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Emerging Artificial Intelligence Tools Useful for Researchers, Scientists and Librarians

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Abstract

Artificial Intelligence (AI) is rapidly transforming the way we live and work. AI has significant impact on academic and scientific research. The world of academic research is constantly evolving, and AI is playing a significant role in transforming the research landscape. From finding sources to analyzing data, AI-powered tools are making the research process more efficient and accurate. By harnessing the power of AI, research scholars and scientists can streamline their research processes, enhance data analysis, and accelerate discoveries. In this context, this paper attempts to review some of the emerging AI technologies and tools, helpfulness of those tools for researchers and scientists with advantages of AI. Again, it describes how AI tools are revolutionizing academic researchand useful for researchers, librarians, and scientists.

Keywords: Artificial Intelligence Tools, Academic Research, Machine Learning, Natural Language Processing, Computer Vision.

1. Introduction

The term artificial intelligence (AI) was coined in 1956. Earlier, AI research in the 1950s explored topics like problem solving and symbolic methods. During 1960s, the US Department of Defence took interest in this type of work and began training computers to mimic basic human reasoning. For example, the Defence Advanced Research Projects Agency (DARPA) completed street mapping projects in the 1970s and produced intelligent personal assistants in 2003, long before Siri, Alexa or Cortana were household names. The above early works paved the way for the automation and formal reasoning that we see in computers today, including decision support systems, expert systems and smart search systems that can be designed to complement and augment human abilities.Though the foundation for AI was laid in the early 1950s, it has become more popular today due to increased data volumes, advanced algorithms, and improvements in computing power and storage. During 1950s –1970s, neural networks emerged. The neural networks stirred excitement for 'thinking machines. During 1980s–2010s, machine learning became popular. At present, deep learning breakthrough drive AI book. No doubt, artificial intelligence has evolved to provide many specific benefits in every industry starting from health care to retail. Artificial intelligence is rapidly changing the education and research environment and use of AI tools will significantly improve the workflow of the

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researchers, scholars and librarians starting from generating lesson plans to looking for journals to cite.

2. Emerging Artificial Intelligence Technologies

The following are some of the important AI tools described briefly.

2.1. Machine Learning

Machine learning is a branch of artificial intelligence based on the idea that systems can learn from data, identify patterns and make decisions with minimal human intervention. While artificial intelligence (AI) is the broad science of mimicking human abilities, machine learning is a specific subset of AI that trains a machine how to learn. It is nothing but a method of data analysis that automates analytical model building.

2.2. Deep Learning

Deep learning is a type of machine learning that trains a computer to perform human-like tasks, such as recognizing speech, identifying images or making predictions. Instead of organizing data to run through predefined equations, deep learning sets up basic parameters about the data and trains the computer to learn on its own by recognizing patterns using many layers of processing.

2.3. Natural Language Processing

Natural language processing (NLP) is a branch of artificial intelligence that helps computers understand, interpret and manipulate human language. It helps computers communicate with humans in their own language, making it possible for computers to read text, hear speech, interpret it, measure sentiment and determine which parts are important.

2.4. Computer Vision

Computer vision is a field of artificial intelligence that trains computers to interpret and understand the visual world. Using digital images from cameras and videos and deep learning models, machines can accurately identify and classify objects. From recognizing faces to processing the live action of a game, computer vision rivals and surpasses human visual abilities in many areas.

3. Advantages of Artificial Intelligence

Artificial Intelligence (AI) makes it possible for machines to learn from experience, adjust to new inputs and perform human-like tasks. Most AI examples rely heavily on deep learning and natural language processing. Using these technologies, computers can be trained to accomplish specific tasks by processing large amounts of data and recognizing patterns in the data. The following are some of the important advantages of artificial intelligence.

- AI automates repetitive learning and discovery through data;
- AI adds intelligence to existing products;
- AI adapts through progressive learning algorithms to let the data do the programming;
- AI analyzes more and deeper data using neural networks that have many hidden layers;
- AI achieves incredible accuracy through deep neural networks; and
- AI gets the most out of data, when algorithms are self-learning, the data itself is an asset.

