The PORTINARI Project: Science and Art team up together to help cultural projects

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The PORTINARI Project : Science and Art team up together to help cultural projects

R.S.G. Lanzelotte, M.P. Marques*, M.C.S.G. Penna†, J.C.Portinari†, F.D. Ruiz†, D. Schwabe**

†Portinari Project – PUC Rio

* Departamento de Informática – PUC Rio

22453-900 – Rio de Janeiro – Brazil

ABSTRACT

Candido Portinari (1903–1962) is the most famous Brazilian painter, whose production of more than 4,500 works is spread all over the world. We are currently undertaking the design and production of the Catalogue *Raisonné* of his complete work. We developed a multimedia database, containing all the information needed for the catalogue. To load the pictures into the database, slides of the painter's works are digitized, using high-end scanners. Some problems arise, then, from the necessity of reliable methods for color control, correction and compression. We have used extensively computer-based techniques to support the development of the Catalogue, the Hypermedia Database and other scientific problems entailed by our research. This work summarizes the effort involved in such tasks, pointing out the technical problems and the solutions found.

1 . Introduction

The painter Candido Portinari lived in a period of time which is very significant in the development of modern Brazilian culture. His work and his interaction with other artists, poets, writers, architects, journalists, educators and politicians reflect the essence of the æsthetical, artistic, cultural, social and political concerns of 20th-century Brazil.

The broader goal of the Portinari Project is, in addition to documenting all the painter's artistic production, to provide a view of Brazilian culture during his lifetime. Capturing all the information related to his work and making it available to new generations is a challenge. Moreover, as many of the works are geographically dispersed, spanning virtually the five continents, this task involves a considerable research effort.

One of the first phases of the Portinari Project was to locate and document the works and documentary material. In a second phase, this information has been catalogued. A third phase, currently initiating, will make the material that has been gathered and documented as widely available as possible. As a first step in this latter direction, the Portinari Project is presently undertaking the design and production of the Catalogue *Raisonné* of the painter's work. It is the first publication of this kind in Latin America.

It has become evident that any effort to make the documented material available publicly, it will be necessary to have computer-based support. Thus, in order to support the Catalogue *Raisonné*, a database has been designed, whose model and implementation guidelines are presented. A second effort is also underway to extend the material in the database to provide a hypermedia application to access the collected material; this application will later be used in the scope of a planned multimedia museum.

Besides these information systems, we face several challenging research problems in the Project. Studying methods for truthful color reproduction is one example, especially critical in our case as the great

majority of the works are only available to the Project through slides, subject to deterioration over time.

Another example of research needs concerns authenticity recognition. Traditionally, this is solved through expertise, but we have been exploring interesting scientific approaches to the problem, based on different forms of pattern recognition.

This work describes the present achievements and planned goals of the Portinari Project. Section 2 briefly reports the Project's history and the process of collecting and cataloguing information, as a starting point for the Catalogue *Raisonné*. Section 3 deals with the database and hypermedia models conceived for supporting both the Catalogue *Raisonné* and the hypermedia museum. In Section 4, we discuss some interesting research problems raised by the Project and Section 5 draws some conclusions.

2. Brief History of the Portinari Project

The Portinari Project was started in 1979, at the Pontifical Catholic University (PUC) of Rio de Janeiro. It is engaged in research and other activities related to the work, life and times of the Brazilian painter Candido Portinari.

Since 1979, the Project has been able to locate, document and catalog about 4,500 works and 25,000 documents. The works, which include paintings, drawings and prints, have been photographed in color and black and white. Among the documents there are 6,000 letters exchanged with the major writers, poets, musicians, architects, artists, journalists, educators and politicians of Portinari's generation. An Oral History Program interviewed 65 of the painter's contemporaries, totaling 130 hours of recordings. More than 12,000 clippings from publications, from 1920 to the present, 300 exhibition catalogues, 1,200 epoch photographs, films and videos, and various *memorabilia* now make up the Portinari Project's archives. This material is a true synthesis of all aspects of Brazilian life during that period. Images, texts and sounds, highly correlated, form a large multimedia database of the main aesthetic, artistic, cultural, social and political concerns of one of the most creative and important periods in the history of Brazil.

The Project has been supported, over time, by several government agencies, such as FINEP (Financiadora de Estudos e Projetos – Financing Agency for Studies and Projects) and CNPq (Conselho Nacional para o Desenvolvimento Científico-Tecnológico – National Council for Scientific and Technological Development)— both of the Science and Technology Secretariat — the Ministry of Foreign Relations, and the Fundação Banco do Brasil (Bank of Brazil Foundation), as well as by such private companies as Kodak, IBM, VARIG Airlines, the Fundação Roberto Marinho (Roberto Marinho Foundation), Rede Globo (a major Brazilian television network), among others.

2.1. The Three Phases of the Project

Before the Portinari Project started it was nearly impossible, in Brazil, to have access to information about the painter in a centralized and systematic way. Indeed, the New York Museum of Modern Art had more information on Candido Portinari than all the Brazilian institutions we had visited.

