Available online at www.sciencedirect.com
SCIENCE DIRECT
Journal of Cultural Heritage 7 (2006) 92–97
Journal of Cultural Heritage
http://france.elsevier.com/direct/CULHER/

Original article

The digital opera house: an architecture for multimedia databases

G. Haus, L.A. Ludovico *

Laboratorio di Informatica Musicale (LIM), Dipartimento di Informatica e Comunicazione, Università degli Studi di Milano, 39, via Comelico, 20135 Milan, Italy

Received 5 October 2005; accepted 20 February 2006

Abstract

This paper deals with the problem of preserving, organizing and retrieving information for a typical opera house environment. On the one hand, the live fruition of a music work in a theatre is an experience very difficult to be recreated in a different context or handed down to posterity; but, on the other hand, opera houses are important centers for cultural preservation and diffusion, and their work cannot get lost immediately after performances. The processes in such an environment are very heterogeneous and complex, including not only the economic management and the logistic activities which take place in the offices, but also on-stage artistic production and craft-made activities in workshops. Probably, these latter activities are the most interesting from the point of view of cultural heritage. This paper provides a classification of the heterogeneous data to put in relationship in order to obtain a thorough and effective database. The ultimate purpose is highlighting which information should be captured, structured, and retrieved in order to transform musical performances in cultural heritage for posterity.

Keywords: Music databases; Cultural heritage; Digital knowledge; Information retrieval; Multimedia

1. Introduction

The ever-growing possibilities and needs to organize information in large databases have recently involved theatrical environments [2,3]. In the case of theatres and opera houses, databases could be employed not only to store administrative and operational data, but also to preserve and transmit the artistic activity itself.

As technology evolves and catches on in the most disparate fields, an increasing number of cultural institutions take into consideration the need to control and manage their vast amount of data and digital media assets. Technically speaking, a digital asset is any form of media that has been converted into a binary source. The term "asset" is used to indicate that such files have some sort of intrinsic value that makes it worthwhile to manage them. Thus, the locution "digital asset management" (or simply DAM) refers to the practice and domain of organizing digital files. DAM is a field related to content management, and often is considered as a superset of this subject.

Our paper deals with the design and implementation of an efficient and effective Digital Asset Management for theatrical environments. A well-designed and structured DAM, by preserving and organizing information, allows its users to save time and money. For instance, long times due to researches into traditional archives, retrieving the collocation of physical objects, composing elaborated document layouts[1] are virtually cancelled.

Before analyzing the subject thoroughly, some words should be spent about the enormous importance of opera houses' activity from the point of view of cultural heritage. Music, in its various forms and representations, constitutes a patrimony of mankind. Such heterogeneous world is made not only of chords and rests (scores), but also of sounds and voices (recordings), of images (photo and video captures), of craft-made objects (costumes, accessories, backdrops and stage tools), of men's work (hairstyle and make-up).

A well-structured database for an opera house is intrinsically different from databases appointed to other purposes. Materials of interest for opera houses include both data and meta-

* Corresponding author.
E-mail addresses: haus@dico.unimi.it (G. Haus), ludovico@dico.unimi.it (L.A. Ludovico).

[1] A trivial example is constituted by the editorial activity to compose evening's programs, which include articles, reviews, photographs, paintings and so on.

1296-2074/$ - see front matter © 2006 Elsevier SAS. All rights reserved.
doi:10.1016/j.culher.2006.02.007

data, and data themselves can be extremely heterogeneous. In fact, such databases have to store a number of document types, e.g. text, audio, still images and video; and multimedia contents, of course, require a multimedia database. As an immediate consequence, the database itself will need a large amount of disk space and a very smart way of managing related information. In other words, both hardware and software requirements will be demanding.

In this context, a particular importance is acquired by two activities: i) database planning, and ii) related applications design. In fact, even a very powerful calculation system could not be sufficient to handle the computational burden, in particular when data and metadata are not organized in a proper way. Thus, database structuring requires an accurate analysis, and related applications to retrieve information should be implemented very carefully.