4. Artificial Intelligence Tools and Research

Gone are the days where scholars and students devoted countless hours in the libraries to search literature to support their academic research and writing. In those days, the availability of research literature was scanty and mostly in print. Due to the advancements in ICT, there is a tremendous information explosion and abundant availability of information becomes a problem. Scholars and researchers require assistance to sort and organize sources due to the abundance of information available today. Moreover, they must write informative, engaging and quality articles and reports due to the ongoing pressure to publish.

AI has revolutionized numerous industries, and scientific research is no exception. By harnessing the power of AI, research scholars, and scientists can streamline their research processes, enhance data analysis, and accelerate discoveries. AI tools are being used to automate tasks, analyze data, and generate insights in ways that were not possible before. This is helping researchers to make faster progress, achieve breakthroughs, and improve the quality of their work. AI tools that have proven to be invaluable assets for researchers. Whether you're conducting experiments in the lab, writing scientific articles, publishing in journals, or working on your thesis or dissertation, these tools can greatly enhance your efficiency and productivity.

5. How AI tools help research scholars and scientists?

AI tools can be a valuable resource for research scholars and scientists at all stages of their research. They may be helpful to:

- conduct comprehensive literature reviews, generating summaries, and organising references, facilitating the writing process;

- automate tasks, such as data collection and analysis. This may free up researchers to focus on more creative and strategic work and ensure effective use of their precious time;

- brainstorm, write and edit their work. They may also be used to generate citations, create bibliographies, and check for plagiarism;

- find relevant high-impact factor journals, submit their work, and track their progress through the publication process;

- design experiments, optimizing parameters and automating data collection, saving time and reducing human error; and.

- provide sophisticated algorithms for data analysis, enabling researchers to uncover patterns, identify trends, and derive meaningful insights from complex datasets.

6. AI Tools helpful for the research scholars and scientists

When we talk about AI tools, many of us think about ChatGPT, a large language model-based chatbot developed by OpenAI which was launched during 2022, an AI tool which enables users to refine and steer a conversation towards a desired length, format, level of detail, style and language used. But, apart from ChatGPT, there are a variety of AI tools available for researchers and librarians.

The following are some of the important AI tools helpful for the scholars, researchers, and librarians.

6.1. Any Summary

Any Summary is an AI-powered tool that quickly summarizes long interview audio, video files, long texts, research papers, etc. It offers a customizable summary format such as bullet points, quotes, or a full abstract, and can create summaries from files or URLs. It supports various file types including images, audio, video, text and CSV files. Any Summary also provides helpful FAQs, examples, and customer feedback. No doubt Any Summary is a valuable tool for librarians and researchers who need to sift through extensive textual or video data. It enables them to extract key insights efficiently, aiding in research analysis and content curation.

6.2. Bing Create

The Microsoft Bing Image Creator is a tool that uses AI to generate images based on words and text. It is currently available in some regions, and the team is working to bring it to more regions. It is powered by an advanced version of DALLE-2.Librarians and researchers can use Bing Create to quickly produce visual representations of concepts or research findings, enhancing the visual appeal of their materials and presentations.

6.3. Books AI

BooksAI takes a novel approach by utilizing Vision AI and GPT-4 to create book summaries from images of book covers. This innovative tool enables users to generate concise book summaries swiftly and effortlessly, merely by capturing a photo of the book in question. For librarians and researchers, BooksAI offers a time-saving solution for producing succinct overviews of books, an essential resource for those seeking quick insights into the content of various publications.

6.4. ChatGPT for Search Engines

ChatGPT for search engines is an AI-powered chatbot extension that can be added to search engines that allows users to ask questions and receive human-like responses. It includes syntax highlighting for code, trigger settings, a dark theme, and a right-click option to send selected text as a prompt. It is compatible with most devices and can be triggered manually, with a question mark, or always. There are no ads, analytics, trackers, or cookies, and no user data is collected.This tool enhances the efficiency of researchers and librarians by providing a quick and reliable way to find information, clarify doubts, and gather research insights, all while maintaining user privacy and security.

