

Momentous AI-aided Search Tools and Services for Academic and Research Tasks: A Review of the Literature

Saeed Asgary¹, Ardavan Parhizkar²  

¹ Professor of Endodontics, Iranian Centre for Endodontic Research, Research Institute for Dental Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran

² Assistant Professor of Dental Biomaterials, Iranian Centre for Endodontic Research, Research Institute for Dental Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Abstract

The current comprehensive state-of-the-art review aims to offer an in-depth exploration of “Artificial Intelligence” (AI)-driven platforms, tools and resources; specifically customised for academic and research pursuit. The integration of AI into academia and research has occurred in an era of already-heightened efficiency and productivity; nonetheless, AI-powered tools and services have become indispensable assets for researchers across diverse scientific fields. The present article attempts to present a categorised overview of pivotal AI-based tools and services tailored to specific aspects of academic and research work. Moreover, it tries to cover areas encompassing research and literature search, writing assistance, data analysis, reference management, and so forth. Additionally, descriptions and real-world use-case scenarios are provided for each tool empowering worldwide researchers to harness AI's innovative potential, and promote their scholarly and research abilities, skills, potential and confidence. Furthermore, the comprehensive evaluation ensures that the current review could serve as a reliable guide for those seeking to leverage AI's myriad capabilities in their academic and research endeavors.

Key Words: Artificial intelligence, Dentistry, Platform, Research, Search, Tools

✉ Corresponding author:
Ardavan Parhizkar, Assistant Professor of Dental Biomaterials, Iranian Centre for Endodontic Research, Research Institute for Dental Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran

ardavanparhizkar@yahoo.co.uk

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Introduction

In today's expansive realm of academic and research pursuit, “Artificial Intelligence” (AI) has emerged as a transformative force, revolutionizing efficiency as well as accuracy and productivity (1). A multitude of AI-enabled tools and services, with platforms specifically purpose-built to analyze and execute various academic and research tasks, exemplify the above-mentioned profound shift (2). As academia and research continue to evolve, it is crucial to keep abreast of rapid advancements

and integrate AI innovative tools to maximize scholarly output and erudite impact.

Large language AI generative models (LLMs) are deliberated as a pinnacle in natural language processing exemplified by architecture; e.g. “Generative Pre-training Transformer (GPT)”—3.5 (3). These models are characterised by their extensive training on diverse datasets, enabling them to generate texts across a broad spectrum of topics. In addition, their hallmark is the capacity to understand context, generate coherent

responses and exhibit contextual flexibility. Moreover, they serve as the foundational bedrock for the subsequent developments in platforms, applications and research tools (4). Foundational models are addressed as the representatives of the basic technologies that support a specific field, e.g. the advanced theories/models which function as the basis for further application and exploration. The aforementioned foundational elements are able to deliver a theoretical or technological structure on which further developments will be built (5).

Artificial intelligence “platforms” characteristically refer to the integrated systems/environments which support generative models for different number of objectives (6, 7). Platforms vary from multipurpose frameworks in technology to collaborative platforms in academic environments. Additionally, they usually provide an infrastructure that leverages the integration, deployment and customization of AI models, providing space for researchers and academics to expose themselves to resources, tools and functionalities (8). Consequently, they can act as broad environments for researchers and developers to relate the power of models, i.e. generative, for various applications, e.g. OpenAI's GPT-3 platform.

“Applications” represent the precise and specified implementations/uses of AI generative models in real-world circumstances and situations in research enquiries (9). Applications may cause a multitude of domains; including language translation, code generation, conversational agents, content creation and more. The effectiveness of applications depends upon the integration of generative models into practical solutions; promoting user experience and solving problems. The adaptability of applications displays the versatility of AI in addressing challenges (10-12). In research context, “applications” could be experiments, demonstrations or simulations which help researchers study their theories, hypothesis and so forth so as to achieve results from their investigations (13, 14).

