

A distributed structure for the automization of the catalog of the national cultural heritage: experiences and proposals.

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Abstract

Efforts to automate the handling of information concerning the Catalog of the Italian cultural and artistic heritage have been made in the past by the Institute for the Catalog and Documentation (ICCD) of the Ministry of Cultural and Environmental Heritage.

A feasibility study for the realization of a data base of the national cultural heritage has been conducted by CNUCE, the scientific computing center of the Italian National Research Council and ICCD. This study led to the determination of the characteristics of data contained on the record cards, to the location of some samples areas, sufficiently representative of the Italian situation, for the setting up of a model of information system and to the implementation of a data bank on CNUCE computers using the IBM STAIRS information retrieval system.

Following this study, a project is presently conducted by the two institutions, with the aim of setting up a distributed structure for the preparation, acquisition, access to and dissemination of the information concerning the Italian cultural and artistic heritage.

This paper describes the functions of this proposed structure, with reference to the results of the first experiences and implementations.

1) Introduction to the project

For some time now, there is a general awareness of the necessity for a census and cataloguing of the Italian cultural and artistic heritage - in the widest sense of these terms - with the aim of obtaining a precise knowledge and exhaustive documentation of all the components - historic, artistic and environmental - which in the past contributed to the determination of the present status of the nation's cultural heritage.

This work is considered a preliminary pass towards any initiative in this sector: conservation, valorization, fruition and promotion of the works of art, regional programming, etc.

The process of cataloguing of the Italian historic-artistic, archeologic and environmental heritage is the responsibility of the Institute for the Catalog and Documentation (ICCD) of the Ministry of Cultural and Environmental Heritage; in the past the ICCD defined the methodology for the realization of a catalog of the national heritage and promoted and coordinated the cataloguing activity carried out by the various peripheral offices of the Ministry (Superintendencies). The ICCD, as one of its various enterprises now conducts an activity in the field of documentation, managing this catalog of the national artistic heritage.

With the introduction of recent Statutes, the central and peripheral offices of the Ministry are being supported in this work of cataloguing and documentation by regional and local administrations; the latter should be viewed in light of a new relationship between the "administration of the culture" and the community, to satisfy the needs of the public to participate and to benefit from their own cultural patrimony. The primary objectives of this coordinated action of the central, regional and local offices are, on one side the

salvage, conservation and fruition, for social ends, of the national cultural-environmental patrimony and, on the other side the diffusion of the knowledge of this heritage for scientific and social ends.

These objectives can be reached through the work of the museums - acting as public centers for cultural services -, the regional centers for documentation - now establishing offices for the collection of any documentary material concerning the cultural heritage of specific geographic areas -, and the ICCD - the central organization responsible for the collection of all the information on the national heritage, and the realization and managing of the catalogue. This information, which includes fundamental identifying data, (identity number, object name, collection name, acquisition, etc.) and detailed scientific documentation on the objects of art (historical-critical descriptions, photographs, bibliographic documentation, etc.), are contained on record cards; nevertheless the majority of these data is subject to change and modification depending on the life of the object itself (conservation, restoration, research, etc.).

2) The feasibility study

The large amount of scientific material already produced, or to be produced, creates difficulties and inadequacies in the manual handling of the record cards for information retrieval. This problem led to the consideration of the possibility of applying the facilities offered by EDP systems for the automization of the catalog of the cultural heritage.

CNUCE, the scientific computing center of the Italian National Research Council, and ICCD have conducted a feasibility study for the realization of a data base of the national cultural-artistic heritage.

This study, integrated by the setting up of a number of regional centers for documentation, the first of a decentralized structure which, on its completion will be distributed throughout Italy, is articulated in three different phases:

- a) definition of the user community and evaluation of its needs; designing of procedures for the organization, acquisition, handling and dissemination of information;
- b) acquisition of data from some samples of cards of different types, suitably selected from the existing record cards, to create a sufficiently meaningful data base;
- c) study and implementation of a model of an information system for the artistic heritage of two given geographical areas which, for their specific historic connotations, identify two "cultural areas" assumed as actual samples of the context situation of the artistic heritage. These areas are the region of Vigevano (near Milan) and the necropolis of Andriolo in Paestum (near Naples).

The experimental phase already conducted has given a confirmation of the validity of the basic criteria adopted for the acquisition and systematic organisation of the data. Other indications are expected on the quantity and types of data to be collected in response to the different requirements of the various social-cultural entities and on the distributed structure which must manage the preparation, acquisition, access and dissemination of the information concerning the cultural heritage; this will follow the completion of the model of information system and the setting up of the first regional centers of documentation.

3) The experimental phase

Preliminarily, it must be remembered that the documentation on the nation's artistic heritage comprizes different types of descriptive items: record cards, monographs, photographs, etc. The record cards comprize sets of data established on the basis of widely tested criteria and standards proposed by the ICCD. At present, the amount of record cards, already prepared by the Italian superintendencies, is approximately 1 million; it represents about 10% of the estimated complete set of cards for the national heritage. The quantity of information contained, on average, on each record card can be estimated as about 2.000 characters per card, while the essential identifying data is, on average, about 300 characters per card.