To produce a systematic, detailed and comprehensive listing of the complete works of a visual artist, together with the establishment of his biography and of the profile of his generation is an undertaking that necessitated the development of a specific methodology, which evolved during the actual execution of the work. It was also necessary to train the required human resources, which at the time were quite scarce.

This methodology, which has now been established, makes the Portinari Project a *pilot project*, an example that can be followed by similar endeavors, even outside the sphere of the visual arts – it is applicable to poets, writers, architects, musicians, scientists, educators, journalists, or politicians whose lives might provide a cross section of their times.

In order to arrive at this model, the Portinari Project went through three phases, each with its own clearly differentiated characteristics: locating and documeting, researching and cataloguing, and dissemination.

The first task was to *locate* and *document* the works and the documentary material. This included a visiting program in order to list and photograph "in loco", in color and black and white, works and documents scattered throughout Brazil and in more than 20 countries in the Americas, Europe, and the Middle East. In addition, a group of personalities were interviewed in the Oral History Program.

The second phase involved *research* and *cataloguing*, indexing, establishing various controlled vocabularies and a thesaurus of the material collected, cross-referencing all the data and complementing, through a survey of all the documentary material, the information gathered in the visits. Various lines of research were developed in this phase: the study of the *authenticity* of the works attributed to the painter; the establishment of the *chronology* of his complete output; the survey of all the technical, bibliographical and historical references concerning each of the nearly 4,500 works surveyed; and others.

The third phase is concerned with the *dissemination* of the information. As such, several complementary instruments are being considered, the foremost being the Catalogue *Raisonné* and its supporting database.

In addition to the Project's *thematic* comprehensiveness, there is also its *methodological* comprehensiveness. As a pilot project, it led to a new methodology, ranging from museology and documentation to high technology areas, particularly in computer science. Examples of such areas are non-conventional databases, hypertext, multimedia, image processing and techniques in artificial intelligence, neural networks, pattern recognition and automatic object classification, among others.

This interdisciplinary approach has already yielded concrete results, not only in opening a dialogue between researchers in the various areas involved, particularly in computer science, but also in raising interesting technical-scientific problems in image processing, especially regarding color pictures with high resolution and chromatic fidelity, non-conventional databases, multimedia and hypertext.

All of these activities have naturally led to the development of a close relationship between the Portinari Project and several scientific and technological researchers, not only in PUC but also in other institutions, in Brazil and abroad.

Among the activities that the Portinari Project is conducting at present, two are mutually complementary and are given top priority: preparation of the Catalogue *Raisonné* and its supporting database.

2.2. The Catalogue *Raisonné*

Of all kinds of monographs and studies, the Catalogue *Raisonné* is the most definitive and complete source of references for an artist's work. It is, in the words of the art historian Francis O'Connor, "*... primarily an inventory of existing holdings, and illustrated listing designed to serve as the basis for further critical and scholarly exploration*".

Candido Portinari – The Complete Works will probably be the first publication of its kind in all of Latin America with such characteristics of comprehensiveness and detail. The catalogue, to be published in eight 250-page volumes on a bilingual version, will contain an average of three reproductions per page. Portinari's almost 4,500 works will be presented one by one, each with its technical, historical and bibliographical descriptions. A typical page of the Catalogue *Raisonné* can be seen in the Appendix II.

Clearly, in this sort of specialized reference work, it is of crucial importance to ensure the reliability of the information contained in each entry: technical, historical and bibliographical data, as well as the reproduction — as faithful as possible — of the work in question. For this purpose, we intend to develop, as part of the database described in the following paragraph, application programs to ensure the automatic feeding of entries in the *mise-en-page* of each of the catalogue's 2,000 pages.

The design is being implemented electronically, so that each of the 4,500 works must be digitized and color-corrected according to the standard scales of colors and grays recorded together with each work. This digitization will also be useful for the preservation of the visual record.

We also intend to publish the work electronically, a CD-ROM which will contain the same material, with nearly instantaneous information retrieval, as well as make it available through networks

3. The Portinari Project Database and Hypermedia Models

The Portinari Project is divided into two sub-projects. The first refers to the information related to the artist's works. It may be seen as the essence of the Catalogue *Raisonné*. The other, which is much more vast, deals with the information related to the personal life of the artist and his contemporaries, and is a true initiative in the sense of preserving one of the richest periods of the Brazilian cultural life. It should be noted that we are, for the moment, concentrating efforts in the first sub-project only.

All this information is meant to be organized in a database and to be made accessible through hypermedia interfaces. In this section, we show an overview of the models developed to support both the database and the hypermedia applications for the project.

3.1. The Database Model

To develop the conceptual database model, we adopted the inside-outside strategy (cf. Ceri, Batini and Navathe, 1992), where the main ("inside") concepts are established at a first moment (*works*, *medium*, *theme*, for instance) and, moving towards the "outside", we gradually concentrate on new concepts (friends of the painter, Brazilian cultural events in a specific period of time and so on).

The starting point for the full understanding and further modeling of the artist's work was the Work Description Card (FCO, Ficha de Catalogação de Obra, in Portuguese). All works have been previously identified and described through the FCO's and this is the starting point to design the conceptual DB model. Each FCO is associated to one and only one work of the artist and contains all the relevant data about that specific work.

