Developing an electronic thesaurus of terms for Byzantine Icons in the framework of a project, focused in the creation of a virtual Museum

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ABSTRACT

In the framework of a project realized by the University of Athens, an electronic thesaurus of terms for Byzantine icons is developing, based on Dionysios Mourelatos' Phd thesis entitled Icon, its placement and function in the Byzantine society. In the following paper, you may see an overview of this project, the system' structure, developed by the Department of Informatics of University of Athens and the initial study and the general principles of this thesaurus of terms, part of D.Mourelatos' Phd thesis at the Department of Archaeology of the University of Athens.

1. GENERAL OVERVIEW OF THE PROJECT

This research takes place in the framework of the project realized by the University of Athens under the supervision of Associate Professor D. Martakos (Dep. of Informatics) and Professors M.Panayotidi and S.Kalopissi-Verti (Dep. of Archaeology) with the collaboration of the Foundation of Mount Sinai (Athens, Greece).
It is entitled *"I-BYZANTINE – Use of Advanced Applications of Hypermedia Systems for the Benefit of Services of Individualized Navigation and Learning in Virtual Byzantine Museum Environments"*, funded by the General Secretary of Research and Technology of the Minister of Development of Greece. The researchers, who take part in this project are: Dimitrios Charitos, Theodora Patsalou, Andreas Andreou, Ioannis Kontaxakis (Department of Informatics) and Nikolaos Fyssas, Georgia Foukaneli, Charikleia Diamanti and Dionysios Mourelatos (Department of Archaeology).
Previous projects of the University of Athens, mainly excavations, related to Saint Catherine's Monastery in Sinai were the starting point for this project. This research project intends to create a virtual museum for Byzantine Antiquities, relating to Saint Catherine's Monastery in South Sinai (Egypt). More specifically, its thematical direction focuses on "Cultural and economic routes in South Sinai during Byzantine period (4^{th}-15^{th} c.)".

2. SYSTEM ARCHITECTURE

In general, this project aims to materialize a system, which will provide the possibility to a widely distributed public to access items from South Sinai, especially from Saint Catherine's Monastery, which is located – as it is well known – in a long distance area. The project also aims to ensure the preservation of such historical items, by digitizing them and by recording all related information.
Such historical items are known to be fragile, delicate and secluded and as a result, few citizens and researchers have been given the possibility of observing and studying them.
The System Architecture is based on a three level model consisting of the Presentation Layer, the Business Layer and the Data Layer. Such architecture is widely used for the development of Internet applications.
The Presentation Layer enables interaction of the final user with the application through a Web Browser. This layer is responsible for creating the final interface, which is used for the submission of the requests of the final users.
The Business Layer is the middle layer of the application and is comprised of business objects / components and application functions. The Business Layer is used in order to access all the necessary data of the Data Layer.
The Data Layer concerns the (multimedia and textual) data, the database and the handling of data objects. (see in fig.1 a graphical representation of system architecture).
The client accesses the offered services through the Internet (by using a web-browser). One can view the detailed structure of the business and data layers. These layers contain additional modules that handle conducted tours, multimedia data, analysis and documentation administration.
The Information Model for the presentation layer consists of: The User Profile Information Model is responsible for the preservation of the information, relating to the user's profile. This profile is created by the system during the procedure of the subscription of the user and is enhanced based on the choices made by the user during his navigation. The Tour

Information Model is responsible for the preservation of information relating to the structure and content of a virtual tour. The Documentation Information Model is responsible for the electronic filing of notes relating to archeological items. The Multimedia Content & Classification Information Model is responsible for the preservation of data, relating to the hypermedia information and its taxonomy. It contains many different kinds of meta-data such as: Audio meta-data, Streaming Video meta-data, Image meta-data, Text meta-data, Virtual Reality Environment (QTVR), Digitized historical information.

3. META-DATA INFORMATION-THESAURUS MODEL

The information stored in the system concerns: Locations, people and itineraries during this period (4^{th}-15^{th} centuries) in South Sinai, mentioned in historical sources. Archaeologist Georgia Foukaneli is responsible for this field. Ceramics found in the area of South Sinai and especially in two sites, excavated by the University of Athens. Archaeologist Charikleia Diamanti is responsible for this field. Works of painting, especially Byzantine icons located at Saint Catherine's Monastery in South Sinai, which is considered to be the largest deposit of icons in the world. Archaeologist Dionysios Mourelatos is responsible for this field.
The cultural content is organized using the following logical data model (The logical model revolves around the needs of the business, not the database). This model contains entities such as Monument, Cultural-Historical Periods, Typology, Decoration, Technique, Material, Bibliography, and Theme[1].
The thesaurus model used in I-Byzantine system is based on the generic model represented in Figure 2.
It displays how different terms are, either directly or indirectly, related to each other[2]. Additionally, each relation has the following characteristics: a) Type, which defines the type of the relation. The types used in this system are narrow, broaden and relate to. For instance, the term "saint" broadens the term "military saint" and conversely the term "military saint" narrows the term "saint". Also, the term "weapon" relates to the term "military saint". b) Description, which is a textual description of the relation c) Weight, which quantifies each relationship by providing a measure for the similarity of two related terms. This characteristic enables fuzzy searches and creates results containing a certain percentage of correctness. The value for the weight characteristic of each relation can be either defined by the user or computed on the fly by an algorithm in order to extract results or prove/disprove certain hypothesis.

