

Applications of the Metaverse and ChatGPT in Libraries

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Abstract

The metaverse refers to a virtual digital world that, by integrating elements of the real and virtual worlds, creates an open, diverse, and borderless space encompassing fields such as artificial intelligence, virtual worlds, and online social networking. In the metaverse, people can freely interact, create, and share information, presenting libraries with both new opportunities and challenges. Meanwhile, ChatGPT is a natural language processing model based on large-scale pre-training technology, capable of generating accurate and coherent text responses. As an intelligent conversational model, it can provide personalized support and assistance to users. By combining the applications of the metaverse and ChatGPT, libraries can provide readers with a richer, more convenient, and intelligent learning and reading experience. This paper aims to explore the discovery prospects of the metaverse and ChatGPT in libraries as a platform for learning and knowledge acquisition. By leveraging the characteristics of the metaverse and the intelligent responses of ChatGPT, libraries will gain new development opportunities, providing richer resources and innovative learning methods.

Full Text

Abstract and Keywords

The metaverse refers to a virtual digital world that creates an open, diverse, and borderless space by integrating elements from both the real and virtual worlds, encompassing fields such as artificial intelligence, virtual environments, and online social networking. Within the metaverse, people can freely interact, create, and share information, presenting both new opportunities and challenges for libraries. Meanwhile, ChatGPT is a natural language processing model based on large-scale pre-training technology capable of generating accurate and coherent text responses. As an intelligent dialogue model, it can provide personalized support and assistance to users. By combining metaverse and ChatGPT

applications, libraries can offer readers a richer, more convenient, and more intelligent learning and reading experience. This article explores the prospects of metaverse and ChatGPT technologies in libraries as platforms for learning and knowledge acquisition. By leveraging the characteristics of the metaverse and the intelligent responses of ChatGPT, libraries will gain new development opportunities, providing richer resources and innovative learning methods.

Keywords: Metaverse; ChatGPT; Library; Management and Services

1.1 The Metaverse

The metaverse is a virtual space designed to simulate the real world, allowing users to interact with digital environments in a realistic manner. Within the metaverse, people can create their own avatars, explore various virtual scenes, and communicate, trade, and collaborate with other users. By integrating advanced technologies such as virtual reality (VR), augmented reality (AR), blockchain, and artificial intelligence (AI), the metaverse creates a complex and realistic virtual world that enables users to transcend real-world limitations and realize unlimited imagination and creativity. Through the metaverse, people can experience unique and rich visual, auditory, and interactive experiences, immersing themselves in a completely new digital society.

Metaverse technology refers to the concept of interactively merging virtual and real worlds through VR, AR, blockchain, AI, and other technologies. With continuous technological advancement, metaverse technology is gradually becoming a reality. In the fields of VR and AR, we have already witnessed numerous breakthroughs. VR technology provides immersive virtual environments, offering enormous potential for gaming, entertainment, education, and other domains. AR technology overlays virtual content onto the real world through glasses or devices, enabling users to display virtual objects, navigate, and access information.

Blockchain and cryptocurrency also play crucial roles in the metaverse. Blockchain technology ensures the uniqueness of virtual assets, prevents fraud and theft, and provides reliable data records and transaction verification. Through the use of cryptocurrency, users can own and trade their virtual assets in the metaverse, promoting the development of the virtual economy. AI is likewise an indispensable component of metaverse technology. AI can be used to create and manage virtual characters, intelligent NPCs, and provide personalized user experiences. Using machine learning and deep learning algorithms, AI can simulate human language and behavior, making interactions with virtual characters more natural and realistic.

Furthermore, the development of metaverse platforms and ecosystems is essential. Numerous metaverse platforms currently exist, providing users with tools and resources to create, interact, and share virtual worlds. These platforms attract developers and creators, building vast metaverse ecosystems that inject new vitality into metaverse development.

ChatGPT Technology

ChatGPT is a natural language processing technology based on large-scale pre-trained Transformer models. It employs unsupervised learning methods, training on vast amounts of text data to develop the ability to understand and generate human language. OpenAI leads ChatGPT's development, continuously improving model performance through multiple version iterations.

