

# THE HISTORY OF COMMANDARIA: DIGITAL JOURNEYS BACK TO TIME

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## ABSTRACT:

Commandaria is considered one of the oldest types of wines and it has been ranked as one of the best wines of the last millennium. Production of Commandaria in Cyprus is associated with historical and political events that took place at the island, especially during the last millennium, hence studies related to Commandaria are heavily related to the culture and history of Cyprus. Unfortunately up to now the issue of preserving the history and traditions related to the production of Commandaria over the years did not receive adequate attention and as result the danger of losing important aspects of the relevant Cypriot cultural heritage is obvious. With our work we aim to develop an interactive system through which the history of the production of Commandaria at different areas in Cyprus and different time periods will be presented along with historical events that took place in the island and can be related with Commandaria production. As part of the project we will establish a multimedia digital library that will contain items related to the history and production of Commandaria in Cyprus. All multimedia database entries will be sorted according to various criteria, including the chronological period, the geographical location they refer to and the actual contents of the item, and could be searched via semantic-based queries with the aid of an ontology. In addition, an interactive application will be created where users will have the opportunity to explore the history of Commandaria in Cyprus at different geographical locations and different time periods. The final system will operate both as a web application and as a stand alone application in information kiosks. The system we plan to develop will be most useful for preserving traditions related to the production of Commandaria and support efforts of researchers who wish to explore the history of Commandaria and Cypriot culture as well as the great public for educational and entertainment purposes.

## 1. INTRODUCTION

Commandaria is a sweet liqueur wine, which is manufactured exclusively in Cyprus with the same basic technology, as it was manufactured in Cyprus during the Homeric years. The Commandaria is considered one of the oldest types of wines and it has been ranked as one of the best wines of the last millennium. Traditionally Commandaria in Cyprus was produced in a geographical area that contains 14 villages – the so-called Commandaria region (see Figure 1). Simultaneously, in the course of this wine through the centuries that keeps pace with the history of Cypriot population a big number of heirlooms exists, related to Cyprus wine or even directly to Commandaria, scattered in all over the island and specifically in the region of Commandaria. Ancient amphora, cylices, earthen jars of small and of enormous dimensions, wall paintings, mosaics, poems, books. An enormous cultural, historical and archaeological wealth, that needs to be utilized and exploited for the befalling generations. Commandaria production had caused important socioeconomic influences in the life of people of Commandaria region across the years. We strongly believe that through our research such influence factors will be revealed and made available to researchers of Cyprus history and sociology.

In this paper we describe our preliminary work and plans for future work that will be undertaken in the framework of

Commandaria project, in relation with the development of an interactive system through which the history of the production of Commandaria at different areas in Cyprus and different time periods will be presented. Our work in this area is divided into the data collection, data digitization and annotation, and system design and implementation phases.



Figure 1. The Commandaria Region in Cyprus

During the data collection phase we plan to locate different types of items such as documents, photographs, videos, sound recording and artefacts. Our aim is to collect appropriate items that can be used for synthesizing a complete picture related to the production of Commandaria during a specific time period. An important task to be completed during the data collection process is the scientific evaluation of the items so that the most appropriate items will be used in the system. All items collected will be digitized, pre-processed and annotated using appropriate techniques.

A properly defined ontology along with a multimedia repository will be created so that all items will be stored in such a way that efficient retrieval of information, even in semantic-based terms, and addition of new data is supported. An interactive multimedia system will be designed so that users will be able to retrieve and study information related to Commandaria. The system will be implemented both as a web-based application and stand alone application suitable for use in information kiosks. Special emphasis will be given to the design of the system interface so that the needs and requirements of different categories of users are satisfied.

In the remainder of the paper we provide a brief history of Commandaria, and its relation to the Cyprus history, and describe related work that appeared in the literature. In sections 4 and 5 we describe the data collection and data digitization processes and in section 6 we present our preliminary work on the design of the system. In section 7 we provide concluding comments and plans for future work.

## 2. HISTORY OF COMMANDARIA

Commandaria is a Controlled Appellation of Origin sweet liqueur wine, which is manufactured exclusively in Cyprus. It is produced from the two indigenous varieties of grapes, Mavro and Xynisteri, by drying of grapes under the sun and fortification of the fermenting juice with wine alcohol, thus sugar, contained in the final wine, is totally natural. Commandaria wine is aged in oak barrels, for a minimum of three years.