Research “tools” in the context of large language AI generative models comprise a wide range of resources, methodologies and instruments, including libraries, software and frameworks that assist researchers in exploring, analyzing, and experimenting models and experiments (15). Research tools play an important role in (i) enhancing the perception of AI capabilities, (ii) revealing potential bias, and (iii) perfecting model performance. “Tools” are contributory in the process of model development, and contribute to the scholarly discourse surrounding AI technologies (16, 17). In general terms, the evolution from LLMs (i.e. AI generative models) to applications, platforms, and tools indicates an advancement from foundational technology to scholarly investigation and practical implementation. In addition, each component plays a distinct part in the realization of the AI potential in various domains, contributing to both academic exploration as well as technological enhancements of AI. In a more abstract sense, the components form an environment where (a) foundational elements provide the basis for exploration, (b) applications bring research concepts into practical reality, (c) platforms offer integrated ecosystems for diverse activities, and (d) tools empower researchers to conduct investigations (18). The interplay between the mentioned elements contributes to the overall progress and evolution of knowledge within a given field.

The current comprehensive review delves into the extensive spectrum of AI-driven tools and services. Moreover, it offers a structured and clear overview designed to inform and guide researchers, academics, and professionals in navigating the existing dynamic terrain. In addition, the review illuminates the multifaceted roles of AI within academia and research, spanning research and literature search platforms, intricate data analysis, writing assistance, project management, and so forth. It also equips the global academic and research community with a profound understanding of

the AI-based tools and services, which could subsequently empower thinkers and

researchers to leverage these advanced resources for superior scholarly outcomes. Moreover, each section of the review categorically presents various tools; elucidating their functionalities, features, and unique use-case scenarios. The proposed structured approach enables readers to easily identify the tools which align with their specific academic and research needs, facilitating the seamless integration of AI technologies into their work process.

In the modern-day era marked by the rapid proliferation of AI, leveraging and familiarizing with the cutting-edge capabilities offered by AI-based tools and services seems crucial for the enhancement of academic and research tasks. The presented state-of-the-art comprehensive review could serve as an invaluable guide; offering readers the essential insights needed to navigate the AI-driven academic and research landscape, ultimately fostering increased innovation, collaboration and discovery in various scholarly fields.

Materials and Methods

In producing the present comprehensive state-of-the-art review, a systematic and exhaustive approach was meticulously adopted. The used approach ensured a thorough and in-depth analysis of AI-based tools and services for academic and research tasks. The structured phases, which guided and paved the path for the current research article, are as follows:

1. Literature Search and Review

- An extensive search across various databases, journals and online resources was conducted to collect a wide range of available AI-based tools and services for academic and research tasks.
- Specific search terms and phrases relevant to AI tools and services in academia and research were studied; ensuring the inclusion of pertinent data and information.

2. Inclusion and Exclusion Criteria

- Following the accumulation of substantial amounts of the literature, defined criteria were applied to refine the gathered information. The inclusion criteria focused on tools and services which directly employ AI to enhance academic and research tasks. Sources which discussed AI

technologies unrelated to the context, or lacked substantive information on their application and functionality were excluded.

3. Categorisation of AI-Based Tools and Services

- The chosen literature was systematically categorized; based on the distinct functionality and role of AI-based tools and services in academia and research. Consequently, categories included research and literature search platforms, writing assistance tools, data analysis tools, reference and citation management tools, project management tools, survey and data collection tools, note-taking and organization tools, artificial intelligence and machine learning (ML) platforms, collaboration and presentation tools, professional networking tools, learning and development tools, cloud computing tools, publication tools, code sharing and collaboration tools, data visualization tools and language translation tools.

4. Analysis of AI-Based Tools and Services

- Each categorized tool and service underwent a comprehensive analysis. This phase included an exploration of real-world applications and use-case scenarios; providing readers with practical insights and understanding.

5. Expert Review and Validation

- To ensure accuracy, relevance, and reliability, the preliminary draft of the current review was shared with experts in the fields of AI, academia, and research. Next, feedback and insights from the experts were incorporated, and then, necessary revisions were made to enhance the credibility and robustness of the review article.

Through the above-mentioned vigorous and detailed methodology, the current review could emerge as a comprehensive, reliable and invaluable resource, granting profound insights into the universe of AI-based tools and services to the readership for bolstering academic and research tasks. Furthermore, the proposed methodological blueprint could ensure the delivery of a well-rounded, balanced and exhaustive exploration of AI technologies in academia and research, empowering readers to make informed and efficacious decisions regarding the assimilation and integration of

the present-day AI avant-garde tools into their academic and research pursuits.