4. ELECTRONIC THESAURUS OF TERMS

This electronic thesaurus of terms concerns mainly Dionysios Mourelatos' PhD thesis, entitled: *Icon, its placement and function in the Byzantine society.* In order to classify the icons, based on their iconography and on taxonomy of semantic relations, we ended in two main categories, isolated figures and compositions. This corresponds of course to all painting and especially Christian religious painting[3]. Based on the study of the bibliography on Byzantine iconography we concluded in these sub-categories. This categorization is based in common iconographical elements among the parts of each category. Isolated figures are meant in Christian iconography especially saints and more specifically: Military Saints, Female Saints, Medical Saints, Monks and Ascetics, Bishops, Apostles and Evangelists, Kings and Prophets[4]. The main components of these groups of saints are similar. For instance military are considered certain saints, because of their stories and attributes of their representations. Sometimes, if we don't have an inscription, it's difficult to distinguish them.
Additionally, according to the international bibliography[5] on Christian Iconography, compositional themes may be divided

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1 **The selection of fields is based on the project POLEMON, see Bekiaki, Ch.; Gritzapi, Ch.; Kalomoirakis, D., POLEMON: A federated database management system for the documentation, management and promotion of cultural heritage. In Barcelo, J. A.; Briz, I.; Vila Assumpcio (editors) – New Techniques for Old Times CAA98, Proceedings of the 26th Conference, Barcelona, March 1998, BAR 757, 1999, p. 317-330.**

2 **See the logical model in Waterworth J. (1991), Multimedia technology and applications. In Chignell, M. H.; Felix Valdez, J.; Waterworth J. A., eds. – Knowledge Engineering for Hypermedia, Chichester, p. 250-255 and in Chaffin, R.; Herrman, D. J. (1984) – The similarity and diversity of semantic relations. Memory and Cognition, 12, p. 134-141.**

3 **In Lexikon der Christlichen Ikonographi, one of the main publications on Christian iconography, there is an alphabetical order of all related terms.**

4 **This division is based on Henry Maguire's The Icons of their bodies. Saints and their images in Byzantium, Princeton 1996, especially in chapter 2 corporality and immateriality, p. 66-99.**

5 **In Louis Reau's Iconographie de l'art chretien, edited in, Paris between 1957and 1959, are followed divisions as New and Old Testament, iconography of saints, where it's used an alphabetical order in classification of the saints. Also in Gertrud Schiller's Ikonographie der Christlichen Kunst, edited in Guetersloh between 1966 and 1969, there is a classification of Christian iconography that follows the range of texts. This arrangement is also followed in the typical decorations of Byzantine churches. G.Millet in his book Recherches sur l'iconographie de l'Evangile aux XIVe, XVe et XVIe siecles (Paris 1916), follows the same arrangement. Millet's book is fundamental in the study of Christian iconography. He divides compositional scenes of Christian iconography between the feasts, the liturgical cycle, cycle of passion, the miracles. More specifically see its summary, ibid, p. XXXVII-LXIV.**

in the following iconographical cycled: Cycle of Passion, Cycle of Virgin Mary[6], Cycle of Old Testament, Cycles of Saints' lives, Christ's childhood and Great Feasts. The researchers in this field prefer to adopt context and not iconographical criteria, in order to group these compositions. Furthermore in a typical iconography of Byzantine churches, the themes, which belong to these cycles, have also a spatial context.

We believe that, if we follow these general principals in organizing this thesaurus of terms, this could be the beginning of a wider international project. We hope that we will be able in the future, with collaboration, to create a multilingual electronic index of Byzantine Art.

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6 See in Lafontain-Dosogne, J. (1964) – Iconograpie de l' enfance de la Vierge, Bruxelles.