As early as 1100 B.C. the great epic poet Homer refers to the wine of Cyprus, indicating that it must have existed long before. The great poet of antiquity Hesiod in his book "Works and Days" written around 800 B.C. describes its production in such detail that there can be no doubt that he had in mind the sweet wine of Cyprus. Furthermore, it is known that the Pharaohs had a preference for Cyprus wine, as did Cleopatra. King Solomon in his famous "Song of Songs" mentions the island frequently, her grapes and her wine.

Traditional Cyprus wine production also continues during the Byzantine and Roman periods, with the latter taking up the baton where the Greeks left off and introducing viniculture to all the countries they conquered. During this period Cyprus wine enjoyed an even greater development, and its trade was carried out on a sounder basis. The Romans took up the technique of wine-making more methodically, writing manuals and guides on wine.

However, the modern history of Commandaria begins after 1192 A.D., when on his way to free Jerusalem from the Arabs, Richard the Lionheart decided to conquer Cyprus first, given that it was an important staging post for the success of the campaign; at the same time, the King of Cyprus, Isaac Comnenos, was hostile to the crusaders. It was then, during his sojourn in Cyprus during the course of the Third Crusade, that Richard the Lionheart married Berengaria, the nuptials taking place on 12 May 1191. Throughout the marriage celebrations the sweet wine of Cyprus was served to the exclusion of all others, without yet having taken on the name of Commandaria. After defeating the King of Cyprus Isaac Comnenos, Richard departed from Cyprus loaded with plunder, selling the island to the Knights Templar and then to the Frank, Guy de Lusignan, the deposed "King of Jerusalem", who became the founder of a dynasty that was to rule Cyprus for three centuries (1192-1489).

Throughout the rule of the Lusignans, settlers that were mainly catholic crusaders in origin established themselves on the island, and were given privileges and land in order to build

up the feudal kingdom. Among these were the Knights Hospitallers, the religious and military order of St. John of Jerusalem founded at the end of the 6<sup>th</sup> century by Pope Gregory. The forty villages situated in the lands given to them formed the feudal territory of the Grand Commandery of Cyprus, whose seat was the castle to be found west of Limassol, known today as "Koulas, or Colossi Castle" (see Figure 3(e)).

Under their government, and in order for them to have better control of the whole of Cyprus, the island was divided into various districts called 'commanderies'. The largest territory was that of Limassol, its centre of administration being Colossi Castle. This area was named 'La Grande Commanderie', to distinguish it from the other two smaller territories: that of Paphos called 'Phoenix', and that of Kyrenia called 'Templos'. Because the Knights of St. John of the Great Commandery loved the wine of Cyprus produced in this area, and further stepped up its production, it was called 'Commandaria'.

After the 12<sup>th</sup> century, there followed a period when Commandaria was sold in almost all countries of Europe, with Venice as the main importer.

During the course of Turkish rule, the development of viniculture and the production of Commandaria had to a great extent declined due to poverty, oppression and the heavy tax on the wine trade imposed by the Ottoman Empire. Commandaria, however, had by now taken root on Cyprus soil and had been preserved both through tradition and the Christian faith. Already, since Byzantine times, the sweet wine of Cyprus had been designated as the wine of holy communion; thus, despite adverse conditions it survived and was preserved up to the period of British rule, when the first attempts were made to establish the territory of Commandaria and the villages that were entitled to produce this wine, since both its price was far higher than similar wines produced in other areas and the quality of grapes, in terms of natural sugar content, was appropriate for its production.

The systematic, improved production of Commandaria begins with the establishment of the Cyprus Republic in 1960. From then onwards, there is a continuous upgrading of Commandaria and it begins to be known abroad in typically labelled bottles. At the same time, the safeguarding of Commandaria as a national product of Cyprus is promoted, one produced in a well-defined area under controlled conditions, something which is achieved in the year 1990. The accession of the Republic of Cyprus to the European Union in May 2004 prompted the further upgrading of Commandaria. Despite the fact that it is produced with the same technology as that of three thousand years ago (but now using modern machinery), it not only wins gold medals in international wine competitions, but also the hearts of wine lovers everywhere.

