Artificial Intelligence and Open Science

EIFL Training Programme Outline

for Librarians and Open Science Trainers

July 2024

Introduction

Recent developments in artificial intelligence (AI) pose a wide range of new challenges to libraries. To support university and research libraries, as well as all trainers working with researchers and students, EIFL has compiled a training programme outline that can be used to develop training about the ethical and responsible use of AI. While focusing on the synergy of AI and open science, it also provides general information to help understand the broader landscape of AI, paying special attention to research integrity.

How can librarians use this resource?

This resource is divided into six sections: Introduction to AI, Research and AI, Intersections of AI and Open Science, Boosting Knowledge Discovery with Open Science and AI, AI and Research Integrity, Libraries and AI.

Each section gives an overview of the topic, what the trainer should cover, and what the learner should gain by the end of the training. Each topic includes “Resources for facilitators and learners”, with useful material that trainers and learners can use to improve their own knowledge or, if the licence allows, use in their own training.

In order to be able to follow the programme learners should have at least a basic understanding of open science principles.

We encourage you to become familiar with this training programme and to adapt and use relevant topics to train librarians, students and researchers.

If you would like to suggest new content and resources for consideration, please contact us at: oa@eifl.net.

Table of contents

Introduction to AI

This training covers definitions of AI and outlines its development using non-technical language. Special attention is paid to chatbots.

By the end of this training, learners should:

- understand the basic concepts of AI
- understand the concept of generative AI

Training outline

- Definitions of AI
- Development of AI
- Generative AI
- Chatbots

Resources for facilitators and learners

Online courses

- 'A Free Online Introduction to Artificial Intelligence for Non-Experts'. *Elements of AI*. University of Helsinki & MInnaLearn. https://www.elementsofai.com/.
- 'An Introduction to Artificial Intelligence'. *Open Learning*. https://www.open.edu/openlearn/education-development/ai-matters/content-section-overview
- *Artificial Intelligence*. 2023. The University of Queensland. https://uq.pressbooks.pub/digital-essentials-artificial-intelligence/
- 'AI in Practice: Applying AI'. 2023. *TU Delft OCW*. 2023. https://ocw.tudelft.nl/courses/ai-in-practice-applying-ai/
- 'AI in Practice: Preparing for AI'. 2023. *TU Delft OCW*. 2023. https://ocw.tudelft.nl/courses/ai-in-practice-preparing-for-ai/
- 'Generative AI Prompt Literacy - Office of Online and Digital Education'. University of Michigan - Flint. https://umflintpd.pdx.catalog.canvaslms.com/browse/ode/courses/generative-ai-prompt-literacy
- "AI vs. Generative AI: Exploring the Artificial Intelligence Landscape." 2024. Coursera. https://www.coursera.org/articles/ai-vs-generative-ai

Publications, blogs

- 'What Is AI? All You Need to Know about Artificial Intelligence'. ISO. https://www.iso.org/cms/render/live/en/sites/isoorg/contents/news/insights/AI/what-is-ai-all-you-need-to-know.evergreen.html
- SITNFlash. 2017. 'The History of Artificial Intelligence'. *Science in the News* (blog). 28 August 2017. https://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/
- 'What Is Artificial Intelligence (AI)?' IBM. https://www.ibm.com/topics/artificial-intelligence

- “What Is the Turing Test? Definition, Examples, and How to Conduct Your Own.” 2024. Coursera. March 19, 2024. https://www.coursera.org/articles/what-is-the-turing-test
- ‘What Is a Chatbot? How Do Chatbots Work’. G2. https://www.g2.com/articles/chatbot
- Huang, Saffron, and Divya Siddarth.‘Generative AI and the Digital Commons’. The Collective Intelligence Project. https://cip.org/research/generative-ai-digital-commons

