

Assessment of fine-tuned large language models for real-world chemistry and material science applications

Original

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Dottorato in Patrimonio Architettonico

Formazione e ricerca
37° - 40° ciclo

**PhD Programme
in Architectural Heritage**
Training and Research Activities
37th - 40th cycle

a cura di / *edited by*

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06.
Tesi
e ricerche

Antichi edifici ludici e teatrali nell'Adriatico orientale: una metodologia per la loro conservazione e valorizzazione in Croazia e Albania

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Restauro dell'architettura

Parole chiave

**patrimonio archeologico, restauro, Adriatico orientale, teatri,
anfiteatri**

Il patrimonio archeologico che testimonia le vicende storiche di età classica, da decenni, interessa e coinvolge scientificamente le discipline dell'architettura, e nello specifico del restauro, per uno studio ampio e completo, per comprendere meglio lo stato di conservazione delle rovine al fine di proporre consapevoli azioni di riuso, valorizzazione e gestione di tale patrimonio culturale.

I resti archeologici di teatri, anfiteatri, circhi e odeia oggi sono presenti in numerosi contesti urbani, all'interno di siti archeologici, in aree rurali o in contesti paesaggistici. La conservazione, il riuso, le riconfigurazioni e la parziale distruzione subiti da queste strutture nel corso delle epoche successive sono al centro di ricerche che coinvolgono le discipline del restauro, grazie a un preciso apporto multidisciplinare.

Il caso dell'Adriatico orientale, ancora non sufficientemente esplorato, con particolare riferimento alle attuali Croazia e Albania, rappresenta le aree che la ricerca dottorale vorrebbe affrontare soffermandosi su quei contesti in cui, negli ultimi secoli, sono stati individuati ruderi archeologici di particolare interesse su cui è necessario approfondire la conoscenza.

Attraverso l'analisi di numerosi esempi nazionali e internazionali, la ricerca desidera proporre idonee soluzioni progettuali applicabili al sito archeologico di Salona (Croazia). Tali analisi, nel tentativo di suggerire confronti metodologici geograficamente distanti, interessano anche il parco archeologico italiano di Libarna (Alessandria), ove le caratteristiche architettoniche e lo stato di conservazione delle rovine consentono una valutazione comparata dei diversi contesti.

Pertanto, la ricerca mira, dopo aver ampliato la conoscenza di questi siti nel panorama culturale internazionale, a individuare e ad applicare una metodologia di analisi e di intervento sulle aree in oggetto. Lo studio andrebbe a collocarsi in una dimensione europea e mediterranea del patrimonio; raggiungibile solo attraverso nuove acquisizioni archeologiche, interventi di restauro, analisi conservative e investimenti culturali, quale volano per lo sviluppo dei territori interessati, dei popoli e della civiltà contemporanea.

issue of hospital and community care” from a renewed perspective.

Musealization of the Archaeological Site: Design of an *In-Situ* Structure for the Enhancement, and Integrated Management of Archaeological Sites in Piedmont

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PhD in Architectural Heritage, 39th cycle

Keywords

In situ Archaeological Musealization, *Antiquarium*, Archaeological Landscape Enhancement, Integrated Site Management, Industria (Monteu da Po)

In situ archaeological musealization involves the transformation of a site of human activity and its natural environment into a kind of museum, highlighting the influence of the environment and cultural expressions on architectural choices and the materials employed. It is proposed as a strategy for reuse aimed at the understanding, conservation and enhancement of the archaeological landscape directly within its original context. This practice can take shape through pathways that allow for internal access and contemplation, or through the creation of small exhibition spaces known as *antiquaria*. While the former approach remains valid in contexts where alternative uses might compromise the preservation of ruins, the Siena Charter (2014) emphasizes the need to rethink these structures, which often lack adequate spaces to meet contemporary museological needs. Consequently, this research advocates for the adaptation of *antiquaria* to current requirements so that they may function *in situ* as new conservation-oriented, educational, and community-engaging facilities, establishing spatial and temporal relationships among the components of

the archaeological landscape.