We chose an extension of the Entity-Relationship Model (ER) (Chen 1976) to design the conceptual DB model. The ER diagram is shown in figure 1.

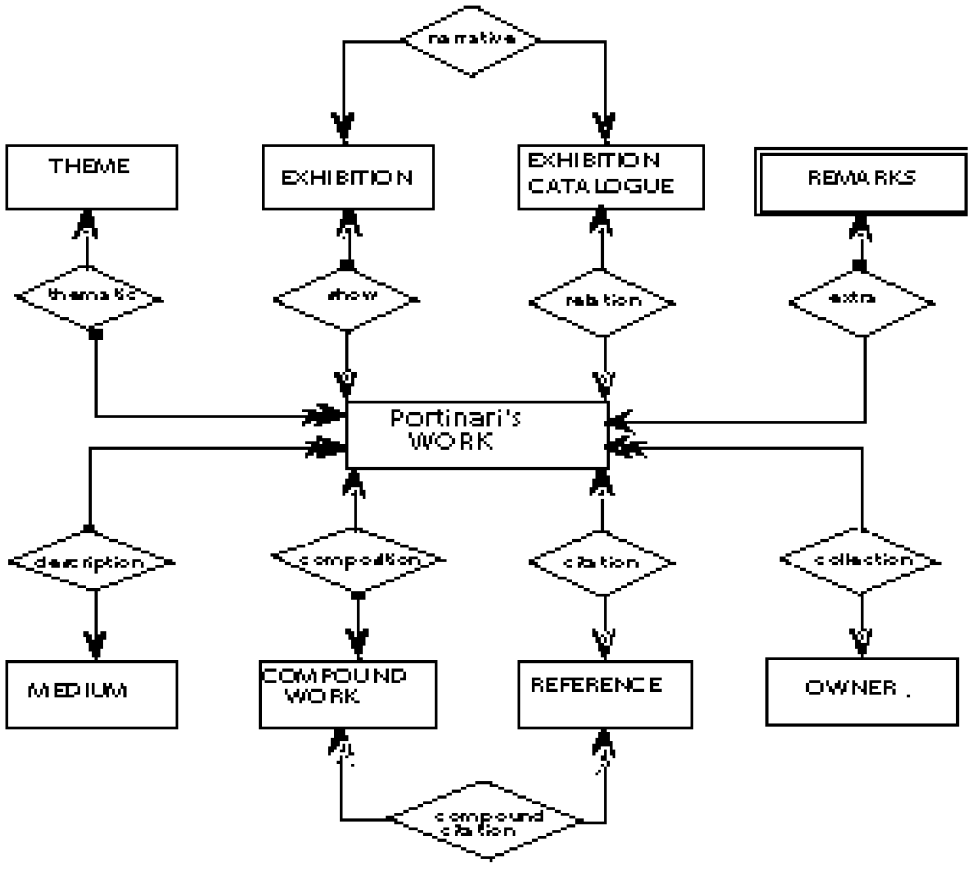


FIGURE 1 - The Portinari Project ER Diagram

This ER model was then translated into the relational model, since this model is widely ac-

cepted and available in different hardware and software platforms. The latter is an important point as we wish to evaluate, in the future, the database accessibility through computer networks by users using different platforms. We have chosen an ORACLE platform, based on the standard SQL language. The actual implementation is based on the DBMS ORACLE Server for Macintosh.

A last consideration about the database model refers to its bilingual version (Portuguese & English). Since we intend to make all information available to every researcher and, being sure that Portinari's works are spread all over the world, it is mandatory to have data in an idiom more "universal" than Portuguese. This, in fact, poses an interesting problem whose solution we have not yet agreed on, since the mere duplication of the text attributes affects negatively the performance, due to the considerable increase in the size of tuples. The creation of distinct databases, each of them containing one idiom, implies in redundancy of all non-translatable attributes that can originate database inconsistencies. Our current thinking is that the more interesting alternative is the creation of synonym tables containing only the primary key and the translatable attributes in the original table.

3.2. The Hypermedia Model for the Portinari Project

The Portinari Project provides an ideal background for hypermedia applications. It deals with multimedia information, such as photographs of the works, related documents and recorded interviews. On the other hand, it also provides an interesting context for database applications, because of the great amount of data treated in its scope.

Two approaches are possible to integrate hypermedia and database applications. The first one, adopted in previous works (Zdonik and Smith, 1987), focuses mainly on the hypermedia component and considers the database only as a support for it. Another viewpoint, adopted in Portinari Project, is to start from an existing relational database application and to develop hypermedia front-ends to it. In this case, the database is accessed independently of the hypermedia interfaces, the data stored in the database being retrieved either through the usual DBMS interfaces or through the hypermedia ones.

Integrating the two paradigms and preserving the autonomy of the DBMS applications poses some problems. Consistency must be enforced: changes in the database must be automatically perceived in both environments. Another difficulty is due to the fact that hypermedia systems work on graph structures, composed of nodes and links, in opposition to relational databases, that deals with tuples and relations. Our approach was to start from an existing relational DB model and from a conceptual model of the hypermedia application (Marques 1993b).