6.5. Consensus

Consensus is an AI search engine that helps researchers to find relevant research papers. It uses machine learning to identify papers that are likely to be relevant to a given

research question, even if they do not use the same keywords. Consensus also provides summaries of each paper, making it easy to assess their relevance.

6.6. Elicit

Elicit stands as a valuable research assistant tool, leveraging language models to automate various research tasks, with a particular focus on literature reviews. For librarians and researchers, Elicit can efficiently locate pertinent research papers, summarize essential findings, and extract vital information. Additionally, it extends its capabilities to tasks like brainstorming, summarization, and text classification, providing a multifaceted solution to research challenges. Researchers and librarians can benefit significantly from Elicit's ability to streamline literature review processes and facilitate information retrieval.

6.7. Explain Paper

Explain Paper simplifies the daunting task of understanding complex academic papers. Users can upload academic papers, highlight perplexing passages, and receive explanations. This tool is a game-changer for researchers and librarians who often grapple with intricate research articles. Explain Paper offers a more accessible path to comprehending academic materials, enabling users to grasp the content's nuances and significance.Each of these tools provides unique benefits for librarians and researchers, whether through efficient literature reviews, simplified data management, creative engagement with academic and literary content, or accelerated research processes.

6.8. Formulizer

Formulizer emerges as an indispensable AI assistant tailored for users of Excel, Google Sheets, Notion, and other spreadsheet applications. Its primary goal is to expedite tasks by swiftly transforming ideas into functional formulas. This AI marvel generates and clarifies formulas, tasks, regex patterns, and script code based on user inputs. Furthermore, it prides itself on data privacy and security, boasting rapid response times, impeccable accuracy, and a user-friendly interface. Librarians and researchers can harness the power of Formulizer to automate data-related operations, reducing errors and saving valuable time in data management and analysis.

6.9. Gamma App

Gamma is a user-friendly tool that simplifies the creation of visually engaging and interactive content from raw notes. It utilizes AI-powered design tools to generate attractive slides and presentations with one-click templates and no-code editing required. Users can easily embed various elements like GIFs, videos, charts, and websites. Additionally, it offers built-in analytics and collaboration features. For librarians, Gamma can enhance content creation for library presentations and workshops. Researchers can use it to create visually appealing reports and presentations to communicate their findings effectively.

6.10. GPT for Sheets

The GPT Sheets Add-on provides an easy way to access OpenAI GPT-3's powerful capabilities from within Google Sheets. It exposes two simple custom functions: =GPT and =GPT_LIST that can be used for tasks such as generating blog post ideas, writing paragraphs or procedures, cleaning up lists, classifying reviews, summarizing, writing responses to comments, and experimenting with hyperparameters. The add-on is free to use, with the only cost being OpenAI's API cost.This tool can assist researchers and librarians in various tasks related to data analysis, content creation, and organization within Google Sheets, improving productivity and facilitating data-driven decision-making

6.11. Grammar GPT

The GPTGrammar Fixer with ChatGPT Technology is an ultimate writing companion that provides users with an AI-powered tool to help them improve grammar in their writing. The tool uses OpenAI technology to detect and suggest corrections for grammar mistakes, allowing users to edit their writing quickly and efficiently for accuracy and clarity.Grammar GPT assists researchers and librarians in ensuring the correctness and clarity of their written materials, including research papers and reports, enhancing the overall quality of their work.

6.12. Inciteful

Inciteful is a comprehensive AI tool that empowers researchers to find relevant literature, understand new topics, and explore connections between ideas. Within the Inciteful suite of tools, Paper Discovery stands out as a powerful feature. Leveraging citation networks, Paper Discovery creates a robust web of interconnected papers, providing valuable insights into similar works, important contributions, and prolific authors and institutions. This unique approach allows researchers to navigate the literature landscape more effectively, gaining a holistic understanding of a particular field. Inciteful is accessible to researchers worldwide, and it is available free of charge, making it an invaluable resource for the academic community.

6.13. Konjer

Konjer offers a unique and engaging experience for both librarians and researchers. It allows users to interact with historical figures, fictional characters, or dive deep into specific topics of interest. This tool fosters creative exploration and discussion of texts, making it a valuable resource for librarians and researchers seeking fresh perspectives or innovative ways to understand and engage with literary and historical content.