2. Contents of an opera house database

Which kind of information should find place inside the database of an opera house? As told before, we can roughly consider two different categories of information: i) data about theatre management (e.g. personal data, salaries, addresses), and ii) data and metadata about its artistic production (e.g. playbills, recordings, photos).

Often, the two different ambits are tightly related: for instance, precise information about the presence of an artist in a certain number of performances could be used not only to reconstruct the cast of the plays, but also to calculate his/her salary. Many other examples could be cited: the relationship among the costs of a particular staging and the run of the play, the availability of recordings to be marketed, and so on.

Only the second category of data and metadata is peculiar in a theatrical environment, so this paper will focus this subject, omitting comments about the organization of a traditional archive of personal data. However, even ignoring one of the two facets, the matter is still complex and challenging. For example, the contents to be stored in the database can be very heterogeneous, ranging from textual information to symbolic representation of music, from still images to video, from audio to physical objects. A more structured vision of the matter will be presented in the following sections.

We can individuate three different phases that are consecutive and logically interdependent: information capturing, information structuring, and information retrieval. In this context, we prefer the term “information” to “data” as it can embrace also the concept of metadata. Literally meaning “data about data”, metadata is information that describes another set of data. In the paper, we will underline that database entries are constituted not only by digital objects, but also by some additional information. Metadata are fundamental in order to classify and retrieve such digital objects. Besides, metadata allow one to relate objects to other objects inside the database. As a consequence, our proposal for an effective database will support both data and metadata.

3. A night at the opera

The purpose of this section is introducing some important concepts typical of theatre’s jargon.

A standard opera house usually runs different kinds of show: mainly operas, ballets, symphonic concerts, chamber concerts, and recitals, but also other initiatives such as lessons, conferences, and presentations.

By adopting the top-down approach shown in Fig. 1, the first key concept is the idea of *base version*, which represents the music work as conceived by its author(s). This definition is meaningful for operas, ballets, and concerts, and not for other kinds of manifestation such as conferences.

Among the data related to base version, we can cite the original title of the composition, the name and the role of its author(s), the date and place of its first representation, and finally the instrumental and vocal ensemble. In this context, the ensemble is a mere list of instrumental and vocal parts, often with a quantitative indication. For instance, by examining the original score we learn that S. Prokofiev’s *Peter and the Wolf* is written for flute, oboe, clarinet in A, bassoon, three horns, trumpet, trombone, timpani, triangle, tambourine, cymbals, castanets, snare drum, bass drum, and strings. On the contrary, the cast—intended as the names of the performers—cannot be specified in the base version. Similarly, for an opera or a ballet the ensemble information includes also the name of the main characters, but once again not the personal data about the interpreters.

The second key concept is the one of *staging*. By such term, we indicate a set of performances characterized by the same music program, belonging to the same season and having common features about production, staging, and cast. Under our hypotheses, *Le nozze di Figaro* by W.A. Mozart and L. da Ponte represents a “base version”, whereas its production for Teatro alla Scala’s 2005/06 opera season will constitute a “staging”.

It is worthy of noting that stagings—if compared with base version—are characterized by a superset of common features. In fact, all the common aspects of a base version are inherited by stagings, which allows one to put in correspondence different stagings of the same music work. But choosing a particular staging makes some other peculiar elements emerge, such as the same conductor, orchestra, director, stage designer, cos-

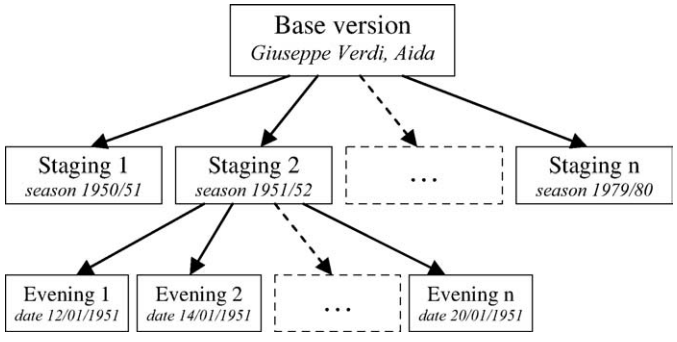

Fig. 1. Hierarchy among base version, staging and evening concepts. In italic, an example about different revivals of the same opera.