

AI FOR DIGITAL HISTORICAL RECONSTRUCTIONS

Shaping the Future of Heritage Preservation in Dubai

WHY HISTORICAL RECONSTRUCTION IS A GLOBAL CHALLENGE

Preserving and restoring historical sites and artifacts is essential for safeguarding our global cultural heritage. As of July 2024, there are 1,223 World Heritage Sites spanning 168 countries ¹. Many of these cultural treasures face significant threats from natural decay, conflict, and rapid urbanisation, heightening the urgency to protect them. However, the process of restoration is both costly and time-consuming, with funding primarily sourced from state governments and private donations. Traditional reconstruction methods are often hampered by high expenses, lengthy timelines, and incomplete records, making accurate restoration a formidable challenge. The growing risk of losing these invaluable landmarks underscores the importance of leveraging innovative solutions to preserve our shared heritage for future generations.



KEY STATISTICS



For the biennium 2024-2025, the World Heritage Fund is set at

USD 5.8 billion

with an additional **USD 0.4 million earmarked for emergency assistance.**²



The global heritage tourism market size was valued at

USD 556.96 billion

in 2021 and is expected to expand at a compound annual growth rate (CAGR) of **3.8% from 2022 to 2030.**³



AI can improve the **accuracy of historical reconstructions** by up to

62% and 71%

accuracy in **identifying their original location**, and can **date texts to within 30 years of their ground-truth date ranges** enhancing the preservation and educational outcomes of cultural heritage projects.⁴

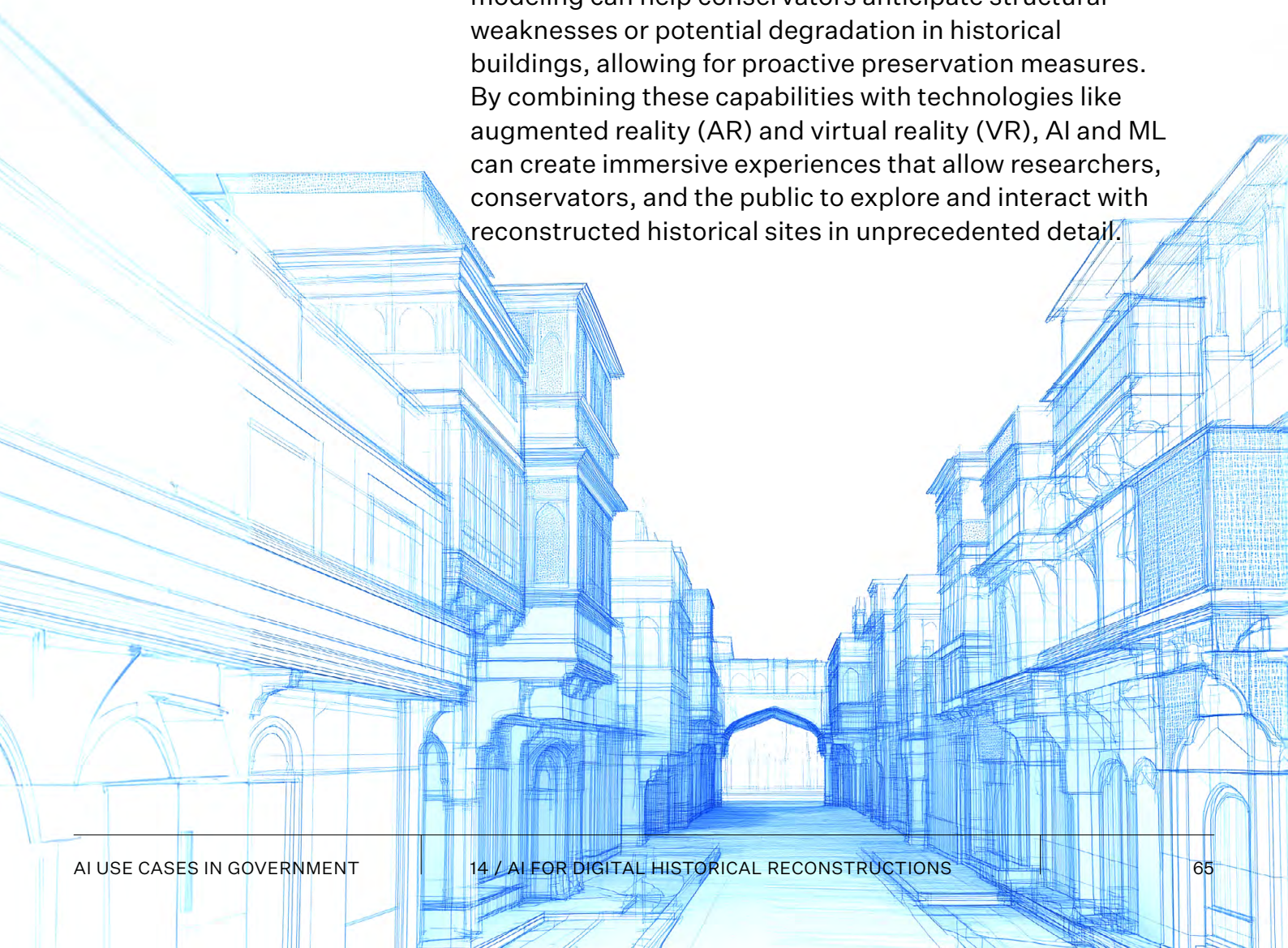
WHAT DOES IT LOOK LIKE IN DUBAI?