Videos, webinars, online tutorials

- IBM Technology, dir. 2023. *The 7 Types of AI - And Why We Talk (Mostly) About 3 of Them*. https://www.youtube.com/watch?v=XFZ-rQ8eeR8
- IBM Technology, 2023. *How Large Language Models Work*. https://www.youtube.com/watch?v=5sLYAQS9sWQ
- Matthew Berman, dir. 2024. *Simple Introduction to Large Language Models (LLMs)*. https://www.youtube.com/watch?v=osKyvYJ3PRM
- Henrik Kniberg, 2024. *Generative AI in a Nutshell - How to Survive and Thrive in the Age of AI*. https://www.youtube.com/watch?v=2IK3DFHRFfw. (German, Ukrainian)
- IBM Technology, dir. 2021. *What Is a Chatbot?* https://www.youtube.com/watch?v=o9-ObGgfpEk
- IBM Technology, dir. 2023. *What Is Prompt Tuning?* https://www.youtube.com/watch?v=yu27PWzJI_Y
- Futurepedia, dir. 2024. *The ULTIMATE Guide to ChatGPT in 2024 | Beginner to Advanced*. https://www.youtube.com/watch?v=6JeaYWDyw54

Library guides

- Artificial Intelligence Now: ChatGPT + AI Literacy Toolbox: AI LibGuides’. Florida International University Libraries. https://library.fiu.edu/ai/libguides
- ‘Research Guides: Generative AI and Chatbots: Home’. Temple University Libraries. https://guides.temple.edu/c.php?g=1331776&p=9808350

Collections of resources

- ‘Generative AI Resources’. *MIDAS - Michigan Institute for Data & AI in Society*. https://midas.umich.edu/generative-ai-resources/
- Brown, William. 2024. ‘Generative AI Handbook: A Roadmap for Learning Resources’. https://genai-handbook.github.io

Guides for trainers

Heaps, Troy. 2024. *Generative Artificial Intelligence: Practical Uses in Education*. Red River College Polytechnic. https://pressbooks.openedmb.ca/aiineducation/

Research and AI

This training outlines effective uses of AI in research, while highlighting limitations and risks associated with AI use.

By the end of this training, learners should:

- Be familiar with typical uses of AI in research
- Be able to describe examples of effective use of AI in research
- Be able familiar with the limitations of AI use in research

Training outline

- Overview of research topics where AI has been effectively used
- Notable examples of AI use in research
- Limitations and risks of AI use in research

Resources for facilitators and learners

Publications, blogs

- OECD. 2023. *Artificial Intelligence in Science: Challenges, Opportunities and the Future of Research*. https://doi.org/10.1787/a8d820bd-en
- *Science in the Age of AI: How Artificial Intelligence Is Changing the Nature and Method of Scientific Research*. 2024. The Royal Society. https://royalsociety.org/-/media/policy/projects/science-in-the-age-of-ai/science-in-the-age-of-ai-report.pdf
- 'What Is AI in Science'. *MIDAS - Michigan Institute for Data & AI in Society* (blog). https://midas.umich.edu/what-is-ai-in-science/ [Examples]
- Messeri, Lisa, and M. J. Crockett. 2024. 'Artificial Intelligence and Illusions of Understanding in Scientific Research'. *Nature* 627 (8002): 49–58. https://doi.org/10.1038/s41586-024-07146-0
- 'Generative AI in Academic Research'. Cornell University, Research & Innovation. https://research-and-innovation.cornell.edu/generative-ai-in-academic-research/
- Klami, Arto, Theodoros Damoulas, Ola Engkvist, Patrick Rinke, and Samuel Kaski. 2022. 'Virtual Laboratories: Transforming Research with AI'. TechRxiv. https://doi.org/10.36227/techrxiv.20412540.v1
- 'Discover the Role of Artificial Intelligence in Virtual Labs'. 2023. https://blog.praxilabReduce the Human Error and Increase the Accuracys.com/2023/04/19/role-of-artificial-intelligence-in-virtual-labs/
- Züger, Theresa. 2024. 'The (Potential) Impact of AI on the Individual Research Process and Science in General', https://doi.org/10.5281/zenodo.10850268
- Bartlett, Chris. 2024. 'Will AI Help or Hinder Trust in Science?' 360. 16 April 2024. https://360info.org/will-ai-help-or-hinder-trust-in-science/

Videos, webinars, online tutorials

- Prof. Dr. Max Welling, 2023. *The Artificial Intelligence in Science and the Science in Artificial Intelligence*. Science & Cocktails. https://www.youtube.com/watch?v=6FZ12DuO6Hk

Intersections of AI and Open Science

This training focuses on the implementation of the OS principles in AI development and highlights open-source AI tools and notable projects at the intersection of OS and AI.