The rigorous exploration of AI-based tools and services for academia and research was subdivided into different categories, summarising the substantial role of AI in the enhancement of efficiency and productivity in academic and research contexts. Each class depicted AI's notable contribution(s) to various facets of academic and research work.

1. Overview of AI-Based Tools and Services

The extensive literature search and review revealed a sweeping array of AI-based tools and services, each designed to amplify efficiency and productivity in academic and research contexts. The exploration unveiled a marked enhancement in task automation, advanced analytical capabilities, and the provision of personalized and intuitive interfaces, all working synergistically to augment the academic and research experience.

2. Categorisation

*****Research and Literature Search**

Google Scholar

Google scholar is a tool that uses various technologies, including ML, to help users find academic resources and scholarly articles (19, 20). It does not generate new knowledge nor does it perform advanced reasoning; however, it does employ algorithms to index and rank academic publications based on relevance to user queries. This tool is elaborated as an ideal choice for conducting extensive literature reviews, sourcing references for research papers and navigating through a plethora of scholarly articles (21, 22). In fact, "artificial intelligence" potentially assist "Google Scholar" in helping researchers to overcome difficulties in their research. Researchers and scientists usually face roadblocks, preventing them from further advancement in their study/work; however, "Google Scholar" is a precious tool for researchers despite being overwhelmed to navigate (23, 24). Similarly, PubMed uses AI for the betterment of search results.

Microsoft Academic

"Microsoft Academic" is an academic search engine similar to Google Scholar; however, it

operates independently and uses AI and ML so as to index and organize academic papers and publications (25). "Microsoft Academic" provides a platform for researchers, academics and students to discover scholarly content, explore connections between researchers and institutions, and stay informed on the latest developments in various fields (22, 26). Although it may not be considered a direct AI, the underlying technologies it harnesses, including natural language processing and machine learning, align with the broader category of AI-aided tools in the academic domain. Moreover, it proficiently assists researchers in pinpointing seminal papers related to specific topics, significantly enhancing the efficiency of literature exploration (27).

Semantic Scholar

"Semantic Scholar" is an AI-supported/powered search engine of scientific literature which assist its users with finding semantically "similar" research papers (28-30). Through the scholar, researchers and investigators can reach more than 200 million papers from various fields of science as well as the data served as a source for the advancement/development of other AI tools. "Semantic Scholar" is considered a free, AI-powered research tool for scientific literature; although registration is needed to access all possible functions (31).

Scite.Ai

"Scite", used by students and researchers worldwide, is an organization that assists researchers and investigators in the better discovery and understanding of research papers through "Smart Citations"; i.e. the citations which display the context of citation(s) and, describe whether the selected paper presents contrasting or supporting evidence. In fact, "Scite" has the ability to reach deep learning model and full-text articles for a publication (32, 33).

******Writing Assistance***

These are the tools that leverage AI technologies to support and enhance the writing process. Users choose writing assistance

tools based on their specific preferences and the particular features that align with their needs.

Grammarly

“Grammarly” is a popular and prominent writing assistance tool that integrates AI technologies and helps users to improve their writing (34). It utilizes natural language processing (NLP) algorithms and ML to analyze and pinpoint texts for possible errors in grammar, spelling, punctuation and style. Furthermore, it has proved to be an indispensable tool for proofreading and refining research papers, articles and proposals, ensuring a high standard of written communication (35).

ProWritingAid

“ProWritingAid”, as another writing assistance tool, uses AI technologies to help its users enhance their writing and seems to be comparable to “Grammarly” (36). The aforementioned tool amalgamates the functions of a grammar checker, style editor and writing mentor; offering broad writing assistance. Consequently, it presents a range of features designed so as to improve style, grammar and overall writing quality, readability (37, 38).

Ginger

“Ginger” is another writing enhancement tool which employs AI technologies in order to assist users in the improvement of their writing (39). “Ginger” has been designed to be a comprehensive writing assistant; offering a wide range of tools to support its users in producing clear and error-free content. Similar to other writing assistance tools, it uses AI algorithms to understand context, analyse writing patterns, and provide relevant suggestions (40).

