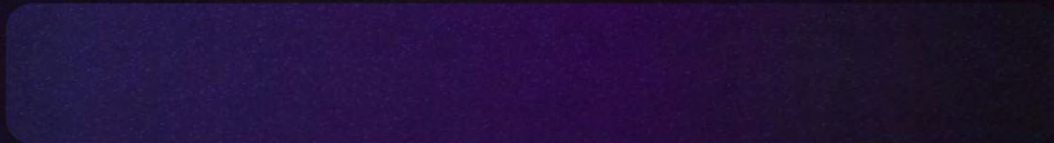
It's all about that big data.

Chris Chiancone, Chief Information for the City of Carrollton, Texas, wrote in a 2023 [LinkedIn blog post](#) that (as we noted earlier) in order to function effectively, AI systems often rely on huge quantities of data — data that can include sensitive information about users. This, Chiancone said, raises valid concerns about user privacy and data security, and libraries are not immune.

As [Dr. Brady Lund](#) — Assistant Professor in the Department of Information Science at the University of North Texas's College of Information — [told PressReader](#) recently, the use of AI tools can expose a library to cybersecurity risks.

According to Lund, libraries are often targeted for ransomware attacks. When cybercriminals target a library in this kind of attack, they are usually after all of that juicy user data (which can include financial details and other critical info about patrons and staff), often with the intent of using it as leverage to extort money from the institution.

"There is likely a belief among attackers that the visibility of the attack and the fact that it compromises the privacy of many members of the community will result in public pressure to pay a ransom to regain access to the library systems and data," Lund said.



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Ultimately, [zero trust cybersecurity](#), where everyone accessing a network must continuously prove who they are using certificates and receives limited access to only the information they need, is an ideal solution, but it may be impractical given the resources available to many libraries.

Dr. Brady Lund

Security audits and staff training are essential

Libraries of all sizes and types, including public libraries and those at colleges and universities, should conduct regular privacy and security audits, Lund told us.

It is also critical to provide regular training and test your employees' cybersecurity awareness, because as Lund pointed out, if the account of one employee can be compromised, then the attacker may soon gain access to a wide variety of systems and data.

Robots are not coming to replace you

AI implementation has its risks, and libraries must be prepared to navigate those. One thing we can say with certainty, however, is that the robots are not coming to replace you. Yes, artificial intelligence and machine learning will only continue to get more advanced, but librarians are just as important as they have ever been — even if their role is evolving along with the high-tech tools.

On the [American Journal Experts](#) website, Charla Viera summed this continued evolution up nicely:

“ Just as library professionals took the reins in developing the search engines and strategies necessary to maneuver through intricate cataloging systems, they will also participate in the design of artificial intelligence-powered knowledge discovery tools. They will then take the initiative to educate the public on how to locate and interact with these AI tools.

Librarians can lead the AI revolution

If all the uncertainties inherent in adopting emerging tech seem a little daunting, that's fair. It's a little scary! As Mary Ellen Bates pointed out in the Springer Nature blog post we cited above, the rise of AI provides librarians, archivists and other information professionals with new opportunities to showcase their skills and provide even more value to patrons and clients.

“By staying informed about the latest AI tools and mastering the art of prompt engineering, information professionals can harness the power of AI and support users in developing solutions that were previously unimaginable,” Bates wrote. “The key is to embrace this technology and effectively communicate its best use cases, ensuring that information professionals remain at the forefront of the AI revolution.”

About PressReader

PressReader is on a mission to empower and enrich curious minds by bringing a universe of quality content within reach. PressReader has partnered with leading institutions such as the New York Public Library, Yale University, Los Angeles Public Library, the Library of Congress and Public Libraries Singapore to provide patrons with access to thousands of the world's top newspapers and magazines.

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