

Review of AI-Driven Chatbot Solutions for Remote Sensing in Archaeology

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This study reviews AI-powered chatbot solutions for remote sensing archaeology, emphasizing its capacity to transform data interpretation and accessibility. The study reviews methods that integrate large language models (LLMs), like those of GPT-4, with machine learning algorithms, such as convolutional neural networks (CNNs), to handle and evaluate vast remote sensing datasets. The incorporation of these AI technologies allows archaeologists to query and engage with satellite images, LiDAR, and multispectral data via intuitive, conversational interfaces. The literature review findings demonstrate that the utilization of AI chatbots markedly enhances the efficiency of data retrieval and analysis, rendering intricate geographical information more accessible to non-experts and facilitating real-time site detection and monitoring.

The combination of artificial intelligence and remote sensing has gained interest as archaeologists encounter the difficulty of analyzing extensive datasets generated by contemporary imaging technology. Conventional approaches, however efficacious, are resource-demanding and necessitate specialized training, hence constraining wider participation in archaeological data. AI-driven chatbots serve as a -recent- revolutionary approach by automating data processing and offering natural language

interfaces for enhanced accessibility and interpretation [2]. Platforms like those of Google Earth Engine (GEE) have proven the viability of cloud-based geospatial analysis, so reinforcing the contribution of AI to the progression of archaeological research [1].

Although AI-driven chatbots provide significant advantages for remote sensing archaeology, certain issues must be resolved to guarantee their efficient deployment. A major concern is the dependability of LLMs in handling intricate and context-dependent inquiries. Despite being trained on extensive datasets, these models may occasionally yield erroneous or too generalized outputs, requiring thorough validation by specialists. The reliance on high-quality data for training these models raises concerns around biases and limitations in dataset representation, which can impact the performance and inclusivity of AI systems. The risk of over dependence on automated technologies may undermine researchers' critical analytical skills. Addressing these issues is emerging and it is essential for creating resilient, reliable systems that enhance rather than supplant conventional archaeological skills [3].

The incorporation of AI-driven chatbots into remote sensing processes has significant ramifications for computational applications and quantitative techniques in archaeology. These tools democratize access to advanced remote sensing technologies by simplifying data interaction, thereby facilitating broader engagement from researchers, heritage managers, and community stakeholders. This method promotes interdisciplinary collaboration, uniting archaeologists, computer scientists, and data analysts to create scalable solutions for heritage conservation. Furthermore, the capability of AI models to automate routine data processing and deliver real-time

updates can improve the efficiency and precision of site monitoring, corresponding with contemporary requirements for proactive cultural heritage management.

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