Paperpal

“Paperpal” is another AI-aided writing assistant, which ensures its users get relevant and accurate editing that are as good as those made by human editors. “Paperpal” has demonstrated sophisticated NLP capabilities (41); consecutively, it can *(i)* perceive academic writing structure and conventions, and *(ii)* recommend rectifications while conserving entities; e.g. title page, references, technical terms and so forth. It is claimed that “Paperpal”

can present more meaningful corrections of language, thus doubling the editing coverage compared to other writing assistance tools. As a trusted writing assistant, the AI of Paperpal is able to understand academic context, highlights complex language, indicates grammatical errors and suggests betterments to assist its users in polishing writing (42, 43).

*****Data Analysis**

Google Colab

Google Colab (i.e. Google Collaboratory) is a free robust platform based on cloud provided by Google and allows its users to write and execute Python code, specifically tailored for data analysis and machine learning, in a collaborative environment (44, 45). “Google Colab” is vastly used by researchers to efficiently run a diversity of ML models and algorithms. Although “Google Colab” in itself is not AI, it is a platform used widely for the development of AI and ML. Moreover, it affords access to GPU resources, making it an appropriate matrix for the training of ML models. In addition, its users may be able to run Jupyter notebooks, which often consist of code(s) for AI-related tasks.

Kaggle

“Kaggle” is elaborated as a comprehensive platform for dataset research and collaborative learning. In addition, it hosts and participates in competitions where ML practitioners and data scientists can compete to solve complex problems. “Kaggle” is not considered an AI in itself; however, it is a platform heavily used by AI community. It delivers datasets, kernels (code notebooks) as well as a collaborative space for its users to become involved in data science projects and ML (46).

RapidMiner

“RapidMiner” is addressed as an inclusive and broad data science platform which manages an incorporated environment for data preparation, ML and advanced analytics (47). While “Google Colab” and “Kaggle” are platforms utilized in the context of AI and ML, they are not AI. Nonetheless, “RapidMiner” is a platform with AI capabilities; specifically designed for data science and analytics and a tool for the integration of AI and ML capabilities. Moreover,

it allows users to build predictive models, design and execute ML workflows, identify meaningful patterns, and analyze extensive datasets. "RapidMiner" is used in industry for tasks related to predictive modelling and data analysis (48).

***Reference and Citation Management

Mendeley

"Mendeley" is an academic social network and a reference manager that allows its users to properly organize their research, efficiently manage academic references, promote collaborations with others online, and discover recent trends and developments in their field (49). "Mendeley" is not an AI; nevertheless, it incorporates some AI-like features. Mendeley is able to suggest related articles based upon the user's library, which involves some degree of ML to analyse user preferences and content similarities (50, 51).

Zotero:

"Zotero" is deliberated as an open-source reference management software, assisting users in the collection, organization and citation of research materials as well as permission of sharing them with other investigators (52). Consequently, Zotero is not an AI in its core functionality and considered a tool designed to streamline the process of managing and citing sources. However, the strength of Zotero lies in its collaborative features and user-friendly interface (53).

Although "Mendeley" and "Zotero" themselves cannot be addressed as AI, the former includes a number of features, leveraging ML for personalized suggestions. In addition, both tools have shown to serve as efficient platforms for the management and citation of academic references (54).

***Plagiarism Checking

Turnitin

"Turnitin" provides a powerful plagiarism checking service; conducting extensive scans against comprehensive databases. Furthermore, it assures the authenticity and originality of materials, manuscripts and research papers prior to their submission. It is claimed that the AI detection system of "Turnitin" is designed on data which includes authentic academic writing

as well as AI-generated text across various subjects (55).

***Project Management

Trello

"Trello" is claimed to be a dynamic project management tool; capable of helping researchers and investigators brainstorm new subject. Moreover, it uses boards and cards for effective organization, monitors tasks and projects, shortens the existing content, and improves spelling and grammar (56). Seemingly, "Trello" is able to manage collaborative research projects and ensures task execution and pursuit of significant milestones. "Atlassian Intelligence" used for Trello is a vigorous tool that can help researches save time and improve their productivity (57). "Atlassian Intelligence" puts modern models developed by OpenAI next to the data and power inside its own platform. With the aid of AI, workflow becomes more efficient and much simpler (58).

