

Libraries in the Age of Artificial Intelligence

BY BEN JOHNSON

*THE SAME CRITICAL LENS
OF INFORMATION LITERACY THAT
WE APPLY TO BOOKS AND ARTICLES
MUST BE APPLIED TO AI;
TO DO SO, WE WILL NEED A
MUCH MORE POWERFUL LENS.*



You can ask Google, Alexa, Cortana, Watson, or Siri—but will you be able to ask your local library? A century or so ago, electricity was a new, quasi-magical thing—a novelty with few applications. Back then, nobody could have predicted that it would give rise to telephones, production lines, and microchips. And yet, electricity transformed every industry, including agriculture, healthcare, transportation, and manufacturing. As a foundational springboard for so many new innovations, that novelty was the most important engineering achievement of the 20th century.

Now, in the 21st century, a new quasi-magical thing has come into our lives: artificial intelligence (AI). And just as it was in the early days of the electronic revolution, we are only beginning to grasp how completely this new technology will transform our daily lives. Nearly all of today's emerging technologies are built on the foundation of increasingly sophisticated machine learning. Every major technology company is betting on machine learning, hoping to be a player in the coming revolution by developing proprietary machine intelligences to perform tasks that used to require human intelligence. Today, our interactions with AI are mostly novel (“Siri, why did the chicken cross the road?”)—and the results crude—but so were the first lightbulbs and photographs.

The modern public library arose alongside the late 19th-century/early 20th-century electrical revolution and has steadily adapted systems and services to new technologies ever since. However, AI will test the institution of librarianship as no technology has before. We value libraries because they keep us informed and connected; we read to enrich our lives and inform our decisions. But what happens when that decision-making process is fundamentally changed?

Machines are becoming skilled at learning, speaking, recognizing patterns, and making decisions. As a result, asking a machine for answers is quickly becoming a normal, everyday activity. As AI becomes better and better at understanding our information needs and delivering relevant answers, it seems likely we will come to rely on it more. Over time, these interactions will be less novel and more essential.

After the AI revolution, we will not read a library book to get information to inform a decision. Why would we, when a machine has already read all of the books and is more skilled at analysis and decision making? We will not spend hours on library computers researching a question when AI can do it for us in seconds. And we certainly won't go to a human librarian with an information need when AI is able to deliver a better answer in a fraction of the time.

Right now, when we seek an answer to a problem, we often put data (numbers, search terms, or whatever) into software, make an analysis, and use the results to inform a decision. This hybrid process takes place in our heads and on the computer. Soon, it will seem very natural to just state the problem and let the computer deliver the decision. The middle pieces—the input, analysis, and critical reasoning parts—will take place inside a black box. We won't understand how it happens, and we won't care as long as we get consistently good results.

While libraries will certainly be changed by the AI revolution—and in ways we can't imagine—it seems unlikely that they will cease to exist altogether. Indeed, public libraries and public universities may yet have a critical role to play in the AI revolution. Today's mainstream AIs are dominated by proprietary software. Apple, Microsoft, Google, Facebook, and other major tech players all have their own AIs. These companies have invested heavily in research and development, and they have guarded their intellectual property closely. The algorithms that give rise to machine learning are mostly kept secret, and the code that results from machine learning is often so complex that even the human developers don't understand exactly how their code works. So even if you wanted to know what AI was thinking, you would be out of luck. But if AI is a black box for which we have no key, public institutions can play an important role in providing open source AI solutions that allow for more transparency and more control.

Access

A black box is a device that receives an input and produces an output without any knowledge of its internal workings. If you ask Alexa, "What was the cause of the Civil War?" you will get a different answer than if you ask Siri—and you will not know how either arrived at the answer. You can never know what Alexa is thinking because the thinking happens at a secure data center far away.

Public institutions can help lower the barriers to AI by producing, providing, and promoting open source AI projects. There are currently several open source AI projects available to researchers and developers, and as the technology becomes more ubiquitous, practical AI systems will be available for people outside of these specialized fields.

By supporting open source AI, public institutions can ensure that researchers can access powerful systems that are free from corporate bias. Because Alexa is happy to answer your questions—and to sell you a subscription to Amazon Prime.

Information Literacy

Information literacy is about knowing when there is a need for information and being able to identify, locate, evaluate, and effectively use that information for the issue at hand. When IBM's Watson beat Ken Jennings and Brad Rutter at *Jeopardy* in 2010, it knew exactly how to evaluate and effectively use information. And after watch-

ing a computer absolutely own the world's best human contestants, I think it is safe to say that AI is capable of superior information literacy. What's worse, recent events (Russian influence, claims of fake news, etc.) have illustrated just how bad humans are at assessing the accuracy of the things we read.

When AI becomes good at using information for problem solving, it is possible that our dependence on AI information literacy will lead to a weakening of our own. But if it is important to critically evaluate information sources, it will be doubly important (but considerably more difficult) to evaluate our AI information providers and decision makers.

As we have seen in recent years, minor changes to a dataset or algorithm can greatly alter our digital experiences. Google has been accused of favoring its own products and services over those of its competitors. Facebook has been accused of altering the course of an election. Microsoft's chatbot Tay morphed into a Hitler-loving troll. The popular game Pokémon GO kept players confined to white neighborhoods. We may assume that an AI is an unbiased arbiter, but an AI with biases in its dataset will output biased answers.

The same critical lens of information literacy that we apply to books and articles must be applied to AI; to do so, we will need a much more powerful lens.