In Dubai, the preservation and reconstruction of heritage sites play a vital role in the city's cultural preservation efforts. Since 1991, the Dubai Municipality's Architectural Heritage Department has been leading initiatives to conserve historical buildings, adhering to international standards. The city is home to over 17 significant archaeological sites, including Saruq al-Hadid and Al Sufouh, which reflect Dubai's rich history spanning over 300,000 years. Managed by the Dubai Culture and Arts Authority, these sites are carefully preserved to enhance public access and appreciation. The emirate's commitment to heritage preservation is further exemplified by the approval of a project to restore an additional 35 heritage sites and buildings, as part of a larger initiative to protect Dubai's cultural and architectural heritage⁵.



HOW AI WILL SOLVE THIS CHALLENGE

Artificial intelligence (AI) and machine learning (ML) technologies offer significant potential for enhancing historical construction projects through advanced analysis and reconstruction techniques. These technologies can analyse vast amounts of historical data, including architectural plans, archaeological findings, and historical documents, to create accurate 3D models of ancient structures. Machine learning algorithms can be trained on existing historical buildings to recognise architectural styles, construction techniques, and materials used in different periods, enabling more precise reconstructions of partially destroyed or lost structures. AI-powered image recognition and processing can enhance the quality of old photographs or drawings, providing clearer visual references for restoration work. Additionally, predictive modeling can help conservators anticipate structural weaknesses or potential degradation in historical buildings, allowing for proactive preservation measures. By combining these capabilities with technologies like augmented reality (AR) and virtual reality (VR), AI and ML can create immersive experiences that allow researchers, conservators, and the public to explore and interact with reconstructed historical sites in unprecedented detail.





THE IMPACT OF USING AI FOR DUBAI

Dubai is pioneering the use of AI to preserve and showcase its cultural heritage, seamlessly integrating cutting-edge technology with tradition. By leveraging AI and Generative AI, the city is developing detailed 3D models and immersive virtual reconstructions of historical sites, offering interactive experiences through virtual reality (VR) and augmented reality (AR). These advancements not only elevate cultural tourism but also make Dubai's rich history more accessible to a global audience. With AI at the forefront, Dubai is not only shaping the future of heritage preservation but also reinforcing its position as a global leader in innovation and cultural preservation.

CITATIONS

¹ Wikipedia, "World Heritage Sites by Country," en.wikipedia.org/wiki/World_Heritage_Sites_by_country, accessed 2024.

² UNESCO, "World Heritage Fund," whc.unesco.org/en/world-heritage-fund/, accessed 2024.

³ Grand View Research, "Heritage Tourism Market Report," www.grandviewresearch.com/industry-analysis/heritage-tourism-market-report, accessed 2024.

⁴ DeepMind, "Predicting the Past with Ithaca," www.deepmind.google/discover/blog/predicting-the-past-with-ithaca/, accessed 2024.

⁵ WAM, "Hamdan bin Mohammed Approves Second Phase of Dubai's Development," www.wam.ae/en/article/b346evz-hamdan-bin-mohammed-approves-second-phase-dubai%E2%80%99s, accessed 2024.