By the end of this training, learners should be able to:

- explain the importance of FAIR and open data for training AI models and for AI-assisted research
- understand the role of AI in data analysis
- understand how open data and software licences enable the development of AI tools
- be familiar with examples of AI tools for research

Training outline

- FAIR principles and the concept of AI-ready data
- Using open-source AI to create customized tools for research (e.g. customized chatbots)
- Simulations and Virtual Research Environments
- Open-source AI tools for research (Tip: make the selection relevant to the target group's discipline)
- Notable OS projects involving AI (Tip: make the selection relevant to the target group's discipline)

Resources for facilitators and learners

Publications

- OECD. 2023. *Artificial Intelligence in Science: Challenges, Opportunities and the Future of Research*. OECD. https://doi.org/10.1787/a8d820bd-en
- *Open Data for AI: What Now?* n.d. Paris: United Nations Educational, Scientific and Cultural Organization. https://unesdoc.unesco.org/ark:/48223/pf0000385841
- Huerta, E. A., Ben Blaiszik, L. Catherine Brinson, Kristofer E. Bouchard, Daniel Diaz, Caterina Doglioni, Javier M. Duarte, et al. 2023. 'FAIR for AI: An Interdisciplinary and International Community Building Perspective'. *Scientific Data* 10 (1): 487. https://doi.org/10.1038/s41597-023-02298-6
- Scheffler, Matthias, Martin Aeschlimann, Martin Albrecht, Tristan Bereau, Hans-Joachim Bungartz, Claudia Felser, Mark Greiner, et al. 2022. 'FAIR Data Enabling New Horizons for Materials Research'. *Nature* 604 (7907): 635–42. https://doi.org/10.1038/s41586-022-04501-x
- Sbailò, Luigi, Ádám Fekete, Luca M. Ghiringhelli, and Matthias Scheffler. 2022. 'The NOMAD Artificial-Intelligence Toolkit: Turning Materials-Science Data into Knowledge and Understanding'. *Npj Computational Materials* 8 (1): 1–7. https://doi.org/10.1038/s41524-022-00935-z
- Sansone, Susanna-Assunta, Philippe Rocca-Serra, Mark Wilkinson, and Lee Harland. 2022. 'FAIR: Making Data AI-Ready'. In *Artificial Intelligence for Science*, 627–40. WORLD SCIENTIFIC. https://doi.org/10.1142/9789811265679_0033

Videos, webinars, online tutorials

- RDA Research Data Alliance, 2022. *P19 BO6 BoF - Is FAIR FAIR? A Discussion of the Overlaps in the FAIR Principles of Data Management.*. https://www.youtube.com/watch?v=QjjatI0Cerg
- Elucidata Corporation, dir. 2023. *DataFAIR 2023- FAIR Data Governance and Generative AI*. https://www.youtube.com/watch?v=nq11L5_zdGg
- Center for Open Science, dir. 2023. *How Is AI Impacting Science?* https://www.youtube.com/watch?v=UpeomYqkJQ0.
- Open Science Fair, 2023. *OS Fair 2023 - Panel - AI with and for Open Science*. https://www.youtube.com/watch?v=y5XhS0QviYc
- BrainModes, dir. 2020. *What Is The Virtual Research Environment? (English)*. https://www.youtube.com/watch?v=dsjE_iYZkcU
- Euro-BioImaging Communication, dir. 2024. *Tools from AI4Life That Anyone Can Use*. https://www.youtube.com/watch?v=qp1IWYnntN4
- Blue-Cloud, dir. 2022. *Blue-Cloud Hackathon - Using the Blue-Cloud Virtual Research Environment*. https://www.youtube.com/watch?v=qCa8zfyowF8

Software

- Stumpp, Jürgen. (2016) 2024. 'Awesome Chatbots'. https://github.com/JStumpp/awesome-chatbots
- Blumenfeld, Josh. 2023. 'NASA and IBM Openly Release Geospatial AI Foundation Model for NASA Earth Observation Data'. NASA Eathdata. Earth Science Data Systems, NASA. 3 August 2023. https://www.earthdata.nasa.gov/news/impact-ibm-hls-foundation-model

Boosting knowledge discovery with Open Science and AI

This training focuses on AI-based approaches and tools for knowledge discovery, providing an overview of search engines using AI technologies and tools that combine searching, data extraction, and summarizing.