6.14. Litmaps

Litmaps is a user-friendly platform that simplifies the exploration of academic papers relevant to your research interests. By leveraging advanced AI algorithms, Litmaps enhances the literature review process, providing researchers with powerful features to streamline their workflow. Through automated citation searching, interactive visualisations, and seamless collaboration with other researchers, Litmaps empowers you to delve deep into scholarly works effortlessly.

6.15. MiniGPT-4

MiniGPT-4 enhances vision-language understanding by combining a frozen visual encoder with a large language model. It excels in generating detailed image descriptions, creating

websites from hand-written drafts, composing stories and poems inspired by images, solving problems depicted in images, and providing cooking instructions based on food photos. This tool is computationally efficient, requiring minimal training, and aligning visual features with text using image-text pairs. For librarians, MiniGPT-4 can assist in creating visually engaging content for library events and promotions. Researchers can utilize it to enhance data visualization and communication of research findings through visuals.

6.16. OpenRead

OpenRead is an innovative AI-powered interactive paper platform designed to revolutionize the way librarians and researchers access and interact with research papers. It introduces a range of powerful features, including the Paper Q&A tool, which facilitates rapid answers to questions about research papers. Additionally, the Paper Espresso feature expedites the generation of literature reviews. OpenRead accelerates the reading process with AI assistance, offers a user-friendly low-code paper editor, and provides a robust notes system complete with backlinks and outgoing links for increased efficiency. To further enhance collaboration, OpenRead hosts a research community and university alliance. Librarians and researchers will find OpenRead indispensable for efficient paper interaction, note-taking, and collaborative research efforts.

6.17. Paper Brain

Paper Brain is a powerful tool designed to streamline the research workflow, particularly for librarians and researchers engaged in literature reviews. It utilizes advanced algorithms to identify and organize relevant papers, extracting key points and crucial information. This tool is an indispensable assistant in research endeavours, simplifying tasks such as summarization, information extraction, and even brainstorming. Librarians and researchers can rely on Paper Brain to enhance their productivity and efficiency when dealing with vast amounts of research materials.

6.18. PDF GPT IO

PDFGPT is a tool where you can upload PDF files and chat with it,i.e., ask questions in the content of the pdf and get specific answers. It also provides a demo video and Discord link to join for more information. Researchers and librarians can use PDFGPT to engage in discussions related to their research materials and extract information from PDF documents, facilitating knowledge sharing and content extraction. There are free version as well as paid version available.

6.19. PDFgear

PDFgear is a free AI academic tool which is quite powerful PDF reader for users engaged in academic research work. It efficiently sorts through and organise source pages using its built-in AI summarizer, which accurately extracts key information and locates paragraphs and sentences with archive quotes. The best feature of PDFgear is its support for editing research files according to users' needs. Whether it is text replacement, annotating, rewriting, or proofreading of academic research files, PDFgear makes it incredibly easy and it will be highly useful for the research scholars and scientists.

6.20. Recast

Recast is an AI-powered tool that converts articles into audio summaries. It allows users to listen to summarized versions of articles instead of reading them. The tool aims to make content consumption more convenient, whether users are on the go, working out, or looking for a more efficient way to stay informed. Recast provides an app and a browser extension, enabling users to add their own articles and easily access and listen to the audio summaries.Researchers and librarians can use Recast to consume research articles more efficiently, especially when multitasking or engaging in activities where reading is not practical, such as during commutes or workouts.

6.21. Research Rabbit

Research Rabbit is a powerful AI research assistant. It finds and organizes research papers. If we enter a keyword or phrase, Research Rabbit will return a lit of relevant papers through semantic scholar or PubMed search. After signing up, it will prompt to search for a topic and add papers to a collection. Once articles are added, we can rename the collection and send it to our co-researchers or collaborators through email. It streamlines the research process so that we can do away with manually listing our sources.

