"POLYGNOSIS": Educational Knowledge Web Platform and semantically linked Thesaurus on optical and laser-based techniques for Cultural Heritage analysis and diagnosis

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INTRODUCTION

"POLYGNOSIS" is an educational, Web-Based Information System (WBIS) with emphasis on the conservation, analysis and diagnosis of Cultural Heritage (CH) objects with the use of laser-based and optical methods. It includes notions of conservation of works-of-art, as well as, the examination and analysis method applications on CH objects. The purpose of the system is to assist primarily art conservators, but also scientists who apply such scientific investigation methods.

The present study involves the collection and curation of data for the enrichment of the Knowledge Platform, as well as, the definition and classification of terms for the semantically linked Thesaurus. It includes the organization and analysis of knowledge acquired by examination procedures and scientific texts (research articles, instructional manuals for the use of the instruments, analysis reports etc.).

The aim of the system is to be a reference and educational tool for the analytical and diagnostic laser technologies, and also, provide a powerful conduit for research and study of CH materials, condition state and pathology.

SEMANTICALLY-LINKED THESAURUS

Methodology followed for the construction of the thesaurus:

1. Collection and study of sources and relevant documents
2. Semantic categories and facets of the thesaurus
3. Hierarchy building and formation of relationships between terms (hierarchical, associative and equivalence relationships)

"POLYGNOSIS" thesaurus is a semantically structured vocabulary organized by a faceted classification, which provides a global subdivision of concepts through Broader-Narrower Term Hierarchy.

It is designed under four extensible facets:

a. "Material Objects": dealing with the investigated CH objects
b. "Investigation Methods": dealing with optical and laser-based techniques,
c. "Identifiable Features": dealing with the detectable evidences
d. "Data": dealing with the results of the investigation procedures and their diagnostic and documentation material.

Map of the analysed spots on the mural painting

Reflectance spectra of all four spots analysed

“Polygnosis” provides reliable access to highly specialized knowledge. Its contents are dynamically enriched and semantically organized. It implements a comprehensive environment with respect to a problem. The system gives access to specialized information and guides users to identify categorical relationships through real examples -crucial for interpreting the complex and constantly evolving methodologies and tools described. It classifies examples of examination and diagnosis ("assessment"), texts, object descriptions, images data produced by the applied methods to specific objects. Moreover, the thesaurus' faceted classification brings to light hidden connections between the terms and establishes concept relationships. Thus, each term acts as a junction and offers a holistic point of view for understanding a large part of the knowledge area. To conclude, future work may include the development of mechanisms that would enable the adaptive representation of the system's content according to learners' profiles and educational needs, as well as, allow the exchange of users' assessments, opinions and ideas through an experts’ forum.

Bibliography

Endnotes

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450nm
600nm