Hypermedia Browsing and Authoring

Hypermedia applications involve the managing of data under the form of graphs, composed of *nodes* and *links* between them. Two different needs arise in these systems. The first one refers to the navigation and information retrieval, also known as *browsing*. Browsing allows the navigation through paths previously established in a step called *authoring*. The ease of use of an hypermedia application strongly depends on its author ability to capture the semantics of an application and to adequately organize the structure of the hypermedia graphs.

The clear and rational organization of hypermedia applications is thus much more critical as the more complex is the application. The complexity of an application is measured by the amount of data to be managed or by the intrinsical complexity of the data itself.

The authoring or hypermedia applications project is composed by distinct aspects:

• *authoring-in-the-large* refers to the design of the structural and global aspects of the applications;
• *authoring-in-the-small* refers to the development of the contents of the nodes; it is largely dependent on the media to be used; for example, loading a *text* node requires completely different techniques than dealing with a node which is *animated.*

We have used the HDM methodology (Garzotto, Paolini and Schwabe, 1993). An HDM model

consists of a *schema*, composed of the following components:

Entity — a conceptual or concrete object within the application domain; for example, "WORK", "OWNER" and "EXHIBITION" are HDM entities.
Component — a feature of an entity; an entity is described by the set of its components; for example, "Title", "Signature" and "Visual Record" are examples of components of the "WORK" entity.
Perspective — the way of presenting the information of an entity or component; it is related not only to the used media (text, voice, image) but also to the rethoric style (discursive, schematic, formal) or to the language (English & Portuguese); for instance, in the HDM model of the Portinari Project, the entity "WORK" has a "textual" perspective, that contains the catalographic data, and a "photographic" perspective, which shows the photograph.
Unit — the contents of a component with respect to a given perspective.
Link — relationships between the previous concepts. Links may be classified in one of the following groups:

- *Application Links* connect an entity to another entity; they are defined by the author taking into account the semantics of the hypermedia application; for example, between "WORK" and "EXHIBITION", there is an application link shown in, refering to the fact that an instance of WORK was shown in an EXHIBITION.
- *Structural Links* connect an entity to its components, providing the navigation through the structure of the entity.
- *Perspective Links* connect a component to its perspectives, allowing the presentation of a component.

A particular hypermedia application in a given domain is specified by instantiating the schema, i.e., by instantiating its entities and links.

The primitives above give the structural aspects of a hypermedia application. The application behavior must also be specified, i.e., how the application objects are shown to the user, how he can activate a link and which is the feedback he gets when a link is activated. These aspects constitute what is called *browsing semantics*, and is mainly related to the user interface with the hypermedia application.

Links are activated through *buttons* or *anchors*, which are represented by icons or screen areas. When a link is activated, the user moves from the current node to one or more *destination* nodes.The activation of links is perceived by the user through some kind of feedback. For example, the current node may stay visible or not, after a link is activated, and the destination node is presented. Specifying the interface with the user, concerning anchors and feedbacks, is part of the authoring-in-the-small step of the hypermedia application, which is not the initial focus of HDM. A final important point to be made is that a given HDM model may be implemented in several different software and hardware platforms.

We present next part of the hypermedia model for the Portinari Project, depicting its main entities and links. The hypermedia application entity types and link types are shown in Figure 3. In the diagram, the oval elements represent the nodes. The links are denoted by the arcs connecting the nodes and the labels on the arcs denote the semantics of the links. All the links are bi-directional (Portinari's "WORK" *is shown* in "EXHIBITION", as well as "EXHIBITION" *shows* Portinari's WORK, for example), although they are drawn only once.