Personal Privacy

We may not always realize it, but we are using AI every day. For example, when we search Google, we are feeding data to RankBrain—an AI system that helps sort through search results. With machine learning, a computer teaches itself to do something rather than following detailed programming.

We don't always understand exactly how it works, but if you feed enough photos of cats into a neural net, it will eventually learn to identify a cat. If you give it words and phrases, it can eventually learn to understand and respond. And increasingly, AI is performing better than human-coded algorithmic rules. Given that machine learning requires massive amounts of data to be effective, our personal data has become a hot commodity. Striking deposits of deep data is the 21st-century equivalent of striking oil.

Libraries promote data privacy, and for the most part, we practice what we promote (we don't give out library records, we don't track our web users, etc.). But we will need a new set of sophisticated tools if we are going to truly be champions of privacy rights in the coming decades.

Every day, our data is monetized by corporations, weaponized by political players, and stolen for illicit purposes. If anything should concern us about the AI revolution, it isn't a science-fiction robot apocalypse. It's how already established forms of internet mischief will be exacerbated by machine learning. Libraries can help secure privacy by providing anonymous ways of interacting with AI systems.

Intellectual Freedom

If intellectual freedom is the right of every individual to seek and receive information from all points of view without restriction, then that right is under attack. As we come to seek and receive information from AI, how will we ensure that freedom is protected?

In 2016, authorities investigating the death of an Arkansas man sought as evidence any comments overheard by the suspect's Amazon Echo speaker. In September 2017, the Department of Justice (DOJ) issued search warrants to Facebook, demanding information on accounts associated with "anti-administration" users. By accessing the personal data of these users, the DOJ would know not only about the activists, but also those who read their posts, who followed them, and who messaged them.

A book can't be called to a witness stand. Books don't talk—but your AI assistant listens and talks. If you asked your AI home assistant how to murder someone or if you asked it to read a post by an anti-government activist, you could potentially be producing a trail of evidence that could be used against you. Maybe you were writing an episode of *CSI*. Maybe you were doing research for a book about the history of anarchist organizations. Whatever your reason for seeking that information, your queries were being recorded and saved.

As our primary means of gaining information moves from reading printed words to interacting with machine intelligences, we must ensure that the same safeguards we use to protect books are extended to AI. When an AI makes controversial decisions or predictions, people will almost certainly try to ban it just as they try to ban controversial books.

In 2017, an outspoken critic of Google was fired from a U.S. think tank that received its funding from Google. But in 2025, a company will have far more sophisticated and subtle ways of altering the information landscape. An AI that determines what information you see may learn to reflect the biases of its programming and devalue certain points of view. If an AI is a black box that takes an inputted question and delivers an outputted answer, who is to say that the output was not influenced by someone or something?

Work

As AI comes to outperform humans in a growing number of tasks, it will come to replace humans in a growing number of jobs. And as AI grows more sophisticated, it will become harder and harder to invent new jobs (jobs that humans can perform better than machines). Eventually, these same algorithms that took our jobs may come up with a solution for feeding and housing us, but in the short term, we will be left to deal with a growing number of unemployable people.

Taxi drivers are watching wearily as fleets of self-driving cars descend on Singapore. Cashiers in Iowa watch as their workstations are ripped out and replaced with self-check machines. And insurance underwriters in Japan watch as

their medical insurance claims reps are replaced with an AI system based on IBM's Watson Explore.

Today, libraries offer opportunities for people to find new jobs and learn new skills. The unemployed and the homeless often rely on libraries to connect to services and to find work. Studies suggest that 38% of jobs are at high risk of being replaced by AI in the next 15 years. When this happens, libraries will need to drastically grow services for the unemployed and underemployed. With low-wage jobs taking the brunt of the AI transition, the challenge will be to re-educate a workforce to compete for a small number of highly specialized jobs.

Play

As AI is put to work, some believe that humans will be freed to spend more time playing. Maybe the robots aren't coming to steal our jobs; maybe they are coming to free us from our jobs. If AI comes to take on much of the work we do, it is possible we would have more time to play, create, and discover. Our identities and our sense of meaning may be tied to the work we do, but if that work goes away, we might look to find, invest, and invent meaning elsewhere. Maybe that meaning will come in the form of virtual reality, games, or a resurgence of religion.

Libraries are a social space. We espouse the virtues of community and creativity. We offer meeting spaces and programs. The Association for Library Service to Children (ALSC) has written about the importance of play. ALA has a gaming roundtable that exists to "support the value of gaming and play in libraries." If an AI revolution means humans will be working less, we will be looking for ways to spend all of that newfound free time. Maybe we will get lost in fiction, connect to other humans in our community, or take up a hobby. Maybe we will want to volunteer, play, or create. Maybe the library will be well-positioned to help humans find new meaning.

Conclusion

From intellectual freedom to information literacy and more, libraries provide a set of principles that have helped guide intellectual growth for the past century. In the age of AI, those principles are more relevant than ever. But libraries are not the center of the information world anymore, and the new players don't always share our values. As machine learning proliferates, what steps can we take to ensure that the values of librarianship are incorporated into AI systems? Advocacy should be directed not at maintaining traditional librarianship, but in influencing the development of the emerging information systems that may come to replace us. 🤖

Ben Johnson

(bjohnson@councilbluffslibrary.org)
is the adult services manager at the
Council Bluffs Public Library in Iowa.

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