UDC 316

Personalized mobile museum guides as a cultural phenomenon: the possibilities of using artificial intelligence tools

Oleg A. Smirnov

PhD in Physics and Mathematics,
Associate Professor, Department of applied mathematics and computer science,
Russian State University named after A.N. Kosygin,
115035, 52/45, Sadovnicheskaya str., Moscow, Russian Federation;
e-mail: smirnovoleg1952@mail.ru

Vladimir B. Ternovskov

PhD in Technical Science, Associate Professor,
Russian Technological University MIREA,
119454, 78 Vernadsky ave., Moscow, Russian Federation;
e-mail: vternik@mail.ru

Abstract

Personalized mobile museum guides are a unique cultural phenomenon that combines modern technologies and cultural heritage. These guides are often presented in the form of virtual characters that help museum visitors immerse themselves in the history of art, archeology, history or any other field. The use of personalized mobile museum guides allows you to create an interactive and fascinating learning space that attracts different age groups and levels of education. These guides can be voiced by actors or have voice comments, which makes visiting the museum more exciting and memorable. In addition, personalized mobile museum guides can adapt to the individual preferences of visitors, offering personalized excursions and information. This allows each visitor to get a unique experience and delve into topics of interest to him. Thus, personalized mobile museum guides are an interesting cultural phenomenon that combines technological innovations and the preservation of cultural heritage, making visiting museums more accessible and exciting for a wide audience. Thus, the use of AI technologies in the museum business not only improves the management of collections and the organization of exhibitions, but also contributes to the preservation of cultural heritage, improving interactivity and personalization of the museum experience for visitors. In recent years, mobile museum guides have become a popular way to enrich the museum experience of visitors. These guides use AI technologies to create personalized excursions and interactive programs adapted to the interests and preferences of each visitor. Such guides can offer individual routes around the museum, recommend exhibits and programs based on the preferences of the visitor. They can also provide additional information about works of art, history and culture, making the museum experience more interesting and memorable. Personalized mobile museum guides can help preserve cultural heritage by providing information about digital replicas and models of disappeared or damaged objects and works of art. Thus, the use of AI technologies to create personalized mobile museum guides not only improves the museum experience of visitors, but also contributes to the preservation and popularization of cultural heritage.

Introduction

Modern research in the field of museum studies shows that personalization of mobile guides in museums is important for improving the quality of service for visitors and, as a result, increasing interest in visiting exhibitions. The key challenges of personalization are the lack of information about the individual visitor and the relatively limited time of his or her visit, but at the same time, adapting the user interface to the type of museum visitor is a promising approach to personalization. This approach firstly requires a mechanism to determine the visitor's potential interest and, secondly, knowledge of preferences and needs to apply personalization. A generalization of research in the field of application of artificial intelligence technologies in museums makes it possible to identify the visitor, as well as study the preferences of various personalities of visitors regarding specific functions of the mobile guide.

Main content

Research regarding the use of features such as suggesting connected items based on expressed preference has shown that the most effective technology is to provide recommendations for viewing connected items. A meta-analysis of modern research shows that modern AI technologies make it possible to reliably identify a visitor using two multiple-choice questions about the motivation for visiting and the criteria for achieving one's goal. Additionally, we found that visitors have significant preferences for certain features such as presentation tools, venue navigation tool, object suggestions, level of detail, access to external links, method of finding exhibit information, and social interaction features such as voice communication, instant messaging, group games. It is shown that a number of people prefer navigation without any specific preference. The most effective tool is chatbots answering questions about exhibits. The results provide a basis for personalizing museum guides and services using a personalized approach, which is a solution offered by AI tools where data on individual users may be limited and where customized user interface configuration may not be practical or reasonable.

Personalization of museum guides is important because it improves the overall museum experience for each visitor. By adaptation of information and tours to individual preferences, personalized mobile museum guides make museum visits more fun, interesting and memorable.

This also helps to attract different age groups and educational levels, as each visitor can receive information in a format that is most suitable for him or her. This promotes deeper immersion in cultural heritage and art history, which in turn promotes cultural awareness and education.

Personalization of museum guides can also promote inclusion of people with disabilities. For example, audio guides with options for language, playback speed, and level of detail can be especially helpful for people with hearing or vision impairments. It is also important to consider the cultural

differences and preferences of visitors. Providing information in different languages and adaptation of excursions to suit different cultures and traditions can make a museum more attractive to international visitors.

In addition, personalized museum guides can help visitors better understand and appreciate the exhibits on display in the museum. This can be especially important for children and teenagers, who may have different levels of interest and understanding of history and art. Personalization of museum guides plays a key role in creating a more inclusive and educational museum experience for all visitors.

Artificial intelligence (AI) can also be used in museums to improve personalization and enrich the visitor experience. For example, museum apps with image recognition capabilities can offer additional information about works of art, historical artifacts, or exhibits based on the interests and preferences of a particular visitor. Facial recognition technologies can also be used to create personalized recommendations for exhibits or museum tours based on the visitor's previous visits or interests. This can help make the museum experience more satisfying and interesting for each visitor.