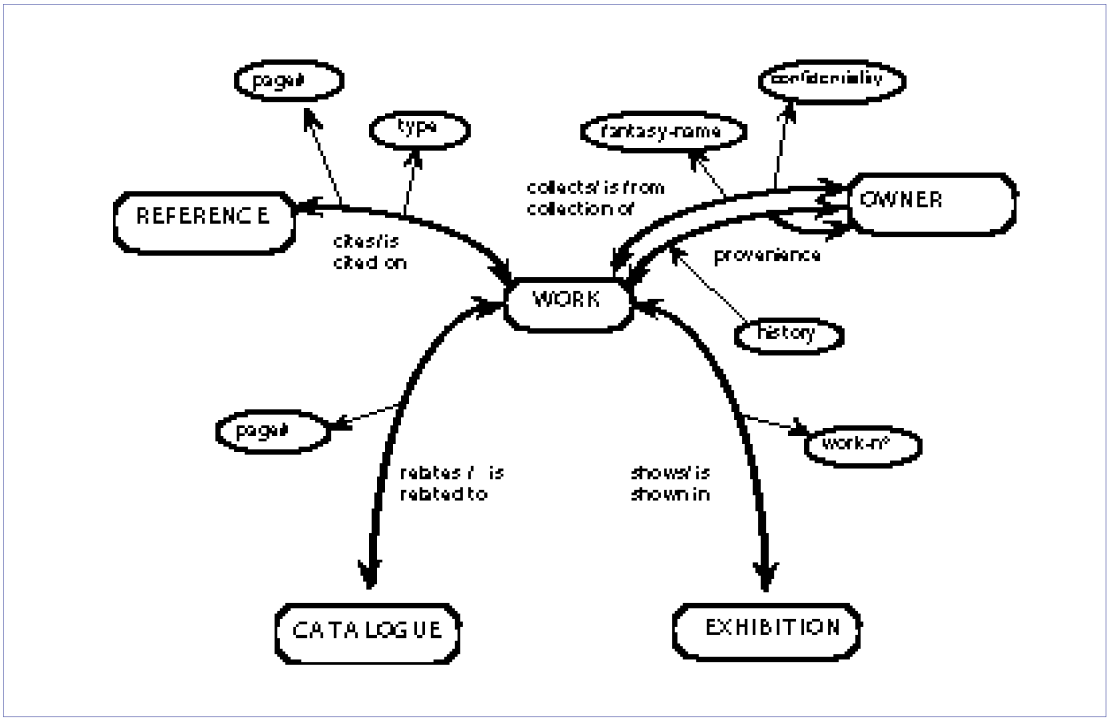


FIGURE 3- Portinari Project's hypermedia application model

After the definition of the schema and further instantiation, it is possible to implement the model using any hypermedia system. When implementing, the authoring-in-the-small aspects of the application are specified, for example the presentation screen for nodes, the buttons, feedback etc. We have already chosen Hypercard System to implement one version of the Portinari Project hypermedia application. An example of an instance of a Work entity, including both its textual and its photographic perspective, is shown in figure 4.

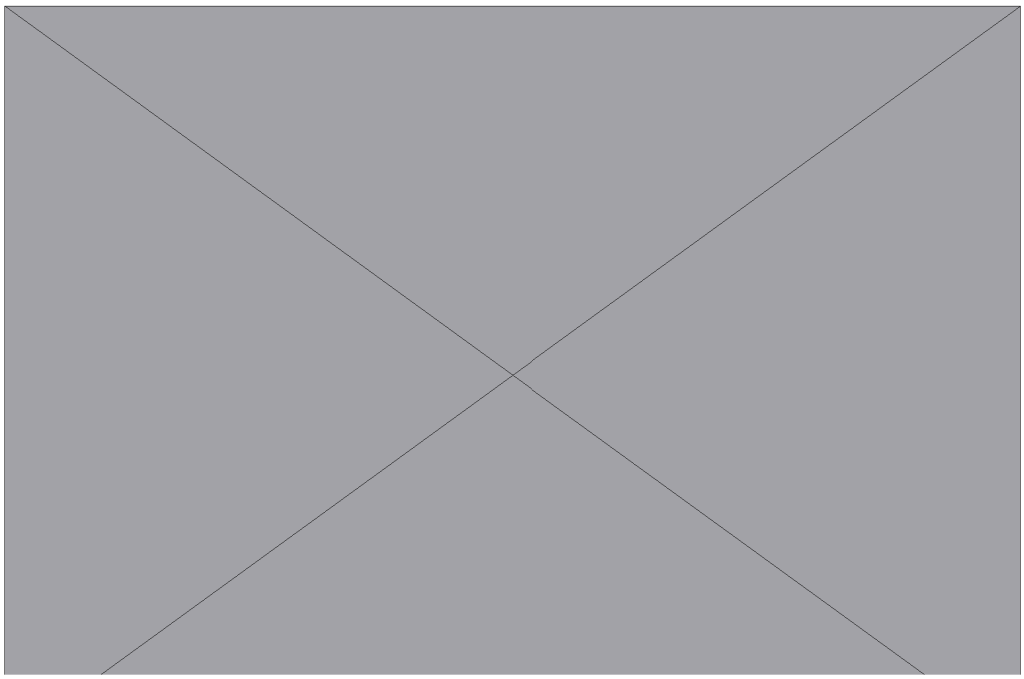


FIGURE 4 - An example of an instance of a WORK Entity including a photographic pespective

4. Future Scientific Research and Development

Besides the database and hypermedia applications, two research projects are under way.

4.1. Digital Preservation of Color Slides

This project stems from the necessity of preserving our 4,500 color slides, the only visual registry of Portinari's complete work. This material was obtained through substantial investment of funds and effort, locating and visiting each of Portinari's 4,500 works, which were scattered throughout Brazil and in more than 20 countries in the three Americas, Europe and the Near East. It would not be viable to reproduce this fourteen-year endeavor. Therefore it is justifiable to look for state-of-art solutions to the problem of preservation.

We are planning to use high-resolution color scanners and image compression techniques for storing the images in some optical media. There are still many problems to be solved, especially in connection with effective color control.

4.2. Digital Analysis of the Authenticity of Paintings

The second project deals with the problem of determining the authenticity of the artist's works. Such questions lie at the heart of our concerns, since we must claim full responsibility for the works included in our Catalogue *Raisonné*, and our staff has already identified more than 400 false attributions among the works we have catalogued.