In 2020, OpenAI first released the GPT-3 (Generative Pre-trained Transformer 3) model, which attracted widespread attention. GPT-3 features 175 billion parameters, making it one of the largest natural language processing models at the time. Through pre-training on datasets from multiple domains, GPT-3 can generate high-quality text content and possesses a certain degree of conversational capability, making ChatGPT an important technology for human-computer interaction, virtual character interaction, and information exchange in the metaverse. OpenAI has also launched a chat model API, enabling developers to add conversational functionality to their applications. The API provides convenient interfaces and development tools, allowing developers to quickly build intelligent dialogue systems based on ChatGPT. Recently, OpenAI announced plans for GPT-4, which is expected to surpass GPT-3 in both scale and functionality, indicating that future ChatGPT technology will be more mature and play an even greater role in the metaverse.

ChatGPT Applications in the Metaverse

ChatGPT technology has broad application prospects in the metaverse. First, ChatGPT can interact with virtual characters to provide users with more realistic and personalized experiences. Through built-in knowledge bases and natural language processing capabilities, ChatGPT can simulate virtual characters' language and behavior, respond to user dialogues, and demonstrate rich emotions and intelligence.

Second, ChatGPT can serve as an intelligent assistant or social companion in virtual social platforms. During social chats, game interactions, or virtual world exploration, users can converse with ChatGPT to ask questions, seek help, share feelings, or engage in role-playing. ChatGPT can provide intelligent responses and suggestions based on user needs and contexts, enhancing user interaction and engagement in the metaverse.

Additionally, ChatGPT can be used for information processing and communication in the metaverse. As data and content in the metaverse continue to grow, ChatGPT can understand users' interests and needs through interaction, recommend personalized information resources, and assist users in processing and organizing large amounts of metaverse data. Simultaneously, ChatGPT can play an important role in social interactions, commercial transactions, and information transmission, achieving automatic classification, filtering, and transmission of information to improve processing efficiency and accuracy.

2. Applications of the Metaverse in Libraries

Metaverse technology provides libraries with numerous innovative applications, delivering more convenient and enriched learning and reading experiences for users.

2.1 Virtual Libraries

The metaverse can create virtual libraries that allow users to access various resources—including digitized books, journals, and research papers—through metaverse platforms. Users are no longer limited by geographical constraints and can obtain needed books and information anytime, anywhere. They can search, borrow, and read e-books through metaverse platforms, bringing library resources into their personal spaces. This unlimited interconnectivity enables users to transcend time and space, roaming freely across oceans of knowledge. The metaverse will also introduce more comprehensive literature resources to libraries. Traditionally, library resources have been limited to physical books and journals, but with the metaverse, libraries can collaborate with other knowledge institutions to digitize and integrate various types of academic materials—such as e-books, academic papers, and multimedia resources—enabling readers to access needed information more extensively.

2.2 Real-Time Learning Environments

The metaverse also provides real-time learning environments where users can join virtual library learning spaces and interact with other learners to share knowledge and experiences. For example, in a virtual study group, students can discuss specific topics or solve problems together, learning and progressing collaboratively. This interactive and cooperative learning model not only increases learning enjoyment but also cultivates students' teamwork and communication skills. The metaverse will provide richer learning and research experiences. In the metaverse, libraries can create virtual reading rooms and research spaces where readers can interact with other readers and scholars through VR technology and participate in online lectures, academic seminars, and other activities. This immersive learning environment will stimulate readers' interest in learning and strengthen knowledge dissemination and exchange.

2.3 Personalized Recommendations

Metaverse platforms can also provide personalized book recommendations based on users' reading histories and interests. With support from intelligent algorithms, the metaverse can analyze users' reading preferences and recommend relevant or interesting book resources. This personalized approach not only helps users discover content of interest more easily but also broadens their reading horizons and exposes them to new knowledge and perspectives.