In order to verify the results of the previous experimental tests in the actual user environment, a model of an information system has been studied taking in consideration a few sample areas, sufficiently representative of the Italian situation.

The region of Vigevano, which is a medium sized city grown up around an ancient center, represents an almost perfect example of the particular situations found in most of Italy, due to its historic origin, the multiplicity of its different architectural and artistic expressions, and the relative problems of security and valorization.

For this reason, the processing of the artistic information concerning this particular area can give indications which can be easily extended to the situation of the whole country.

The archeologic complex of Andriolo (Paestum) comprizes about 150 tombs, revealed in seven years of excavation, which are very rich with many different archeological findings. The processing of the information relative to all the 150 tombs of the necropolis is extremely interesting, since this will permit the verification of the different relationship between the single tombs and the archeologic complex of Andriolo, and their connection to the presumed chronology of this area.

The record cards relative to objects of art, drawings, archeological findings and monuments have been considered; only the essential identifying data have been inserted in the data base with appropriate linkage to an archive of aperture-cards containing microfilmed copied of the original record cards. In this phase, STAIRS, the IBM general purpose information retrieval system is being used for information management.

Data acquisition has been carried out through two different technologies: Optical Character Recognition systems (OCR) for data entry, and intelligent key-to-disk systems for data entry, verification and correction.

4) The operating structure

The proposed distributed structure for the preparation and acquisition of data and the handling and dissemination of information is composed by:

- a) a central nucleus, with the ICCD providing the necessary know-how in the fields of the history of art, archeology, architecture, etc., and CNUCE providing:
EDP systems, an OCR unit, software facilities for information handling and, also, technical consultancy in the field of applied informatics.

CNUCE's central computing structure consists of two IBM systems, a 370/158 and a 370/168 interconnected by a high speed line, supporting a distributed structure of intelligent, batch and conversational terminals, connected to the central units by a data transmission network.

A data base of the essential information concerning the nation's artistic heritage is being created and continuously updated on CNUCE's systems.

At ICCD all the record cards are microfilmed, and an aperture card archive is being created. Appropriate reference to this microfilm archive is made by the information system. ICCD

is also equipped with terminals connected to CNUCE's systems for data validation and information retrieval.

- b) 20 regional centers for documentation, having the purpose of collecting, ordering and distributing the information concerning the artistic heritage of each specific geographical area, produced by the pertinent peripheral offices (Superintendencies).

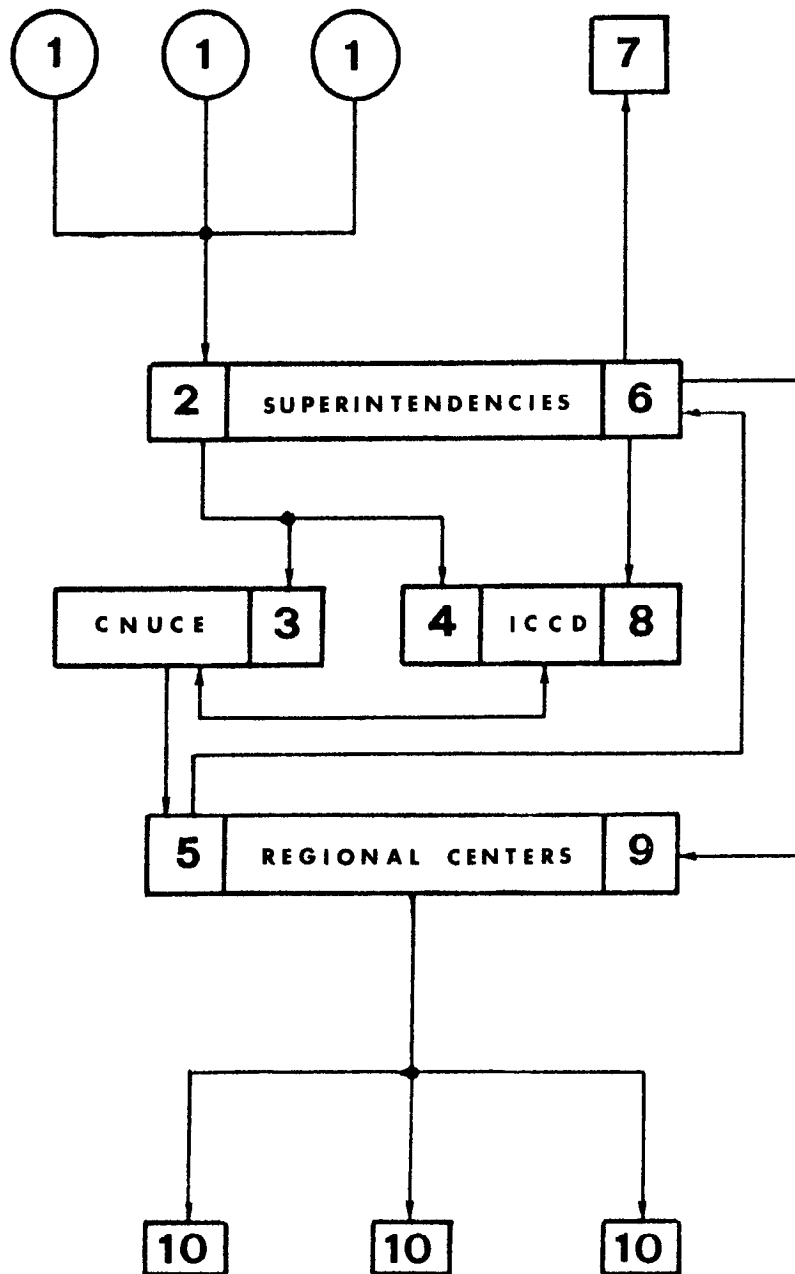
The regional centers are equipped with intelligent terminals capable of working off-line - for data entry, verification and editing - and on-line, connected to the CNUCE's computers, in batch and interactive modes - for information retrieval, record card printing and research purposes.