The use of AI tools in museums can significantly improve the personalization of the museum experience and make it more appealing to a wider audience. AI can help museums manage collections and organize exhibitions. Machine learning algorithms can help to optimize exhibit placement, create interactive multimedia installations, and even predict the potential popularity of certain exhibitions or exhibits based on data from previous visits.

AI technologies can also be used to analyze visitor behavior and optimize the performance of museum exhibits. For example, monitoring and analytics systems can help determine the most popular routes through a museum, which will improve exhibition planning and optimize museum space. AI can also be used to create virtual tours and educational programs, allowing museums to reach new audiences and make their collections more accessible to the general public. The application of AI technologies in museums can lead to significantly improved museum experiences, enriched educational programs and improved collection management, making cultural heritage more accessible and attractive to everyone. All this may lead to the fact that the use of AI in museums can also help in the preservation and restoration of cultural heritage. Using machine learning algorithms, digital replicas and models of missing or damaged objects and works of art can be created, allowing them to be preserved for future generations.

In a broader context, AI technologies can also be used to authenticate and attribute works of art, which will help combat forgeries and ensure the preservation of the historical accuracy of museum collections. Additionally, AI can help personalize the museum experience for visitors. Analysis of the preferences and interests of visitors using AI technologies will make it possible to create individual routes around the museum, recommend exhibits and programs that match the interests of each visitor.

Conclusion

Personalized mobile museum guides represent a unique cultural phenomenon that combines modern technology and cultural heritage. These guides are often presented as virtual characters that help museum visitors immerse themselves in the history of art, archaeology, history, or any other field.

The use of personalized mobile museum guides allows one to create an interactive and engaging learning environment that appeals to a variety of age groups and educational levels. These guides may be narrated by actors or have voice narration, making one's museum visit more fun and memorable. In addition, personalized mobile museum guides can adapt to visitors' individual preferences, offering personalized tours and information. This allows each visitor to have a unique experience and delve deeper into topics that interest him. Thus, personalized mobile museum guides are an interesting cultural phenomenon that combines technological innovation and cultural heritage preservation,

making museum visits more accessible and engaging for a wide audience.

Thus, the application of AI technologies in museums not only improves collection management and exhibition design, but also contributes to the preservation of cultural heritage, improving interactivity and personalizing the museum experience for visitors.

In recent years, mobile museum guides have become a popular way to enrich visitors' museum experiences. These guides use AI technology to create personalized tours and interactive experiences tailored to each visitor's interests and preferences. Such guides can offer personalized itineraries around the museum and recommend exhibits and programs based on the visitor's preferences. They can also provide additional information about works of art, history and culture, making the museum experience more interesting and memorable. Personalized mobile museum guides can help preserve cultural heritage by providing information on digital replicas and models of missing or damaged objects and works of art. Thus, the use of AI technologies to create personalized mobile museum guides not only improves the museum experience of visitors, but also contributes to the preservation and promotion of cultural heritage.

References

1. Andrade J.G., Dias P. (2020) A phygital approach to cultural heritage: augmented reality at Regaleira. *Virtual Archaeology Review*, 11(22), p. 15-25.
2. Chianese A. et al. (2017) An associative engines based approach supporting collaborative analytics in the internet of cultural things. *Future generation computer systems*, 66, pp. 187-198.
3. Díaz-Rodríguez N., Pisoni G. (2020) Accessible cultural heritage through explainable artificial intelligence. In: *Adjunct Publication of the 28th ACM Conference on User Modeling, Adaptation and Personalization*, pp. 317-324.
4. Jiang T., Gan X.E., Liang Z., Luo G. (2022) AIDM: artificial intelligent for digital museum autonomous system with mixed reality and software-driven data collection and analysis. *Automated Software Engineering*, 29(1), p. 22.
5. Lee S.J. (2017) A review of audio guides in the era of smart tourism. *Information Systems Frontiers*, 19, pp. 705-715.
6. Marini C., Agostino D. (2022) Humanized museums? How digital technologies become relational tools. *Museum Management and Curatorship*, 37(6), p. 598-615.
7. Pisoni G., Díaz-Rodríguez N., Gijlers H., Tonolli L. (2021) Human-centered artificial intelligence for designing accessible cultural heritage. *Applied Sciences*, 11(2), p. 870.
8. Roll I., Wylie R. (2016) Evolution and revolution in artificial intelligence in education. *International Journal of Artificial Intelligence in Education*, 26, pp. 582-599.
9. Trichopoulos G. et al. (2023) Crafting a Museum Guide Using ChatGPT4. *Big Data and Cognitive Computing*, 7(3), p. 148.
10. Zhao J., Guo L., Li Y. (2022) Application of digital twin combined with artificial intelligence and 5G technology in the art design of digital museums. *Wireless Communications and Mobile Computing*.