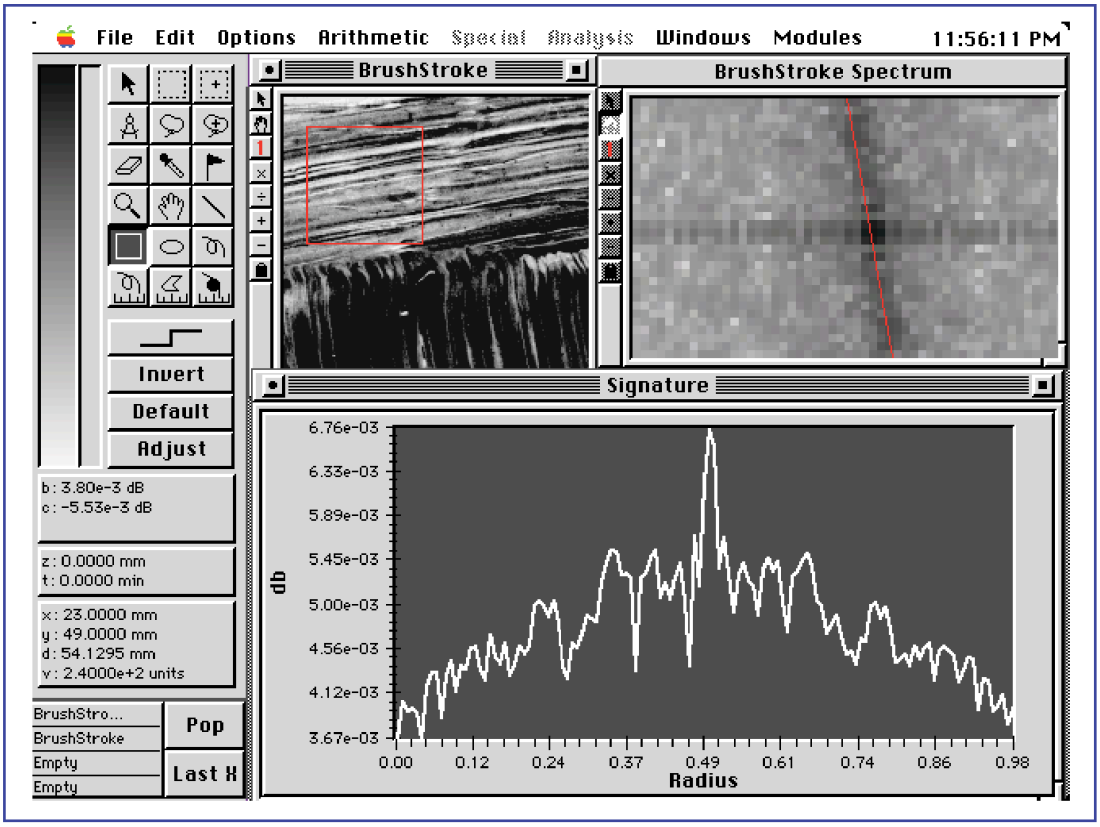
Traditional techniques follow two main directions:

One is pure connoisseurship, the deep and detailed knowledge of a particular artist's oeuvre, obtained through many years of study and scholarship. The other is a full fledged arsenal of physico-chemical techniques to examine and analyze the painting's medium and support.

It is well-known that both of these approaches can fail to identify a forgery, and we have some spectacular examples of this, as in the case of the famous false Vermeers, done by the master forger Van Meegeren in Holland, during the fourties.

Recent developments in the areas of image processing, pattern recognition, and automatic classification might offer new weapons to help this difficult task.

As an example of this, Portinari Project currently investigates the hypothesis that a significant sample of brush-strokes taken from paintings known to be authentic should possess some kind of "fingerprint" of its author, in the sense that no other painter would produce the same sample. At the moment, automatic techniques to classify brush-strokes and other features of paintings are under research, including the possibility of training a neural net to identify *authentic* brush-strokes. Such classification focuses on "profiles" obtained from the brush-strokes through the application of Fourier analysis to extract significant features that involve both the artist's "calligraphy" and the color distribu-



tion in the brush (longitudinal and transversal components). This is illustrated in Fig. 5.

FIGURE 5 - Profile obtained from the Fourier analysis of a brush-stroke.

4.3. The Portinari Hypermedia Museum

In a large sense, hypermedia applications and museums serve the same purpose. Both can be understood as information systems, since they aid people to acquire knowledge or, in a minimal sense, increase the information on some domain. Modern museums can be of many different types; in our case, we envisage a museum in which people will be able to access the information in diverse ways, with a strong emphasis on electronic formats.

The Portinari Museum's *technical arm* will be an imaging and media laboratory, which is currently under development, dedicated to the application of science and technology to art and culture. A first example of the activities of this laboratory is the use of HDM model, combined with traditional database design techniques, to build the applications described above.

5. Conclusions

Throughout this work we investigated how science and art team up together to assist cultural projects. The Portinari Project can be thought of as the research platform because of its great "multimediality", as well the intricacy of the information it has gathered.

The main contribution of this article has been the description of how we have used computer technology to aid in the methodology adopted in all phases of the successful attempt of rescuing Candido Portinari's work. We have shown the data model that was developed to support the Catalogue *Raisonné*; this model can be extended as well to provide the basis for a class of hypermedia applications that will be used as one of the possible accesses to the information surveyed by the Project.