## 3. RELATED WORK

Only few efforts aiming towards the compilation and presentation of the history of Commandaria in Cyprus or the history of wine production in Cyprus, were recorded in the literature. Cobham (Cobham, 1969) assembles the most important peregrinations that were written during the Middle Ages about Cyprus. Cobham's book includes a huge number of reports, of high importance not only historically but also important from oenological aspect, since all the writers, without exception, deal extensively with Cyprus wine and particularly with Commandaria. Mariti (Mariti, 1984) describes in graphic details and with clarity of expression the Cypriot conditions of those years and describes in every detail the production of

Cyprus wine and Commandaria. Papadopoulos (Papadopoulos, 2004) published a unique book that is dedicated at all to the Commandaria wine. It deals with all subjects that relate with Commandaria such as history, viticulture, geology, legislation, production, and marketing and with the art of enjoyment of Commandaria. Another Papadopoulos' work (Papadopoulos, 2008) contains an itemized description of the long-lasting history of Commandaria, beginning from the prehistoric years up to this very day, proving that Commandaria wine is not only the ancienter known appellation of origin wine but also one of a kind in the whole world that is produced precisely in the same way as it was produced in ancient times.

The book "Vines and Wines of Cyprus, 4000 years of tradition" consists of very important articles related to Cypriot geography and history, wineries and wine making in Cyprus, the viticulture of Cyprus, Cyprus vines, Commandaria, and the Limassol Wine Festival. A book published in 2006 by the Limassol Municipality with the title "Limassol Wine Festival" encompasses a wide range of subjects related with wine accompanied by a huge amount of old and new pictures. Some of the articles are closely connected with Commandaria wine as the main wine that has been traded from Limassol port for many years.

Most of the efforts cited above resulted in books and other written reports that are not easily accessible by wide spectrum of perspective readers from different educational backgrounds. Although few web pages dedicated to Commandaria exist ([www.commandariawine.com](http://www.commandariawine.com); [www.cypruscommandaria.com](http://www.cypruscommandaria.com)) none of them provides in depth scientific information related to the history of Commandaria. As an alternative we propose the design of a user-friendly multimedia interactive system that can be used for disseminating information and knowledge related to Commandaria. This is the first time that an effort in generating a comprehensive digital library that aims to preserve traditions related with Commandaria is undertaken.

#### 4. DATA COLLECTION AND EVALUATION

The data collection activity aims to locate and register all types of items related to Commandaria. As part of these efforts all possible sources of information will be explored. Typically we expect to locate significant data items in:

- Private archives such as the archives maintained by the authors of this paper, archives of wineries, and archives of cooperative banks in the Commandaria region.
- Governmental archives such as the archives of the Ministry of Agriculture, Ministry of Trade and Industry, Council of Wine Products and Oenological Department of Ministry of Agriculture.
- Villages of the Commandaria region (see Figure 1). We plan to stage visits at villages of the Commandaria region, in an attempt to locate any type of data items related to Commandaria. As part of this effort we expect to locate tools, old type machinery, vessels, mosaics, instruments, photographs and record evidences about Commandaria production.
- National and International Literature.
- Museums such as the Cyprus Wine Museum ([www.cypruswinemuseum.com](http://www.cypruswinemuseum.com)).

A valuable source of information will also be people who were involved in any way with Commandaria. We expect that we will be able to locate mainly elderly people who will be able to provide other information about Commandaria such as

traditions, fables and histories of the past and of the present times that are not yet recorded.

The data location process will run in parallel with the process of scientific evaluation so that all findings will be rated according to the scientific value and according to the target audience they refer to. For each item located a data register will be completed, where all relevant information about data items will be recorded. In particular the register will contain the following information: (1) Type of data (document, artefact, buildings, stories), (2) Location of data, (3) Contact Person / Owner, (3) Time period that the data item belongs to, (4) Theme (i.e. to which stage of the Commandaria production cycle the data item refers to), (5) Scientific Value, (6) Uniqueness of data item, (7) Target audience (i.e. primary school children, secondary school students, University students, tourists, researchers).

