

METROLOGY

3D Diagnostic Tools for Cultural Heritage

Funded By	Ministero dell'Università e della Ricerca - MUR [P.iva/CF:96446770586]
Supervisor	GRASSINI SABRINA - sabrina.grassini@polito.it
Contact	
Context of the research activity	<p>The research project aims to develop innovative diagnostic approaches for the monitoring and assessment of the conservation state of multi-material artifacts. The possibility to integrate 3D models and multispectral photogrammetry with data obtained from multi-analytical diagnostic techniques is investigated in order to develop new solutions for monitoring and implementing conservation practices.</p>
	<p>The research project aims to investigate the feasibility of integrating 3D digitalization techniques with data on the chemical composition, microstructure and morphology of multi-material artefacts in order to develop best practices and tailored conservation methodologies, both preventive and for intervention. In particular, the possibility to integrate digital photogrammetry with multispectral imaging (MSI) in order to create three-dimensional models capable of integrating geometric and radiometric information with a high level of detail will be investigated.</p> <p>Photogrammetry is gaining increasing popularity for the creation of 3D realistic virtual replicas of historical artifacts since it enables the extraction of three-dimensional information about the geometry and overall appearance of an item from 2D digital images. On the other hand, MSI techniques are widely</p>

Objectives	<p>used to detect and identify artists' materials based on their response to excitation with different wavelengths. It is worth noticing that, even if multispectral imaging can provide useful information with a non-invasive approach, it is usually employed as a two-dimensional technique. Photogrammetry and multispectral imaging are often exploited for the study of historical artifacts, but as separate tools.</p> <p>The research proposed herein aims to fill this gap by integrating data obtained from MSI and photogrammetry to greatly enhance the information included within a 3D model. This approach will provide experts in the field with a powerful tool that combines geometric and radiometric data, with the final goal of creating virtual replicas useful for developing best practices in conservation. Moreover, the digital approach developed can be considered as a starting point for the study of solutions suitable for monitoring and implementing conservation practices, making information more accessible. The metrological validation of the developed approach can also enhance the application of digitalization techniques and 3D imaging systems by providing multiple contributions, in terms of conservation, data archiving, enhancement, fruition and web sharing.</p> <p>The main objectives are:</p> <ul style="list-style-type: none">- the development of a three-dimensional reference and best practices for the assessment of the dimensional accuracy of 3D models;- the development of an approach which enables the integration of 3D model and multispectral imaging with high accuracy;-the feasibility assessment of the developed approach for the definition of preventive conservation plans;-the assessment of the developed solutions on real case studies.
-------------------	---

Skills and competencies for the development of the activity	<p>Fundamentals on diagnostic and imaging techniques</p> <p>Fundamentals on preventing conservation strategies of multi-material artifacts</p>
--	--