The work done so far by Projeto Portinari is in fact the first step of a larger endeavour: the establishment of the Portinari Hypermedia Museum. This will include the construction of a building

whose project has already been designed by the famous architect Oscar Niemeyer — a contemporary and co-author with Portinari of many important works — to physically house the museum, its laboratory and futher multimedia developments that will be accessible to the general public.

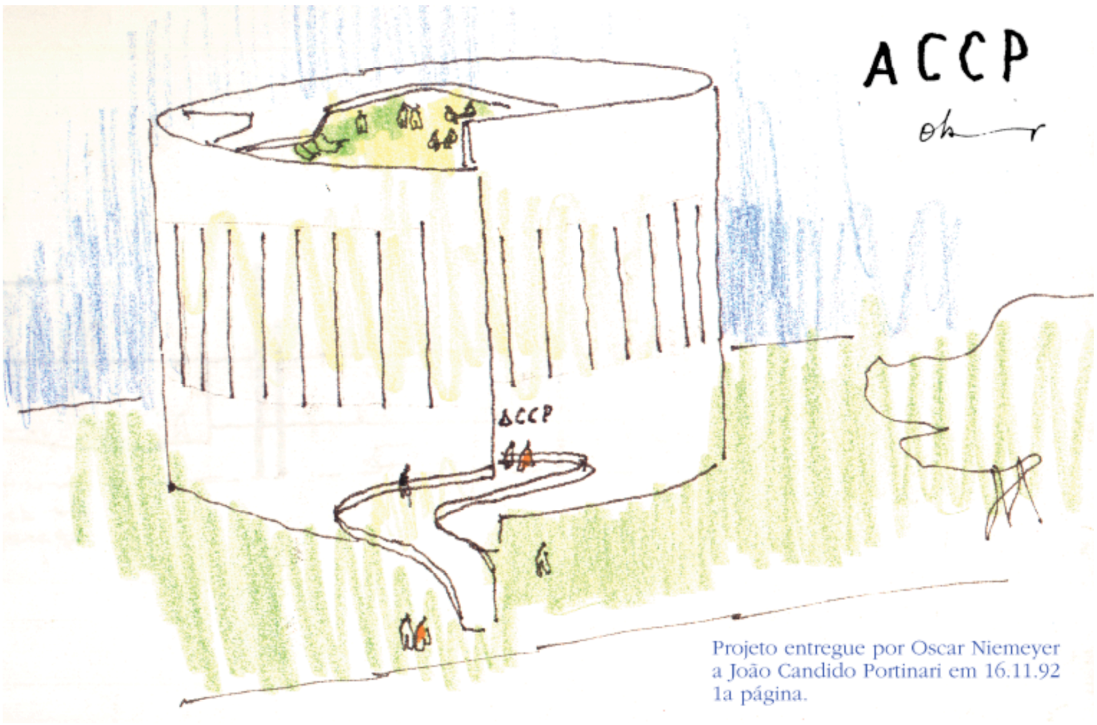


FIGURE 6 - Sketch of the planned Portinari Hypermedia Museum, by Oscar Niemeyer

We hope that this work may also be a methodological example to be adopted for the retrieval and documentation of the work of any artist.

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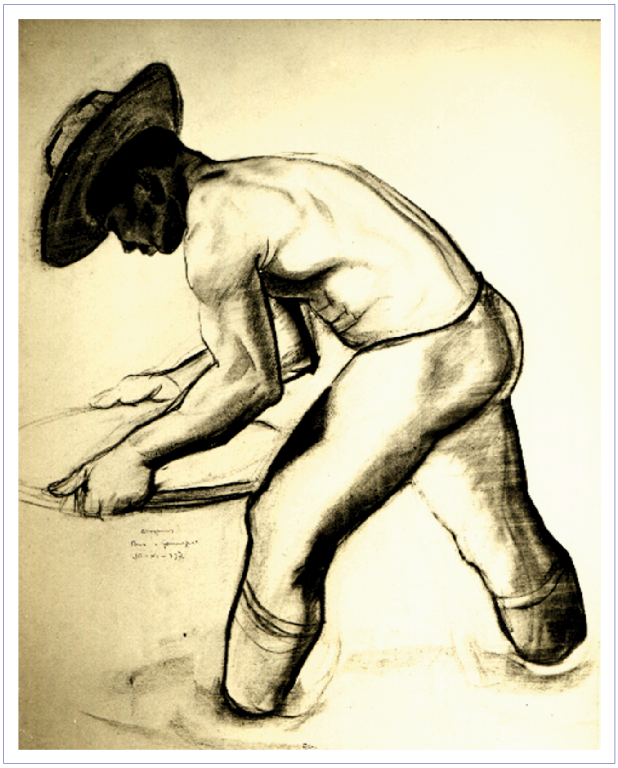
Appendix I - Biographical Notes about Candido Portinari



Candido Portinari was born on December 29, 1903, on a coffee farm near Brodósqui, a town in the state of São Paulo. A child of humble Italian immigrants, he had no more than a primary-school education. After having enrolled in the Escola Nacional de Belas Artes at the age of fifteen, he was awarded the Foreign Trip Prize at the academic Exposição Geral de Belas-Artes in 1928. He went to Paris, where he lived for a year in 1930. Homesick, Portinari decided that when he returned to his country in 1931 he would portray the Brazilian people, gradually weaning himself away from his academic training and blending the ancient craft of painting with an experimental, antiacademic modern personality.