#### 5. DATA PROCESSING

During the data processing phase all data items located during the data collection and evaluation process will be digitized and pre-processed using appropriate techniques. Also metadata that summarize basic information about each item will be defined so as to allow efficient and semantically-based retrieval (e.g. "give me all photographs of Commandaria production in the village of Silikou"). For this purpose, and given the diversity of data items, a user-centred approach of requirement (as far as the metadata types are concerned) will be applied. In particular, several categories of users, i.e., students, tourists, researchers, winery employees, government officials, etc., will be asked to submit free text queries to the system in order to get the required information. These queries will be studied, keywords will be extracted and based on these keywords various taxonomies will be defined (e.g. "Silikou is a part of Commandaria Region"). These taxonomies of keywords will be formed as an XML schema and will be used for data item annotation through a, properly, developed annotation software. The annotators will be experts in the areas of Cyprus history, sociology and wine production. The results of annotation will be saved in the form of ontology so as to allow reasoning services to be used for data retrieval. That is, a query like "Give me all photographs of Commandaria production items found in the Commandaria region" will return, among others, the linos (i.e., old workshop for producing Commandaria) photographs in Silikou village since linos is a Commandaria production item and Silikou village belongs to the Commandaria region (note, however, that neither linos nor Silikou village were used as keywords in the original query). It is obvious that the metadata taxonomies and other non-hierarchical metadata relations will define ontology's T-Box while the actual annotation metadata will form ontology's A-Box. The Commandaria ontology will be linked with a multimedia repository in order to facilitate efficient data indexing and data storage of new items. In order to conform to well-defined and publicly used electronic items cataloguing metadata the Commandaria ontology will be based on the Dublin Core metadata elements (<http://dublincore.org/>).

##### 5.1 Digitization and Preprocessing

According to the data type different digitization and processing techniques will be employed. We expect that for the needs of the project the following types of data will be digitized.

**Documents:** Documents will be digitized using appropriate scanners. Since in various occasions we expect to deal with damaged documents we plan to use dedicated image processing for restoring the appearance of the papers. Examples of damaged documents we expect to encounter in our work are

shown in Figure 2. For each document we will need to provide a text-based description that will describe the main contents, so that it will be possible to retrieve documents stored in the repository. OCR methods will be involved whenever possible to retrieve the actual text of the scanned documents. In addition keyword searching will be also performed in the textual-form of the documents to allow for automatic metadata collection. The list of keywords that will be used for this purpose will be retrieved from the ontology.



Figure 2. Examples of damaged documents

**Photographs:** Old photographs displaying scenes related to Commandaria will be collected and scanned. Where possible the collection of old photographs will be enriched with photographs captured recently. We expect that photographs collected will cover different aspects of the production process, including photographs of vineyards, grape collection, grape drying, production, storage and consumption of Commandaria. As in the case of damaged documents, image processing techniques will be employed for improving the quality of old photographs. Figure 3 shows typical photographs that will be stored in the multimedia repository.

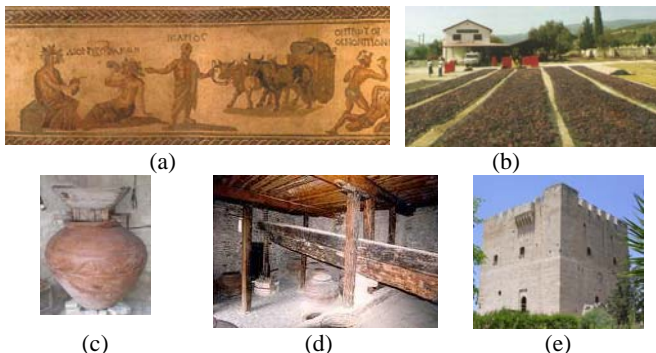


Figure 3. Examples of photographs from the database. (a) 300 bc mosaic found in Paphos, (b) grape drying, (c) traditional wine making tools (d) linos – old workshop for producing Commandaria, (e) Kolossi Castle – a castle related with Commandaria trading during the 13<sup>th</sup> century.

**Audio and Video:** Audio and video data items will be also collected and stored in the repository. Such data items will come from existing recordings or new recordings. In the case of existing recordings (which most probably are in analogue format) we plan to use audio and video restoration and digitization equipment to preserve the original item and obtain a digital representation of the data.