- c) 100 peripheral offices for the catalog (Superintendences), having the purpose of programming and managing the work of classification of the artistic objects and preparation of the relative record cards; subsequently they transmit the cards to the appropriate offices. The record cards are compiled, using preprinted modules, by electric typewriters with OCR-B type golf ball.

From the functional aspect, the structure, shown in fig. 1 must operate in the following way: the peripheral offices are responsible for the cataloguing of the cultural wealth and the Catalog cards are compiled on double-copy modules suitable for optical reading (1,2). The data must be formulated according to precise, recently revised, rules most of which are already available and will be distributed by the ICCD.

A copy of the OCR modules will be sent to CNUCE which will be responsible for the data entry using optical reading systems (3) and will then send the modules to the competent regional centers so that they, in their turn, can verify and correct the information input against the original catalog record cards using a terminal.

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The second copy of the modules, together with the relative photographic material, is sent to the ICCD where the competence of the information is controlled and any eventual modifications are made to the stored data (4).

Successively, the regional centers of documentation, using intelligent terminals, transcribe the data on four copies of the standard Catalog cards (5) and these are then sent to the Superintendency which was the source of the original data.

The Superintendency supplies the cards with their relative photographic material (6) and, then, one is archived and the others are sent respectively to:

- a) the site where the object is located (7);
- b) the ICCD for the general archive of the Catalog (8);
- c) the regional center of documentation which keeps the regional archive and processes the documents (camera cards, microfilm, etc.) (9);

When these operations are completed, the data will be effectively made available to the entire scientific and administrative user community (10).

5) The regional centers for documentation

The regional centers for documentation are new peripheral offices of the State and Regional administration for the cultural wealth, to be established with the purpose of collecting and distributing any documentary material concerning the cultural heritage of specific geographical areas. There will be about twenty regional centers at the completion of the proposed structure.

During the first experimental phase conducted, an office with the characteristics of a regional center has been established in Rome, at the site of the ICCD. The office has been equipped with an intelligent terminal, ULISSE 7601, a system specifically designed to meet the various needs of the average user of a non-commercial computing center operating in a time-sharing environment and, particularly, the needs for non-numeric processing.

Among these requirements are:

- local data handling capabilities (data preparation, text editing)
- local capabilities for storing of data
- local information retrieval (file management)
- local printing
- data communication capabilities, both in interactive (2741, TTY like) and batch (3780, 2780 like) mode of operation.

The system architecture is based on the following components:

- a microprocessor
- a ROM for the system's programs
- a RAM for the application packages
- a Data Bus which interfaces various peripheral devices as: serial printer, dual floppy-disk storage, alphanumeric video display unit and keyboard, line adapter for low speed start-stop communication and high speed binary synchronous communication.

With the use of the intelligent system the following operations are performed at the ICCD site.

a) local processing:

- data entry for some categories of cards
- data verification and correction for all the data acquired
- printing of the essential information on the aperture cards
- a preliminary information retrieval through the file management facilities

b) remote processing in connection to CNUCE's systems:

- printing of four copies of the record cards on the models fixed by ICCD
- information retrieval using the IBM STAIRS information handling system

Another function performed at ICCD which, in the proposed structure will be performed at the regional centers, is the production of microform archives containing a record of all

descriptive and iconographic material relative to each catalog card. These files of microfilmed cards and pictures will be appropriately linked to the data base of essential information existing on the computer, to form a mixed system for information management. This will allow the users to obtain by the computer, in interactive way, a preliminary set of information and a list of references to the microfilm archive which can be used in its turn to obtain complete, detailed information for specific items.

In conclusion, the role of intelligent terminals specifically devoted to the processing of non-numeric data and texts, is of great importance for the research and service activity in the field of the humanities. Their use in a distributed structure like the one described in this paper will provide great improvements in data entry, data preparation, record card printing as well in information retrieval and handling and will reduce the load on the central system.

Acnolegments

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