Recognition abroad came for the first time in 1935, when he won the second honorable mention at the Carnegie Institute's International Exhibition, in Pittsburgh, U.S., with a large canvas titled "Café" ("Coffee"), depicting a harvest scene typical of his native region. His taste for mural painting was vigorously manifested in the panels for the Monumento Rodoviário on the Rio de Janeiro—São Paulo highway, in 1936, and in the frescoes for the new Education and Health Ministry building, painted between 1936 and 1944. These works, taken as a whole and in terms of their artistic conception, were decisive for the evolution of Portinari's art, underscoring the option for social themes that was to be the hallmark of all his later work. A friend of poets, writers, newspapermen, and diplomats, Portinari was a member of the Brazilian intellectual élite at a time when a remarkable change was taking place in the country's aesthetic attitudes and culture.

In the late thirties, Portinari's prestige in the U.S. was consolidated. In 1939 he painted three large panels for the Brazilian pavilion at the New York World's Fair. In the same year, New York's Museum of Modern Art bought his canvas "O morro" ("The Slum"). In 1940 he took part in a group show of Latin American art at New York's Riverside Museum, and put on one-man shows at Detroit's Institute of Arts and New York's MOMA that were successful among critics and the public, and sold many of his works. In December 1940 the University of Chicago published the first book on the painter, *Portinari, His Life and Art,* with an introduction by the artist Rockwell Kent and a large number of reproductions of Portinari's works. In 1941 he painted four large murals at the Library of Congress's Hispanic Foundation, in Washington, D.C., on Latin American historical themes.

Back in Brazil, in 1943, he made eight panels known as the "Série Bíblica" ("Biblical Series"), strongly influenced by Picasso's "Guernica", under the impact of World War II. In 1944, invited by the architect Oscar Niemeyer, he began decorative work for the Pampulha architectural complex, in Belo Horizonte, Minas Gerais State, featuring the mural "São Francisco" ("St. Francis") and the "Via Sacra" ("Stations of the Cross") in the Pampulha Church. The rise of Nazism and Fascism and the horrors of the war reinforced the social and tragic aspect of his work, inspiring such works as the "Retirantes" ("Migrants") and "Meninos de Brodósqui" ("Brodósqui Children") series, between 1944 and 1946, as well as spurring him to become politically active — he joined the Brazilian Communist Party, ran for deputy in 1945 and for senator in 1947.

In 1946 Portinari returned to Paris to hold his first exhibition in Europe, at the Galerie Charpentier. The exhibition was highly successful and earned Portinari the Légion d'Honneur. In 1947 he exhibited at Buenos Aires's Salón Peuser and at Montevideo's Comisión Nacional de Bellas Artes, and was greatly honored by Argentinian and Uruguayan artists, intellectuals, and authorities. In the late forties Portinari began to explore historical themes in mural paintings. In 1948, he sought political asylum in Uruguay, where he produced the panel "A Primeira Missa no Brasil" ("The First Mass in Brazil"), and in 1949 he made the great panel "Tiradentes", telling the story of the trial and execution of the Brazilian hero who fought against Portuguese colonial domination. This latter work earned Portinari the 1950 gold medal awarded by the committee of the International Peace Prize, in Warsaw.

In 1952 he painted another panel on a historical theme, "A Chegada da Família Real Portuguesa à Bahia" ("Arrival of the Portuguese Royal Family at Bahia"), and began studies for the panels "Guerra" ("War") and "Paz" ("Peace"), which the Brazilian government offered to the new headquarters of the United Nations. Finished in 1956, the panels — measuring about 14 meters by 10 meters each, the largest ever made by Portinari — are to be seen in the entrance hall of the United Nations Building, in New York.

In 1955 he won the gold medal awarded by New York's International Fine-Arts Council, as best painter of the year. In 1956, invited by the Israeli government, Portinari traveled to Israel, where he exhibited at several museums and made

drawings inspired by his contact with the then recently-founded country, later exhibited in Bologna, Lima, Buenos Aires, and Rio de Janeiro. Also in 1956 he was awarded the National Guggenheim Prize, and in 1957 his watercolor paintings won an honorable mention at Hallmark Card's Fourth International Contest, New York.

In 1958 he was the only Brazilian artist represented in the 50 Ans d'Art Moderne exhibition at the Palais des Beaux Arts in Brussels. In 1958, as a guest of honor, he showed 39 works in a special room at the I Bienal de Artes Plasticas in Mexico City. In 1959 he showed his paintings in New York's Wildenstein gallery.

Candido Portinari died on February 6, 1962, while preparing a great exhibition with about 200 works that had been proposed by the city of Milan, poisoned by toxic agents (specially lead) contained in some of the paints he used in his work.

Appendix II - Sample Page from the Catalogue Raisonné