New recordings will be based on stories and demonstrations provided by Commandaria experts who are willing to share their experiences and stories related with Commandaria.

**Artefacts:** We plan to use laser scanners for digitizing artefacts and other items associated with the production of Commandaria. Such artefacts will include dedicated tools used (both small size and large size), and whole buildings. Typical items that we plan to digitize are shown in Figure 4. The 3D digitization process will involve the use of a 3D laser scanner

for obtaining multiple 3D scans of an object and then all scans will be joined together in an attempt to generate an integrated 3D model of the objects. The pre-processing stage in this case will involve the elimination of holes and noise in 3D models and the application of optimized texture maps. Where appropriate we plan to apply animation techniques in order to demonstrate the operation of various tools associated with the production of Commandaria. For example we plan to generate a 3D model of the wine workshop shown in Figure 3(d) and Figure 5 and demonstrate the operation of the machinery using 3D animations.



Figure 4. Examples of artefacts we plan to digitize using a 3D laser scanner. (a) wine glass (10<sup>th</sup> century bc), (b), (c) wine vessels.

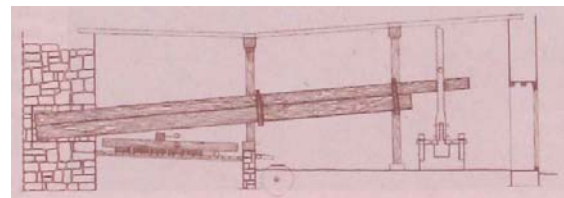


Figure 5. Sketch of the wine workshop for which we plan to generate a 3D animation demonstrating its operation.

## 5.2 Digital Library

The digital form of all data items described earlier will be stored in a digital library consisting of an ontology and a multimedia repository. The former will hold data taxonomies and relations along with metadata while the latter will contain the raw archives (scanned documents, photographs, animations etc.) Obviously links between ontology terms and repository documents will be always present in order to allow access to them through queries. The combination of ontology and multimedia repository will be used instead of a traditional database to allow semantic-based queries, through ontology reasoning, to be executed. The use of ontology will allow prior knowledge about the Commandaria domain to be formally defined (Staab, 2004). It was stated earlier that the T-Box of the Commandaria ontology will consist of the data taxonomy. This taxonomy will be build based upon a properly designed user-requirement analysis process along with suggestion of experts in the fields of Cyprus history, sociology, and education. In order to conform to open source metadata structures the Dublin Core metadata element set (<http://dublincore.org/>) will be used for the data taxonomy. An indicative set of taxonomies include the user taxonomy, the area taxonomy, the time taxonomy, the production cycle taxonomy, the item type taxonomy, and multimedia content taxonomy. The first four taxonomies can be more or less predefined while the item type taxonomy and multimedia content taxonomy will result from the user-requirement analysis. With the exception of multimedia content taxonomy the taxonomies mentioned above can be considered domain specific taxonomies (e.g., taxonomies related with Commandaria). Indicative domain taxonomy of Commandaria is shown in Figure 6. For the multimedia content taxonomy a modification of the multimedia hierarchy defined in MPEG-7 (ISO-2001a; ISO-2001b) may be adopted (see also Figure 7).