By the end of this training, learners should:

- understand the difference between lexical search and natural language search
- be familiar with academic search engines that use AI technologies
- understand advantages and limitations of AI-assisted search
- be aware of the advantages and limitations of the tools that combine searching, data extraction, and summarizing
- understand how open access content and open metadata can help improve knowledge discovery

Training outline

- The difference between lexical and natural language search
- Limitations of AI-assisted search

- AI-assisted search in indexing databases (Scopus and Dimensions)
- AI research assistants (Elicit, Consensus, Perplexity, etc.)
- Aggregators and AI (OpenAIRE Explore, Open Knowledge Maps, Core GPT)

Resources for facilitators and learners

Publications and blog posts

- Tay, Aaron. 2024. 'Boolean vs Keyword/Lexical Search vs Semantic — Keeping Things Straight'. *Medium* (blog). 8 March 2024. https://aarontay.medium.com/boolean-vs-keyword-lexical-search-vs-semantic-keeping-things-straight-95eb503b48f5
- Tay, Aaron. 2024. 'Things I Am Still Wondering about Generative AI + Search in 2024 - Impact of Semantic Search, Generation of Answers with Citations and More..' *Aaron Tay's Musings about Librarianship* (blog). 26 January 2024. https://doi.org/10.59350/vh0zy-9k287
- Kubacka, Teresa. 2024. 'Guest Post - There Is More to Reliable Chatbots than Providing Scientific References: The Case of ScopusAI'. The Scholarly Kitchen. 21 February 2024. https://scholarlykitchen.sspnet.org/2024/02/21/guest-post-there-is-more-to-reliable-chatbots-than-providing-scientific-references-the-case-of-scopusai/
- Aguilera Cora, Elisenda, Carlos Lopezosa, and Lluís Codina. 2024. 'Scopus AI Beta: Functional Analysis and Cases', e-Repositori. http://hdl.handle.net/10230/58658
- Tay, Aaron. 2024. 'Trust in AI: Evaluating Scite, Elicit, Consensus, and Scopus AI for Generating Literature Reviews'. HKUST Library. https://library.hkust.edu.hk/sc/trust-ai-lit-rev/
- Tay, Aaron. 2024. 'List of Academic Search Engines That Use Large Language Models for Generative Answers Using Retrieval Augmented Generation (RAG) | Aaron Tay's Musings about Librarianship'. February 2024. https://musingsaboutlibrarianship.blogspot.com/p/list-of-academic-search-engines-that.html

Tay, Aaron. 2024. 'A Conceptual View of Information Retrieval - Can We Do Better with AI? | Aaron Tay's Musings about Librarianship'. 7 April 2024. http://musingsaboutlibrarianship.blogspot.com/2024/04/a-conceptual-view-of-information.html.https://scholarlykitchen.sspnet.org/2024/02/21/guest-post-there-is-more-to-reliable-chatbots-than-providing-scientific-references-the-case-of-scopusai/

'Powering Research with Dimensions AI Assistant'. 2023. Dimensions. 1 August 2023. https://www.dimensions.ai/blog/powering-research-with-dimensions-ai-assistant/

Tay, Aaron. 2023. 'Large Language Models — More Developments and Thoughts'. *Medium* (blog). 5 April 2023. https://aarontay.medium.com/large-language-models-more-developments-and-thoughts-2db4cb4527cc

- Tay, Aaron. 2023. 'How Q&A Systems Based on Large Language Models (Eg GPT4) Will Change Things If They Become the Dominant Search Paradigm - 9 Implications for Libraries'. Aaron Tay's Musings about Librarianship. 19 March 2023. http://musingsaboutlibrarianship.blogspot.com/2023/03/how-q-systems-based-on-large-language.html