2.4 Enhanced Communication and Collaboration

The metaverse will expand opportunities for reader communication and collaboration. In traditional libraries, readers typically acquire knowledge through books, but in the metaverse, they can engage in real-time exchanges with like-minded readers, participate in online learning communities and academic circles, and conduct collaborative research and creation. This open and collaborative environment promotes information sharing and cooperative innovation.

In summary, metaverse technology brings numerous applications to libraries, including virtual libraries, real-time learning environments, and personalized recommendations. These applications not only expand library service scope and effectiveness but also provide users with more convenient and personalized learning and reading experiences. The metaverse will have a comprehensive and profound impact on libraries, transforming them into more open and flexible knowledge centers. By introducing more comprehensive resources, providing rich learning and research experiences, and expanding reader communication and collaboration opportunities, the metaverse will enable libraries to become truly virtual learning and research spaces.

3. Applications of ChatGPT in Libraries

3.1 Providing Book Reference Information

ChatGPT can serve as an intelligent assistant, providing readers with relevant information, summaries, reviews, and ratings for specific books. ChatGPT plays an important role in libraries by offering references and feedback to help readers better understand book content. Through interaction with ChatGPT, readers can obtain relevant information about books, such as author biographies, publication dates, and tables of contents. Additionally, ChatGPT can provide summaries, reviews, and ratings, enabling readers to better evaluate book quality and make informed selection decisions.

3.2 Answering Common Questions

ChatGPT can communicate with users to answer common questions about library materials, services, and activities, providing help and guidance. Beyond reference information, ChatGPT can become the first choice for readers seeking solutions in the library. For frequently asked questions such as opening hours and borrowing policies, ChatGPT can respond quickly and accurately without requiring readers to search elsewhere. This is crucial for providing efficient and convenient services, especially in busy library environments. ChatGPT technology enables readers to obtain needed information anytime, anywhere, saving their time and effort.

3.3 Providing Writing Support

ChatGPT can help readers solve writing problems by providing inspiration, suggestions, and proofreading services. Writing is a common task in libraries, whether for students or researchers conducting literature reviews and paper writing. ChatGPT can serve as a writing partner, helping solve writing problems. It can provide inspiration and suggestions, help readers think about paper structure and organization, and even offer proofreading services to correct grammatical errors and propose improvements.

3.4 Facilitating Academic Exchange

ChatGPT can serve as an intelligent discussion assistant for academic forums, engaging users in academic topic exchanges and discussions while promoting academic thinking and innovation. In library-hosted forums, lectures, and reading clubs, ChatGPT can participate in various topics—knowledge-based, technical, logical, artistic, and technological—increasing on-site interactivity. AI participation can not only engage in discussions and summarize topics but also identify knowledge systems and master the divergent directions of relevant knowledge, smoothly discussing different topics with readers, inspiring their thinking, and benefiting participants.

3.5 Promoting Library Resources and Events

Through ChatGPT, libraries can publicize latest events and promote specific books to users, increasing reader attention and utilization of library resources. Libraries need to regularly recommend and publicize their electronic and paper resources to readers, and ChatGPT serves as a powerful intelligent personalized recommendation system through which readers can obtain information about books suitable for themselves and popular titles. This enhances the effectiveness of library promotion and event publicity, encouraging readers to use library resources more willingly and enthusiastically.

3.6 Providing Multilingual Support

ChatGPT's multilingual capabilities can help libraries serve broader user populations, especially non-native speakers, meeting their information and communication needs. As international exchanges become increasingly frequent, students, scholars, and readers from various countries frequently use library resources, follow library developments, and participate in library activities. Through AI participation and services, not only can readers from various countries quickly access information and understand relevant library resources and services, but they can also rapidly participate in library services and discussions. During their library use, they can also provide relevant feedback and suggestions for service improvement and enhancement, promoting multicultural exchange.