Персонифицированные мобильные музейные гиды как культурологический феномен: возможности применения инструментов искусственного интеллекта

Смирнов Олег Аркадьевич

Кандидат физико-математических наук,
доцент,
кафедра прикладной математики и программирования,
Российский государственный университет им. А.Н. Косыгина,
115035, Российская Федерация, Москва, ул. Садовническая, 52/45;
e-mail: smirnovoleg1952@mail.ru

Терновсков Владимир Борисович

Кандидат технических наук,
доцент,
Российский технологический университет МИРЭА,
119454, Российская Федерация, Москва, просп. Вернадского, 78;
e-mail: vternik@mail.ru

Аннотация

Персонифицированные мобильные музейные гиды представляют собой уникальный культурологический феномен, который объединяет современные технологии и культурное наследие. Эти гиды часто представлены в виде виртуальных персонажей, которые помогают посетителям музеев погрузиться в историю искусства, археологии, истории или любой другой области. Использование персонифицированных мобильных музейных гидов позволяет создать интерактивное и увлекательное обучающее пространство, которое привлекает различные возрастные группы и уровни образования. Эти гиды могут быть озвучены актерами или иметь голосовые комментарии, что делает посещение музея более увлекательным и запоминающимся. Кроме того, персонифицированные мобильные музейные гиды могут адаптироваться под индивидуальные предпочтения посетителей, предлагая персонализированные экскурсии и информацию. Это позволяет каждому посетителю получить уникальный опыт и углубиться в интересующие его темы. Таким образом, персонифицированные мобильные музейные гиды являются интересным культурологическим феноменом, который сочетает в себе технологические инновации и сохранение культурного наследия, делая посещение музеев более доступным и увлекательным для широкой аудитории. Применение технологий ИИ в музейном деле не только улучшает управление коллекциями и организацию выставок, но также способствует сохранению культурного наследия, улучшению интерактивности и персонализации музейного опыта для посетителей. В последние годы мобильные музейные гиды стали популярным способом обогащения музейного опыта посетителей. Эти гиды используют технологии ИИ для создания персонализированных экскурсий и интерактивных программ, адаптированных под интересы и предпочтения каждого посетителя. Такие гиды могут предлагать индивидуальные маршруты по музею, рекомендовать экспонаты и программы, основываясь на предпочтениях посетителя. Они также могут предоставлять дополнительную информацию о произведениях искусства, истории и культуре, делая музейный опыт более интересным и запоминающимся. Персонифицированные мобильные музейные гиды могут помочь в сохранении культурного наследия, предоставляя информацию о цифровых репликах и моделях исчезнувших или поврежденных объектов и произведений искусства. Таким образом, использование технологий ИИ для создания персонализированных мобильных музейных гидов не только улучшает музейный опыт посетителей, но также способствует сохранению и популяризации культурного наследия.

Ключевые слова

Музейное дело, инструменты ИИ, персонифицированные мобильные гиды, культурологический феномен, посетители музеев.

Библиография

1. Andrade J.G., Dias P. A phygital approach to cultural heritage: augmented reality at Regaleira // Virtual Archaeology Review. 2020. Vol. 11. No. 22. P. 15-25.
2. Chianese A. et al. An associative engines based approach supporting collaborative analytics in the internet of cultural things // Future generation computer systems. 2017. Vol. 66. P. 187-198.
3. Díaz-Rodríguez N., Pisoni G. Accessible cultural heritage through explainable artificial intelligence // Adjunct Publication of the 28th ACM Conference on User Modeling, Adaptation and Personalization. 2020. P. 317-324.
4. Jiang T. et al. AIDM: artificial intelligent for digital museum autonomous system with mixed reality and software-driven data collection and analysis // Automated Software Engineering. 2022. Vol. 29. No. 1. P. 22.
5. Lee S.J. A review of audio guides in the era of smart tourism // Information Systems Frontiers. 2017. Vol. 19. P. 705-715.
6. Marini C., Agostino D. Humanized museums? How digital technologies become relational tools // Museum Management and Curatorship. 2022. Vol. 37. No. 6. P. 598-615.
7. Pisoni G. et al. Human-centered artificial intelligence for designing accessible cultural heritage // Applied Sciences. 2021. Vol. 11. No. 2. P. 870.
8. Roll I., Wylie R. Evolution and revolution in artificial intelligence in education // International Journal of Artificial Intelligence in Education. 2016. Vol. 26. P. 582-599.
9. Trichopoulos G. et al. Crafting a Museum Guide Using ChatGPT4 // Big Data and Cognitive Computing. 2023. Vol. 7. No. 3. P. 148.
10. Zhao J., Guo L., Li Y. Application of digital twin combined with artificial intelligence and 5G technology in the art design of digital museums // Wireless Communications and Mobile Computing. 2022. Vol. 2022.