- Tay, Aaron. 2023. 'Why Entering Your Query in Natural Question Leads to Better Result than Keyword Searching with the Latest AI Powered (Dense Retrieval/Embedding Models) Search | Aaron Tay's Musings about Librarianship'. 23 March 2023. http://musingsaboutlibrarianship.blogspot.com/2024/03/why-entering-your-query-in-natural.html
- Tay, Aaron. 2023. 'JSTOR Generative AI Pilot - Or Is Semantic Search Coming for Academic Databases? | Aaron Tay's Musings about Librarianship'. 22 November 2023. http://musingsaboutlibrarianship.blogspot.com/2023/11/jstor-generative-ai-pilot-or-is.html
- Pride, David, Matteo Cancellieri, and Petr Knoth. 2023. 'CORE-GPT: Combining Open Access Research and Large Language Models for Credible, Trustworthy Question Answering'. arXiv. https://doi.org/10.48550/arXiv.2307.04683
- 'About'. Open Knowledge Maps. https://openknowledgemaps.org/about

Videos, webinars, online tutorials

- IBM Technology, dir. 2023. *The 7 Types of AI - And Why We Talk (Mostly) About 3 of Them*. https://www.youtube.com/watch?v=XFZ-rQ8eeR8
- *SLA Europe Webinar - AI-Driven Search Engines: A Comparative Study*. 2023. https://www.youtube.com/watch?v=dCwh3-Voea4
- *Natural Language Search with Knowledge Graphs - Trey Grainger, Lucidworks*. 2019. https://www.youtube.com/watch?v=5noi2VM9F-g
- Andy Stapleton, dir. 2024. *How To Use Perplexity AI For Research - Terrifyingly SMART!* https://www.youtube.com/watch?v=Ne-j_U2Vkfw. (Perplexity is freemium)
- Science Grad School Coach, dir. 2024. *Discover The Best Research Articles For Your Questions Using Consensus AI!* https://www.youtube.com/watch?v=6tIor8_W5kw. (Consensus is freemium)
- 'Research Rabbit Tutorials - YouTube'. https://www.youtube.com/playlist?list=PL_ctsbuZQZexNfNApkAdEUz0YlcLUUc3n.
- OpenAIRE_eu, dir. 2023. *OpenAIRE EXPLORE - Service Video*. https://www.youtube.com/watch?v=9Jl5BJkKeS8
- Aaron Tay, dir. 2023. *The Possible Impact of AI on Search and Discovery*. https://www.youtube.com/watch?v=M3I7XOHY31k

Library guides

'LibGuides: How to Search for Information: AI in Information Searching'. Haaga-Helia University of Applied Sciences - LibGuides.

AI and research integrity

This training outlines the ethical challenges associated with the use of AI in research and recommendations for responsible AI use.

By the end of this training, learners should:

- Understand the ethical challenges associated with AI in research (IPR issues, plagiarism, unreliable information, data protection issues, etc.)
- Know where to find information about recommendation and the current best practice

Training outline

- Copyright infringement in AI model training
- Copyright infringement arising from the use of AI tools
- Privacy issues
- Using generative AI in scholarly writings
- Recommendations and best practice

Resources for facilitators and learners

Publications

- World Intellectual Property Organization, ed. 2024. Generative AI: Navigating Intellectual Property. Geneva, Switzerland: World Intellectual Property Organization. https://doi.org/10.34667/tind.49065
- Megahed, Fadel M., Ying-Ju Chen, Joshua A. Ferris, Sven Knoth, and L. Allison Jones-Farmer. 2024. 'How Generative AI Models Such as ChatGPT Can Be (Mis)Used in SPC Practice, Education, and Research? An Exploratory Study'. Quality Engineering 36 (2): 1–29. https://doi.org/10.1080/08982112.2023.2206479