In summary, ChatGPT applications in libraries provide readers with more convenient services and support. Through interaction with ChatGPT, readers can

access more comprehensive book information, quickly solve problems, and receive professional writing support. This will further enrich library resources, enhance user experience, and strengthen knowledge dissemination and sharing. As an intelligent assistant, ChatGPT has broad applications in libraries. First, it can provide readers with references. When facing numerous book choices, readers may feel confused. ChatGPT can help them make wiser reading decisions by providing relevant information, summaries, reviews, and ratings for specific books. Second, ChatGPT can answer readers' common questions. Whether about library materials, services, or activities, readers can obtain timely help and guidance through conversation with ChatGPT. Additionally, ChatGPT can provide writing support. Writing is a frequent activity for many readers, and ChatGPT can help solve writing problems by providing inspiration, suggestions, and proofreading services. Whether correcting grammatical errors, improving sentence structure, or providing writing techniques, ChatGPT can offer relevant support and advice. Finally, ChatGPT plays an irreplaceable role in event promotion and external communication. Under library organization and management, as an excellent tool, it can organize more and deeper humanities and arts activities, enhance interactivity, knowledge, and participation, better integrate multicultural elements, serve readers from different countries, backgrounds, and cultures, and better adapt to the needs of contemporary development.

4. Challenges and Opportunities

4.1 Challenges and Countermeasures

Introducing metaverse and ChatGPT technologies in libraries also faces several challenges requiring corresponding solutions. **Data privacy and security issues:** The use of metaverse and ChatGPT involves massive data exchange and storage, which may contain users' personal information and sensitive data. Therefore, ensuring data privacy and security is a major challenge. Libraries need to establish strict data protection policies and measures, encrypt data transmission and storage, and conduct regular security audits and vulnerability repairs. **Resource and technological limitations:** Metaverse and ChatGPT require enormous computational resources and advanced AI technology support. Libraries may face challenges in building and maintaining corresponding infrastructure, such as cloud computing and high-performance computing servers. Simultaneously, training and recruiting appropriate technical personnel to understand and apply these new technologies are also issues libraries must address. **Training ChatGPT to improve its accuracy and usability:** As a natural language processing model, ChatGPT requires large-scale training to achieve high accuracy and practicality, which demands substantial annotated data and time. Libraries can collaborate with AI research institutions or partners to improve ChatGPT model quality through shared resources and experience, enabling continuous improvement and optimization.

4.2 The Immense Potential of Metaverse and ChatGPT in Libraries

As representatives of technological innovation, the metaverse and ChatGPT bring numerous opportunities and challenges to library development. Through metaverse virtualization technology, libraries can break traditional spatial limitations, infinitely expanding the scope of reading and learning. Users can easily access various digital resources through metaverse platforms, whether classic works or the latest research findings, anytime and anywhere. This VR-based immersive reading experience allows readers to explore oceans of knowledge more freely, feeling the library atmosphere regardless of location. Additionally, the metaverse provides possibilities for real-time learning environments. Through interaction with other learners, users can share insights and learning experiences, promoting knowledge sharing and exchange. This open learning community can not only enrich reading experiences but also stimulate creativity and collaborative spirit. ChatGPT, as an intelligent assistant, can play an important role in this learning environment. Whether answering user questions or providing academic guidance, ChatGPT can offer convenient support and consulting services through AI technology. ChatGPT can also assist readers in information retrieval and data organization, greatly improving efficiency. However, these new technologies also face challenges such as data privacy and security issues, resource and technological limitations, and the need to train ChatGPT to improve accuracy and usability. Therefore, libraries must actively address these challenges and continuously leverage these new technologies' advantages to improve service quality. In the future, as technology continues to develop and mature, the metaverse and ChatGPT will play more important roles in libraries, providing readers with more convenient, personalized, and enriched learning and research resources.

Thus, the metaverse and ChatGPT have immense application potential in libraries. Through metaverse introduction, libraries can provide more comprehensive literature resources to meet reader needs. Meanwhile, ChatGPT, as an intelligent robot assistant, can provide automated reference consulting services, helping readers solve problems and recommending personalized books and research materials. They can not only provide more convenient and personalized learning and reading experiences but also promote knowledge dissemination and exchange. However, as technology continues to develop, we must also pay attention to potential challenges and issues, such as information security and privacy protection. Only by balancing technological innovation with societal needs can we truly realize the value of the metaverse and ChatGPT in libraries, continuously driving library development and progress.

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