Asana

"Asana Intelligence" is engineered to feature the use of artificial intelligence (AI) so as to filter, categorize, analyze and manage data/content/project to help researchers and teams in the optimization or organization of their work. With Asana, researchers are able to focus on meetings and lower the need for manual tasks. Moreover, it aids investigators in overseeing project timelines, maintaining comprehensive task lists and guaranteeing the smooth flow of research activities (59).

***Survey and Data Collection

Typeform

"Typeform" is considered an online software service and form builder which helps researchers make visually appealing forms (60). Moreover, "Typeform" is currently used for conducting interactive and engaging surveys that the addressees can easily respond (61). The AI used in "Typeform" provides researchers with the collection of what is needed (usually responds to questions), and then, a form is automatically built. Consecutively, "Typeform" saves time collecting data and creating tasks, using AI-powered features and forms while simplifying the workflow of the audience (62).

***Statistical Analysis

SPSS (Statistical Package for the Social Sciences) / JASP (Jeffreys's Amazing Statistics Program) are statistical software packages utilized for data analysis.

SPSS: Developed by IBM, is a comprehensive dedicated software package that equips its users with a range of data analysis and statistical tools for the execution of corresponding tasks, facilitating comprehensive analysis of research data. It is widely used in academia, business and government for different missions; e.g. statistical analysis, data cleaning and reporting (63). Although SPSS is not fundamentally related to AI, it can be considered in conjunction with artificial intelligence for the analysis of data generated by AI systems or for the integration of statistical methods into AI research (64).

JASP: JASP is defined as a free open-source statistical software package with an extensive suite; specifically designed to make the corresponding analysis available for researchers with different levels of statistical expertise. Moreover, it provides a user-friendly interface incorporating Bayesian statistical methods and frequentist approaches (65). Although it appears not to be directly related to AI, JASP can be used in the context of advanced analysis regarding the data generated by AI experiments or studies (66).

Seemingly, SPSS and JASP can be components of a broader toolkit used in conjunction with AI; however, SPSS and JASP are not inherently AI-focused software systems.

*****Note-taking and Organization**

Evernote

“Evernote” is tailored for the task management, organization, note-taking, archiving and necessary streamlining of mentioned processes in an application (67). “Evernote” may be used for meticulous organization of conceptual ideas, research notes and pertinent references; ensuring a structured and accessible format (68). Furthermore, it uses a third-party AI system for processing notes. They use the enterprise version of this system which is different to the public version we see. Evernote can specifically say that any data they send IS

NOT used for training AI models, and they do this (69).

*****Artificial Intelligence & Machine Learning Platforms**

TensorFlow

“TensorFlow” is an open-source library and is committed to facilitate data flow, differentiable programming and the development of AI through the distribution of tools and resources with machine learning community (70). The functionality of “TensorFlow” encourages researchers to accurately use ML models for pattern discernment and complicated data analysis (71).

PyTorch

“PyTorch” is recognized as an open-source machine learning/python library, specialized in implementing deep learning models and algorithms (72). In addition, it provides support to researchers navigating complex ML tasks, including realms of natural language processing and computer vision (73).

IBM Watson

“IBM Watson” is deliberated as a comprehensive suite of AI tools for building, training, and deploying tailored AI models aligned with research objectives, and delivers a range of AI-powered services; including NLP, ML, and vast data analytics. It is considered a collection of AI capabilities that covers diverse industries and domains, and is branded for its cognitive computing capabilities; which involve processing vast amounts of data, providing insights and understanding natural language (74).

“IBM Watson” has been applied in various fields; e.g. healthcare, finance, customer service. It has been extensively addressed in healthcare for tasks; e.g. analyzing medical literature, assisting in diagnosis and personalizing treatment plans. Additionally, “Watson” is able to leverage NLP to understand and interpret human language, and allows the analysis of unstructured data; e.g. text documents and conversations, and extraction of meaningful information (75). Moreover, “Watson” provides tools for data analysis and visualisation; enabling users to derive insights from large datasets. Besides, it can be applied in business

intelligence, research, and other data-driven domains (76).