The case study is the Roman archaeological site of Industria, located in the current municipality of Monteu da Po (Province of Turin), as it presents the necessary conditions for the development of the aforementioned objectives: the entire archaeological collection is currently housed in the Museum of Antiquities in Turin, there are no significant local initiatives for the musealization and promotion of the site and its artifacts, and the site features a disused railway station with characteristics and a structural integrity that make it the most suitable space to support the expansion of the tourist route without compromising the integrity or authenticity of the preserved ruins. The final goal is to develop strategic guidelines for the integrated management of structures archaeological sites, which are often a marginal part of large-scale enhancement projects, using a replicable archaeological musealization model applicable to similar contexts.

Ancient spectacle and theatre buildings in the Eastern Adriatic: a methodology for their conservation and exploitation in Croatia and Albania

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PhD in Architectural Heritage, 40th cycle

Keywords

Archaeological Heritage, Restoration, Eastern Adriatic, Theatres, Amphitheatres

For decades, the archaeological heritage that bears witness to the historical events of the classical age has engaged the disciplines of architecture, and specifically restoration, in a broad study. The aim is to understand the state of conservation of ruins and to propose informed actions for the reuse, enhancement and

management of this cultural heritage. Today, archaeological remains of theatres, amphitheatres, circuses and odeons are found in numerous urban contexts, within archaeological sites, in rural areas or in landscape settings. The conservation, reuse, reconfiguration and partial destruction undergone by these structures throughout history are at the heart of research involving restoration disciplines, thanks to a precise multidisciplinary contribution. The case of the Eastern Adriatic, which has still not been sufficiently explored, particularly in present-day Croatia and Albania, represents the areas that the doctoral research aims to address. It will focus on contexts where, in recent centuries, archaeological ruins of particular interest have been recognised as requiring additional knowledge. By analysing numerous national and international examples, the research seeks to propose suitable design solutions applicable to the archaeological site of Salona (Croatia). In an attempt to suggest geographically distant methodological comparisons, these analyses also concern the Italian archaeological park of Libarna (Alessandria), where the architectural characteristics and state of conservation of the ruins allow a comparative evaluation of the different contexts. Therefore, after expanding knowledge of these sites within the international cultural landscape, the research aims to identify and apply a methodology of analysis and intervention for these areas. The study would be focused on a European and Mediterranean dimension of heritage, achievable only through new archaeological acquisitions, restoration interventions, conservation analyses and cultural investments, as a driving force for the development of the territories involved, their peoples and contemporary civilization.

Seismic protection of architectural heritage

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PhD in Architectural Heritage, 40th cycle

Keywords

Architectural Heritage, Digital Twin, Structural Health Monitoring and Seismic Protection, Metamaterials, Semi-active Control

The reduction of seismic vulnerability in structures, particularly in historical and architectural heritage, represents a major challenge in structural engineering. Historical buildings often exhibit significant weaknesses due to material degradation, ageing, and construction practices that predate modern seismic codes. Their preservation requires strategies that both respect their cultural value and enhance their safety under dynamic loading, especially in earthquake-prone regions. Moreover, the complexity of these structures, along with limited documentation on their original construction techniques and materials, increases the difficulty in accurately assessing their seismic performance.

Growing interest in the conservation of architectural heritage and in ensuring the safety of structures has encouraged, mostly in recent decades, the development of modern techniques of structural health monitoring (SHM). As can be easily understood, it is really complex to thoroughly define the behaviour of historical buildings due, for instance, to uncertainties regarding material properties, their current conditions, and construction techniques. The high complexity and large dimensions can lead to a wide variety of local behaviours which are hard to detect. In view of this, monitoring the health of structures proves quite useful both for evaluating the conservation status – supporting targeted intervention design – and also for providing a com-