Guidelines and recommendations

- 'Guidelines for the Use of Artificial Intelligence in Research/Scholarship/Creative Activities'. https://www.chapman.edu/ai/guidelines-for-the-use-of-ai.aspx
- 'Generative AI in Academic Research'. Cornell University, Research & Innovation. https://research-and-innovation.cornell.edu/generative-ai-in-academic-research/
- 'Generative AI : A Primer'. 2023. JISC. https://beta.jisc.ac.uk/reports/generative-ai-a-primer
- Leslie, D. (2019). Understanding artificial intelligence ethics and safety: A guide for the responsible design and implementation of AI systems in the public sector. Zenodo. https://doi.org/10.5281/zenodo.3240529
- Tabassi, Elham. 2023. 'Artificial Intelligence Risk Management Framework (AI RMF 1.0)'. NIST AI 100-1. Gaithersburg, MD: National Institute of Standards and Technology (U.S.). https://doi.org/10.6028/NIST.AI.100-1
- "Understanding Artificial Intelligence Ethics and Safety: A Guide for the Responsible Design and Implementation of AI Systems in the Public Sector." https://doi.org/10.5281/zenodo.3240529

- “Artificial Intelligence: Examples of Ethical Dilemmas.” n.d. UNESCO. Accessed April 25, 2024. https://www.unesco.org/en/artificial-intelligence/recommendation-ethics/cases
- “Ethics of Artificial Intelligence.”UNESCO. https://www.unesco.org/en/artificial-intelligence/recommendation-ethics
- Sabzalieva, Emma, and Arianna Valentini. 2023. ‘ChatGPT and Artificial Intelligence in Higher Education: Quick Start Guide - UNESCO Digital Library’. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000385146
- UNESCO. 2023. ‘UNESCO’s Recommendation on the Ethics of Artificial Intelligence: Key Facts’. https://unesdoc.unesco.org/ark:/48223/pf0000385082
- Lindsay, Kieran. n.d. ‘Responsible AI in Academia’. GitHub. Accessed 16 July 2024. https://github.com/Academic-ID/academicAI/blob/main/Responsible%20AI%20in%20Academia.md
- “Foundation Models Such as ChatGPT through the Prism of the UNESCO Recommendation on the Ethics of Artificial Intelligence - UNESCO Digital Library.” 2023. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000385629
- “Artificial Intelligence in Education.” UNESCO. https://www.unesco.org/en/digital-education/artificial-intelligence
- Huang, Saffron, and Divya Siddarth. Generative AI and the Digital Commons’. The Collective Intelligence Project. https://cip.org/research/generative-ai-digital-commons
- https://unesdoc.unesco.org/ark:/48223/pf0000385629
- “WAME Revised Recommendations on Chatbots and Generative AI || WAME.” n.d. Accessed October 10, 2023. https://www.wame.org/news-details.php?nid=40
- ‘Catalogue of Tools & Metrics for Trustworthy AI’. OECD.AI Policy Observatory. https://oecd.ai/en/catalogue
- ‘OECD AI Principles Overview’. 2024. OECD.AI Policy Observatory. https://oecd.ai/en/principles
- ‘AI Licenses’. Responsible AI Licenses (RAIL). https://www.licenses.ai/ai-licenses
- ‘Responsible AI Licenses: A Practical Tool for Implementing the OECD Principles for Trustworthy AI’. OECD.AI Policy Observatory. https://oecd.ai/en/wonk/rails-licenses-trustworthy-ai

Videos, webinars, online tutorials

Open Science Fair, dir. 2023. *OS Fair 2023 - Panel - AI with and for Open Science*. https://www.youtube.com/watch?v=y5XhS0QviYc

Library guides

- Artificial Intelligence Now: ChatGPT + AI Literacy Toolbox: AI LibGuides’. Florida International University Libraries. https://library.fiu.edu/ai/libguides

Guides for trainers

- *Hands-On AI Projects for the Classroom: A Guide on Ethics and AI*. 2024. ISTE. https://oercommons.org/courseware/lesson/113665

Libraries and AI

This training outlines new areas of library services and engagement associated with AI use. This training can be omitted in training for researchers.