FIGURES

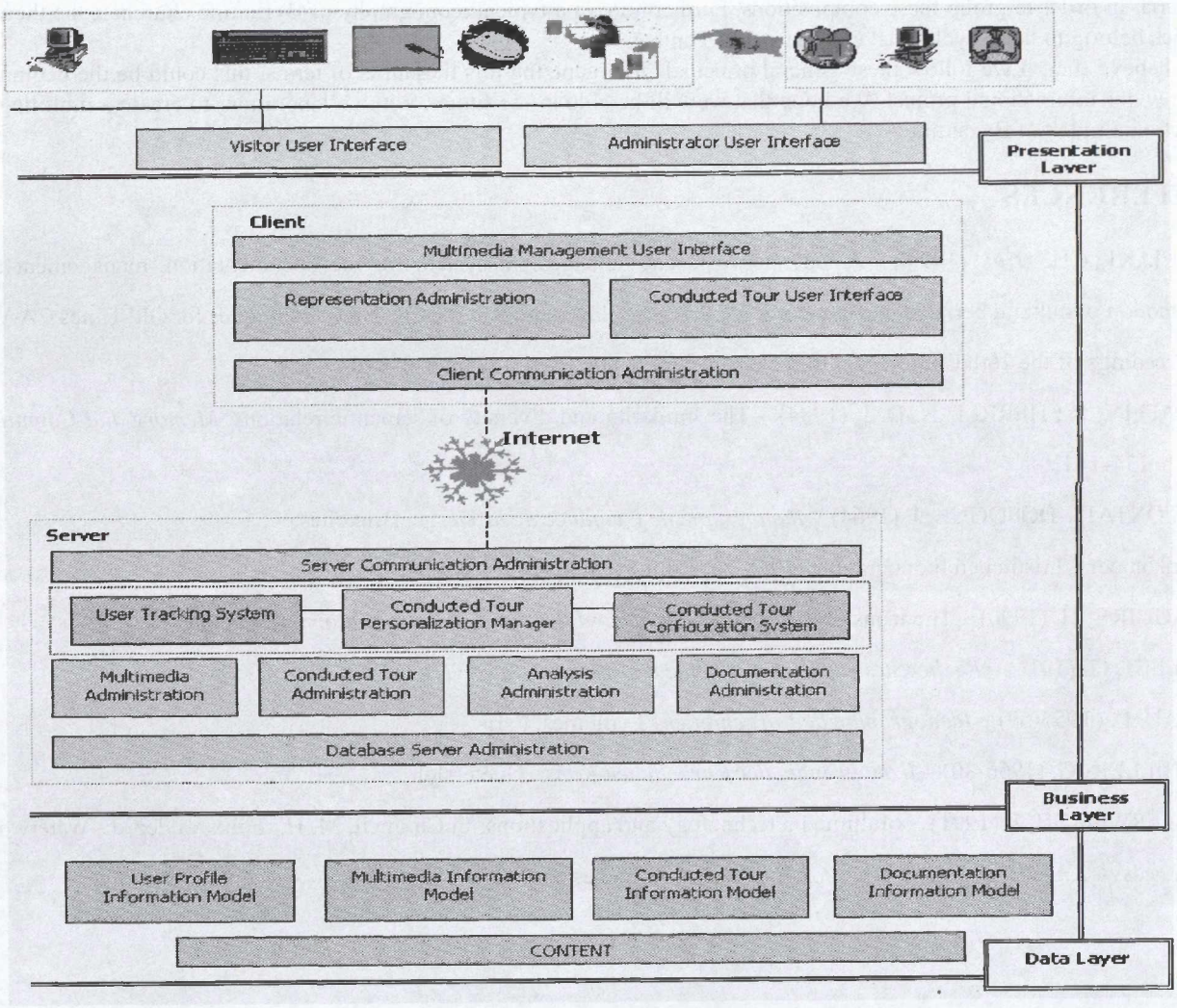

Fig. 1 – System Architecture.

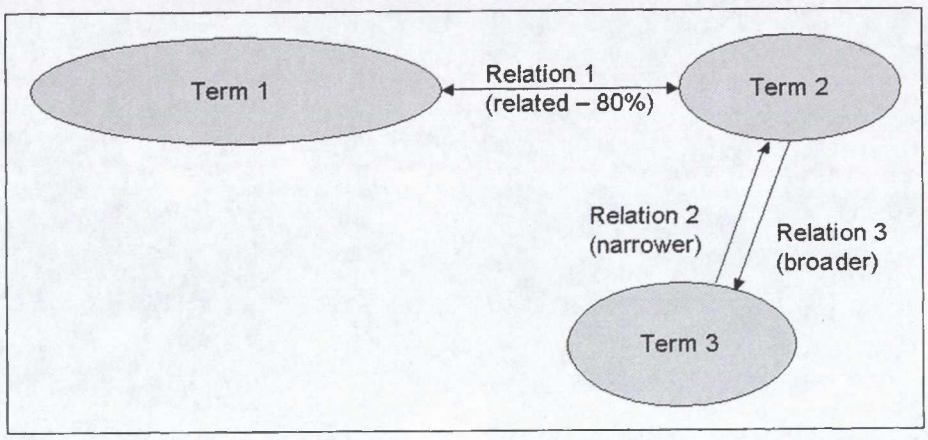

Fig. 2 – Generic Thesaurus Model.