6.22. Scholarcy

Scholarcy is an AI-powered tool designed to assist researchers in summarising their research papers. By employing advanced algorithms,it can generate concise summaries, saving researchers valuable time while ensuring the essential aspects of their works that are effectively communicated. This tool simplifies the research process, enabling researchers to share key findings efficiently.

6.23. SciSpace

SciSpace or Typeset.io is an AI-powered platform that helps researchers to publish their work. It provides a one-stop shop for everything from manuscript submission to peer review to publication. SciSpace can help researchers to save time and get their work published faster.

6.24. Scite Assistant

Scite Assistant is an AI-powered research tool that helps researchers to find, read, and understand scientific literature. It can automatically extract key information from papers, such as the research question, methods, results, and conclusions. Scite Assistant can also help researchers to identify relevant papers, track their progress, and collaborate with others.

6.25. Semantic Scholar

Semantic Scholar is a free, AI-powered research tool that revolutionizes the way researcher's access scientific literature. With a vast repository of over 200 million papers covering all fields of science, Semantic Scholar provides an extensive knowledge base for researchers worldwide. By leveraging advanced AI algorithms, Semantic Scholar enables users to discover, access, and explore scholarly articles with remarkable efficiency.

6.26. Talk to Books

Talk to Books is a revolutionary AI-powered search engine designed to assist librarians and researchers in their quest for knowledge. Users can engage in natural language conversations with this tool, asking questions about books and receiving human-like responses. What sets

Talk to Books apart is its utilization of advanced machine learning algorithms, which scour millions of books to generate responses, providing users with an immersive and conversational search experience. This tool is a game-changer for librarians and researchers as it offers an engaging and efficient way to explore and discover new books, aiding in the discovery of valuable resources and enabling deeper exploration of various topics.

6.27. Teach Anything

The Teach Anything tool is a teaching tool that allows users to quickly get answers to their questions by selecting a language, a difficulty level, and writing a question. Researchers and librarians can use this tool to promptly access answers to specific questions related to their research or information needs, expediting their research process and knowledge acquisition.

6.28. Tome AI

Tome is a collaborative AI partner that helps you create interactive presentations, surveys, games, etc. It features drag-and-drop creation, responsive pages, one-click themes, embeds from the web, native video recording, easy sharing, and an iOS app. It is designed to help you create customer education, sales decks and pitches, and to help you share complex ideas.Researchers and librarians can use Tome AI to simplify the process of creating engaging content for presentations, reports, and educational materials, making their work more impactful and visually appealing.

6.29. Trinka

Trinka is an online sentence structure checker and language proof reader. It is made for specialized and scholastic composition. It catches errors that other grammar checkers miss, like issues with subject-verb agreement, syntax, word choices, the use of pronouns and articles, and technical spelling. Further, it incorporates a professional tone, the use of technical worlds, conciseness that goes beyond grammar and spelling, and style guides.

6.30. Zeroscope Text-to-Video

Zeroscope Text-to-Video is a powerful tool that transforms written text into compelling videos. Users can input descriptive text, narratives, or scripts, and the tool automatically generates corresponding video content. This feature is particularly beneficial for content creators, marketers, and individuals who need to produce video content quickly without extensive video editing skills or resources. For librarians, Zeroscope can simplify the creation of engaging video tutorials or promotional materials for library services and resources. Researchers can leverage it to visually present their research findings and engage a wider audience.These tools offer a range of capabilities, from simplifying content creation and enhancing data visualization to providing innovative solutions for generating video content. They can assist both librarians and researchers in effectively communicating information and engaging with their target audience.

7. Conclusion

The future of academia is likely to be transformed by artificial intelligence language models such as ChatGPT. Academia and AI are becoming increasingly intertwined and as AI continues to advance, it is likely that academics and librarians will continue to either embrace

its potential or voice concerns about its risks. AI tools are a powerful new tool for scientific research. They can help researchers to save time, improve their work, and make faster progress.There is no doubt that the AI tools will redefine the future of academic research but many academics don't know how to use the AI tools intelligently. So, the Librarians shall play a key role to sensitize their users viz., students, research scholars, faculty and scientists about the effective and efficient use of the AI tools to support their academic and research activities.

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