By the end of this training, learners should:

- Understand challenges for libraries associated with AI
- Understand the concept of AI literacy
- Be aware of new training topics relate to AI
- Be familiar with examples of new library services that can be built on AI

Training outline

- AI challenges for libraries
- AI literacy
- AI and library strategies
- Training priorities for libraries to address AI-related challenges
- Examples of new services (chatbots, recommender services, augmented and virtual reality

Resources for facilitators and learners

Publications and blog posts

- Pickering, Ruth, Matthew Ismail, Daniel W. Hook, Simon J. Porter, Catherine Nicole Coleman, Michael A. Keller, James W. Weis, et al. 2022. *Artificial Intelligence in Libraries and Publishing*. Michigan Publishing Services. https://doi.org/10.3998/mpub.12669942
- Frické, Martin. 2024. *Artificial Intelligence and Librarianship*. 2nd ed. SoftOption. https://open.umn.edu/opentextbooks/textbooks/artificial-intelligence-and-librarianship
- Cox, Andrew M., and Suvodeep Mazumdar. 2022. 'Defining Artificial Intelligence for Librarians'. *Journal of Librarianship and Information Science*, 56 (2). https://doi.org/10.1177/09610006221142029
- Halburgi, Suryakanth, and Prashant Mukarambi. 2023. "The Timeless Relevance of Libraries in the Age of Artificial Intelligence: A Review." *IP Indian Journal of Library Science and Information Technology* 8 (2): 84–87. https://doi.org/10.18231/j.ijlsit.2023.014
- WOLDETSADIK, MULUGETA, 2024. "The Digital Librarian in the Age of AI: Embracing Technology for Enhanced Library Services." *21st Century Information & Libraries Network _ INFOLIBNET* (blog). April 5, 2024. https://mylibrarianship.wordpress.com/2024/04/05/the-digital-librarian-in-the-age-of-ai-embracing-technology-for-enhanced-library-services/
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- Upshall, Michael. 2022. 'An AI Toolkit for Libraries'. *Insights* 35, 18. https://doi.org/10.1629/uksg.592
- 'Developing a Library Strategic Response to Artificial Intelligence'. *IFLA* (blog). https://www.ifla.org/g/ai/developing-a-library-strategic-response-to-artificial-intelligence/
- Padilla, Thomas. 2019. *Responsible Operations: Data Science, Machine Learning, and AI in Libraries*. Dublin, OH: OCLC Research. https://doi.org/10.25333/XK7Z-9G97
- Andersdotter, Karolina. 2023. "Artificial Intelligence Skills and Knowledge in Libraries: Experiences and Critical Impressions from a Learning Circle." *Journal of Information Literacy* 17 (2): 108–30. https://doi.org/10.11645/17.2.14
- Tanzi, Nick. 2023. "How Can AI Be Used in Libraries?" The Digital Librarian. January 23, 2023. https://the-digital-librarian.com/2023/01/23/artificial-intelligence-in-the-library/
- "Digital Literacy Will Be Key in a World Transformed by AI." 2023. Schwartz Reisman Institute. March 23, 2023. https://srinstitute.utoronto.ca/news/digital-literacy-will-be-key-in-a-world-transformed-by-ai
- Dixon, Neil. 2023. "Teaching Digital Literacy in the Context of AI Text-to-Art Generators." Information Today, 43 (1). http://www.infotoday.com/cilmag/jan23/Dixon--Teaching-Digital-Literacy-in-the-Context-of-AI-Text-to-Art-Generators.shtml
- Ehrenpreis, Michelle, and John DeLooper. 2022. 'Implementing a Chatbot on a Library Website'. *Publications and Research*, CUNY Academic Works. https://academicworks.cuny.edu/le_pubs/370
- Uzwyshyn, Raymond. 2023. "Academic Research Libraries and Enabling Artificial Intelligence: From Open Science and Datasets to AI and Discovery," ResearchGate. https://doi.org/10.13140/RG.2.2.20360.70404
- Alam, Abid Fakhre, A. Subaveerapandiyan, Dalitso Mvula, and Neelam Tiwary. 2024. "AI Literacy and Zambian Librarians: A Study of Perceptions and Applications." *Open Information Science* 8 (1). https://doi.org/10.1515/opis-2022-0166
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