Despite the fact that "IBM Watson" is a powerful AI platform, its adoption is typically observed in enterprise settings due to its complexity and the specific need for specialized expertise. It has been referred to as influential in advancing AI applications in different industries, and remains an active player in the AI landscape (77).

*****Collaboration**

Slack

"Slack" has introduced itself as a dynamic collaboration tool; enhancing communication and teamwork within academic environments and research (78). A set of AI features have been directly built in "Slack", e.g. AI-powered conversation summaries. "Slack" has shown to operate as a centralized hub for efficient document sharing, streamlined research team communication and coordinated project management (79).

Microsoft Teams

"Microsoft Teams" is a collaboration platform developed by Microsoft (as part of "Microsoft 365" suite of productivity tools), and is responsible for optimizing communication, document sharing and collaborative efforts within research teams (80). It is specifically designed to ease communication and collaboration within groups, teams and organizations; and thus, is extensively used for hosting virtual meetings, disseminating research findings and facilitating real-time collaboration. When "Microsoft Teams" calls or meets, it uses AI to identify certain qualities of the audio or video feed and deliver high quality experience (81).

*****Presentation**

Beautiful AI

"Beautiful.AI" is defined as a cloud-based presentation tool which focuses on assisting users easily create visually appealing and engaging presentations and products (82). "Beautiful.AI" incorporates AI to automate the design process; making it simpler for its users to produce professional-looking slides without the need for extensive design skills (83). "Beautiful.AI" uses AI algorithms to analyse the input content and automatically generates

esthetically-pleasing slide designs. Besides, it chooses layouts, fonts, and colors which could complement the content. In addition, users are able to select and modify a template to fit their specific requirements. Moreover, "Beautiful.AI" can provide content suggestions (e.g. recommendations for adding specific types of content; such as charts or images, to enhance presentation) based on the given information input. "Beautiful AI" can be simultaneously used on the same presentation; making it a collaborative tool for different members and teams. Furthermore, "Beautiful.AI" is a cloud-based platform and allows its users to access and work on their presentations from different devices and locations.

Although "Beautiful.AI" is not a comprehensive AI platform like IBM Watson, it cabinets how AI can be applied to re-organize specific tasks; i.e. the design and creation of presentations. The emphasis of "Beautiful.AI" is on providing its users with a tool that (i) simplifies the design process, and (ii) helps them create visually impressive presentations in an efficient style (84).

Canva

"Canva" is a platform on flexible graphic design and is designated for the creation of a diverse range of visual content; e.g. research posters and presentations (85). "Canva" has attempted to create more AI tools to boost the process of design, and consecutively, has managed to introduce a new AI-powered tool; i.e. Magic Media. Investigators and researchers use "Canva" to create visually arresting presentations (86).

*****Professional Networking**

LinkedIn

Nowadays, "LinkedIn" is elaborated as a leading professional networking platform, seamlessly connecting employers, investigators, researchers and alike with a community of peers and professionals worldwide (87). It is considered contributory so as to broaden professional network(s), uncover novel opportunities and disseminate research insights (88). It is also deliberated as one of the powerful platforms in which AI can be influential to assist its users in achieving their

goals. "LinkedIn" leverages data as inputs (e.g. job title, career location, organization, job type and so on) in order to make job descriptions as drafts using AI (89).

***Learning and Development

Coursera

"Coursera", as a premier online learning platform, offers access to an extensive array of courses, specializations and degrees from different universities around the world (90). Researchers use "Coursera" to augment their skills and knowledge; benefiting from a wide spectrum of educational offerings. Apparently, a generative AI empowers "Coursera Coach", which is based upon expert content to optimize learning (91).

***Cloud Computing

Amazon Web Services (AWS)

"Amazon Web Services" provides robust and economical cloud computing solutions, and is employed by researchers to host web services, data storage, and executing ML models. In addition, AWS offers comprehensive tools and services to meet the AI technology requirements needed for specific tasks (92). Furthermore, AWS causes AI to be accessible to organizations so that researchers and users are able to build innovative technology without any concerns regarding infrastructure resources (93).

Google Cloud

"Google Cloud" presents a collection of modular cloud services; incorporating computing, data storage, data analytics, and ML (94). Additionally, it is used for extensive data analysis and ML experiments. A duet AI is used in the AI-powered collaborator available for Google Cloud and helps researchers and its users get more done faster (95).