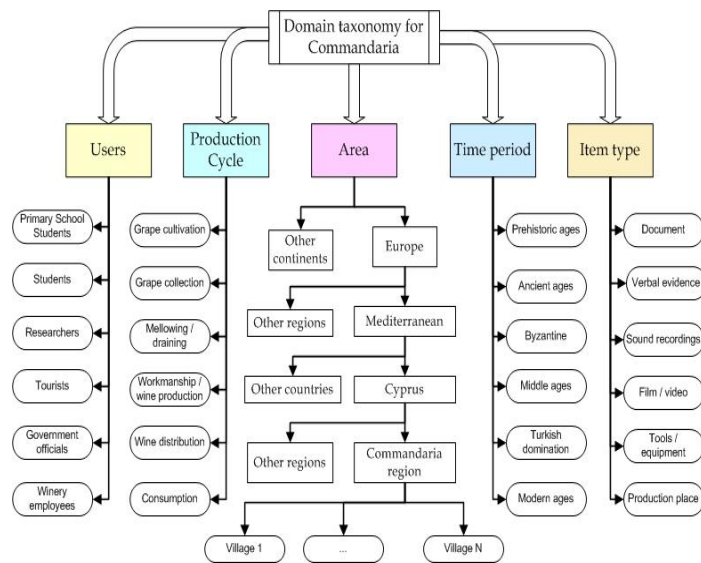


Figure 6. Indicative Commandaria Domain Taxonomy

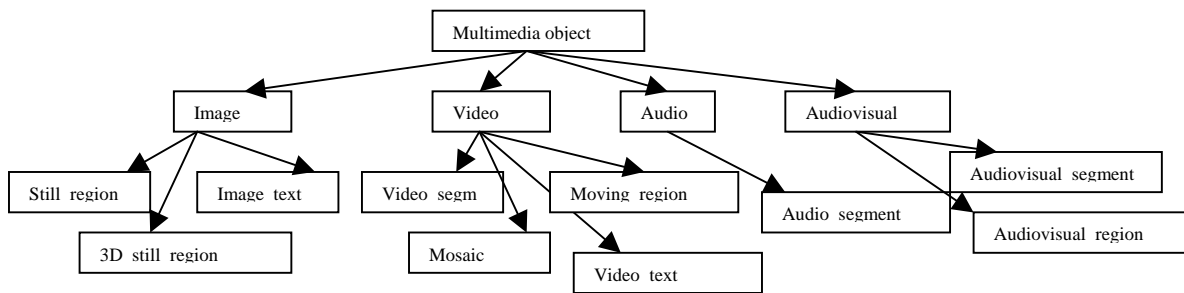


Figure 7. Multimedia Content Taxonomy

## 6. SYSTEM DESIGN AND EVALUATION

### 6.1 Interface

An important aspect of the system design is the interface. The interface will take the form of a GIS system, where the map of Cyprus will be presented. Sites related to Commandaria will be marked on the map, so that users will be able to navigate and view data items associated with a certain location. In order to cover the needs of different users, the need of displaying items from a certain time period, the need for displaying items of different type and different thematic content, the user will have the ability to set his/her preferences so that only data items consistent with the user preferences will be displayed on the map. A screenshot of a typical system interface that we are currently experimenting with is shown in Figure 8.



Figure 8. Example of the GIS-based interface

On the map places containing data items related to the user references are shown with spots. By moving the cursor on a spot the appropriate data is displayed as a thumbnail and if the user decides to explore the highlighted data item he/she clicks on the icon. Clicks on thumbnails activate pop up windows where further information related to the item is displayed. Such information includes text-based descriptions, links to relevant publications, links to sites with relevant information, images, video, recordings and 3D animations.

### 6.2 System Design

The multimedia content of the Commandaria project will be accessed via a specialized designed interactive graphical user interface. through any computer connected to the internet or through dedicated information kiosks, PDA's, or workstations at the Commandaria museum devoted to the research of the history and culture of the wine.

Figure 9 illustrates the architecture of the proposed system whose main blocks are:

- User interface: friendly GUI that allows the user to interactively query the database, browse the results, and view the selected images / video clips.
- Secure Communication and Interaction. Query / Search engine responsible for searching the database according to the parameters provided by the user and securely accessing the data.



- Digitized Content: repository of digitized, compressed images, video clips and documents
- Visual summaries: representation of image and video contents in a concise way, such as thumbnails for images or keyframes for video sequences.
- Indexes: pointers to images or video segments.

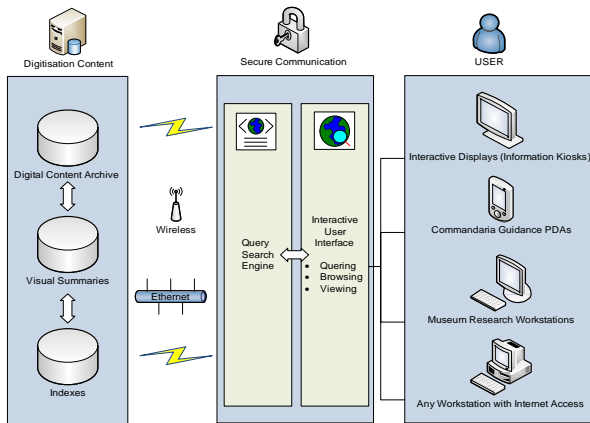


Figure 9. System Architecture

Textual information (metadata) is added to the audiovisual files during the cataloguing stage, with the aid of the ontology, and is used to guide conventional, text-based, query and search engines to find the desired data. Digitization, compression, and cataloguing typically happen off-line. Once these three steps have been performed, the database will contain the image and video files themselves, possible simplified representations of each file or segment, and a collection of indexes that act as pointers to the corresponding images or video segments. The online interaction between a user and the system is represented in the diagram in Figure 8. Users express their query using a GUI. That query is parsed through the ontology's reasoning service and a search engine looks for the link to multimedia repository that corresponds to the desired image or video. The results are sent back to the user via a secure communication link and in a way that allows easy browsing, viewing, and possible refinement of the query based on the partial results.

### 6.3 System Evaluation

System evaluation will be performed in three different perspectives: (a) data validity, (b) design, and (c) semantic retrieval performance. Data validity refers to importance evaluation of the collected and digitized items as well as to the integrity and accuracy of metadata. It will be performed by experts in the fields Cyprus history, sociology and wine production. Design evaluation will be performed in terms of usability tests. Usage scenarios will be defined for every user category and users will be asked to implement these scenarios in a scenario walkthrough approach (Rosson, 2001). Particular interest in this evaluation will be given to the educational nature of the system. For this purpose primary school teachers and other educators will be participate in the evaluation. Finally, semantic-based retrieval evaluation will be performed in terms of precision and recall through a relevance feedback (MacArthur, 2002). In particular, users will be asked to perform a number of semantic-based queries and then select the relevant (to their intention) retrieved results.

## 7. CONCLUSIONS

The history of Commandaria is heavily linked with the Cypriot history and cultural heritage. With our work we aim to design and implement an interactive multimedia system that aims to preserve and disseminate information related to Commandaria. Since this is the first comprehensive approach to generate and make available a digital information dissemination tool for Commandaria, our effort will constitute a major contribution towards national and international efforts of preserving cultural heritage.

So far our work was concentrated on the definition of the methodologies and techniques that we plan to utilize as part of the project. We also completed the draft design of the system including the interface, database schema and mode of operation. In the near future we plan to start the development phase where all tasks defined will be completed. In particular the data collection and evaluation phase will be completed followed by the data digitization, pre-processing and annotation stage. All data will be organized in a suitable multimedia repository based on the schema presented in section 5.2 so that efficient data retrieval is enabled.

An important aspect of the proposed framework will be the provision of tools that will allow users to add new data items to the database. As a result the proposed system will be turned into an ever expanding and up-to-date data depository that will constitute a major source of information for Cyprus wine and most importantly it will contribute towards the conversation of Cypriot cultural heritage.

## REFERENCES

- Cobham CD. 1969. Excerpta Cyprica, Publications "The Library", Nicosia.
- ISO/IEC 15938-5. (2001, March). FCD information technology—Multimedia content description interface—Part 5: Multimedia description schemes..
- ISO/IEC 15938-3. (2001, March). FCD information technology—Multimedia content description interface—Part 3: Visual.
- S. D. MacArthur, C. E. Brodley, A. C. Kak, and L. S. Broderick, 2002. "Interactive content-based image retrieval using relevance feedback", *Computer Vision & Image Understanding*. vol. 88(2).
- Mariti G 1984, Wines of Cyprus, Published by NICOLAS Books, Athens.
- Papadopoulos K.D. 2004, Commandaria, the legendary wine of Cyprus, Kyproepeia Press.
- Papadopoulos K.D. 2008, History of Commandaria, Publisher: Arktinos Ltd, Nicosia.
- M. B. Rosson, JM Carroll. 2001. Usability engineering: scenario-based development of human-computer interaction, Morgan Kaufmann Series In Interactive Technologies.
- S. Staab, R. Studer, 2004. "Handbook on Ontologies", *International Handbooks on Information Systems*, Springer-Verlag, Heidelberg.
- Limassol Municipality Publication, 2006, Limassol Wine Festival.
- Vines Products Commission,1993, Vines and Wines of Cyprus