***Publication

Semantic Reader

"Semantic Reader" is addressed as a promising amplified reading tool which seems to be able to transform scientific reading. "Semantic Reader" uses AI to comprehend the structure of a document and combine it with the academic corpus of "Semantic Scholar"; offering thorough information in the given context via tools and overlays (96).

Elicit

"Elicit", as an AI-powered research assistant, can be used to brainstorm, filter study types, find papers, automate research flow, summarize and so forth (97). It uses language models, e.g. GPT-3, to systematize researchers' workflows. Currently, the main workflow in Elicit is Literature Review. If you ask a question, Elicit will show relevant papers and summaries of key information about those papers in an easy-to-use table (98).

Consensus.app

"Consensus.app" is considered an academic search engine which uses AI to explore perceptions in research papers. It presents a search engine intended to receive research questions, find corresponding responses in research papers, and synthesise the possible results using the same language model (99). The presented research underscores the multifaceted influence of AI-based tools and services in the enhancement of academic and research landscape. The extensive array of important tools available, presented in the "Results" section, highlights the significant strides made in integrating AI into various facets of academic work; from literature search to project management and data analysis.

A critical observation has revealed the seamless integration of AI within academic tools; enhancing efficiency and output. Artificial intelligence platforms, e.g. Google Scholar and Microsoft Academic, have revolutionized the literature review process; making it more streamlined and efficient. Furthermore, they exemplify how AI algorithms can adeptly link users to the relevant academic content; significantly enhancing the literature exploration process.

Research has shed light on the profound impact of AI in data analysis. Different tools, e.g. Google Colab, Kaggle, and RapidMiner, use AI to enable deeper insights into large datasets; showcasing the crucial role of AI in data-driven research. The capability of AI to process and analyze extensive and complex datasets far surpasses human capabilities; making these tools invaluable for academic research.

The exploration of writing assistance tools, e.g. Grammarly and ProWritingAid, has demonstrated the positive influence of AI on the enhancement of the quality and clarity of academic writing. By providing real-time writing assistance, grammar checking and stylistic suggestions, the aforementioned platforms and alike have shown to contribute significantly to the production of high-quality academic documents.

Moreover, project management tools, e.g. Trello and Asana, powered by AI, have demonstrated optimization in the project execution and monitoring process; ensuring continuous organized task management. The automation of scheduling, task assignments and performance tracking underscore the significant administrative burden lifted by such AI-enhanced tools.

Challenges and Future Prospects

Despite notable benefits, it is crucial to acknowledge the challenges faced in the integration of AI-aided tools; e.g. concerns regarding data security, privacy and the need for substantial initial investment (100). Addressing the mentioned challenges and alike is paramount for the continued and expanded use of AI tools in academia and research. Nonetheless, the ongoing advancements in AI technology have indicated the emergence of more sophisticated and efficient tools for use in academia and research. The increasing reliance on AI-aided tools and platforms will continue to shape and define the academic and research landscape, offering enhanced capabilities, efficiencies and outcomes (101).

Conclusion

In conclusion, the transformative impact of AI-aided tools on academia and research cannot be denied, emphasizing the immense benefits and potential challenges. The continued exploration and integration of AI technology into the academic domain stand as a testament to the growing significance and reliance on AI to promote academic and research endeavors. The future clearly holds the promise of continued advancement, with AI playing a pivotal role in

further enriching and enhancing the academic and research landscape.

In the current era of accelerated AI-driven enhancements, a spectrum of promising tools and services stands ready to significantly amplify academic and research endeavors. This exhaustive review could operate as a beacon; guiding towards augmented efficiency, productivity, and innovation in scholarly and research tasks. With the continuous enrichment of this compendium, the goal remains steadfast; i.e. to empower global researchers with the requisite knowledge so as to unleash AI's revolutionary potential, pushing the boundaries of knowledge and innovation much further ahead.

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This study does not contain any studies with human or animal subjects performed by any of the authors.

Conflicts of Interest

The authors of this manuscript declare that there are no conflicts of interest regarding the publication of the presented paper.

Data Availability

The data used to support the findings of the current study are available from the corresponding author upon reasonable request.

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