Elaboration of a Database of Heritage Inventory

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Abstract—Roman civilization left many archaeological traces in the proconsul Africa after the destruction of Carthage in 146 BC. The Roman architecture is a major part of this civilizational heritage that has influenced researchers from various fields. Roman architecture is a main part of this civilizational heritage we must try to understand and document the evolution of their heritage assets. In this research, we specially focus on the study of "Domus" of Roman Tunisia from 146 BC until 439 before. The procedure to follow is at the intersection of several disciplines, it proposes a model of knowledge on which it is based a work of comparison and reasoning of important data in number and relatively complex in terms of structure. We set as objective to investigate the "approach of architectural inventory" multidisciplinary, allowing operational chaining between tools, approaches and scattered disciplines.

Keywords—Architectural inventory, "Domus" of Roman Tunisia, Model of knowledge, Roman architecture.

I. INTRODUCTION

For fifteen years, under the influence of the development of New Technologies of Information and Communication NTIC, The study of the built heritage has undergone profound changes, whether with the introduction of new tools for information management, or with the application of new technology of data acquisition and volumetric representation of the built.

We present the work by meeting three additional questions:

• How to structure and Provide access to data and information manipulated in the study of place built; data not only heterogeneous but also mostly incomplete, uncertain or contradictory?
• How to better integrate this information within a organisation type an architectural information system, to visualize and reason about this information?
• How to finally deploy formalisms and tools of this integration in the concrete practice of data generation?

The work we present is designed to evaluate and verify the capacity and relevance of a knowledge representation formalism involving instruments whose we will show their implementations.

II. THE CORPUS OF STUDY: THE ROMAN DOMUS OF TUNISIA

Roman domestic architecture presents a heritage from an architectural know-how that we must try to analyze, recognize and understand its evolution. In this research, we focus on developing a heritage inventory of corpus of thirty houses spread over the Tunisian territory. shown in Figure 1,2.

Figure 1 On The Left, Map Of Roman Cities In Tunisia. On The Right, Three Romain Domus Of Tunisia: Triomphe De Neptune (Acholla ),Nymfarum (Nabeul) Et Pavone (El Jem) [1]
Figure 2 The Corpus of Study: Thirty houses spread over the whole of the Tunisian territory.

III. WORK METHOD AND TOOLS

Our approach is based on a working method, incorporating the logic of architectural modeling in the practices information of visualization called Approach by information models, through which the shape of the built acts plays the role as a binding to structure heterogeneous documents provides access to model 2D / 3D as the modality preferred of navigation, then passed the model of an interface to the device of information visualization, leading to representation arrangements more or less abstract;

Takes note of this approach, we have set as objective of this work to investigate an “architectural inventory approach”, multidisciplinary, authorizing an operational chaining between tools, approaches, disciplines dispersed. The basis of heritage inventory data is structured to organize relevant way many data of "Domus" of Roman Tunisia.

A. The Development Cycle in Y

For the establishment of the basis of heritage inventory data, The method used is called development cycle in Y [2]. This process is based on three phases, shown in figure 3: Technical phase, functional phase and design phase.

Figure 3 Development process in Y

For this phase of analysis, we rely on the statements, documents, ... with descriptions of different types of variables (geographic, urban, relational, organizational, ...).

B. The Design of the Database

The functional and technical analysis, allowed to list all available data. Now they must be organized in a model data. Merise method provides a framework to enable this analysis and optimize the creation of the model.

C. Merise Method:

The analysis method Merise [3] was created in the late 70s, by the will of public authorities wishing to provide the government and public enterprises with a rigorous methodology. It incorporates new features: computer database ...
There are three levels of the design, shown in figure 4:

- Designing a conceptual data model without considering the computational aspects.
- The implementation of a logical data model depending on the structure of the computer software selected.
- And the establishment of a physical model of data with the language used in the software.

**The conceptual level:** The conceptual level represents the information and relationships. This model integrates also constraints of this data. These definitions are established without regard to any constraint related to the organization and software architecture. The MCD aims to formally describe the data that will be used by the information system. It is a simplified representation of reality.

The method of structuring data is based on the model Entity / association. Entities are objects with properties. They are linked by the associations that they also have their own characteristics. Once the model is validated against the observed reality, it is translated into logical data model.

**The logical level:** The MLD consists to describe the data structure used without reference to a programming language in particular. It takes into account the constraints of structuring data, therefore it is to specify the type of data used during (text, integer, real, ...). Thus, the logic model is dependent on the type of database used.

**The physical level:** The physical data model is used to define the implementation of physical structures and queries on data. The MPD, unlike previous models, depends on the software used. It is the implementation of the database at informatice level through the use of a data definition language. This language is used to create the tables, structures in which data will be stored.

**D. Informatic tool: relational database management system**

The data in the database are managed in a designed system that imposed its performance in managing databases relationally model. This tool is the SGBDR MySQL (Server of relational databases, software widely used for the manipulation of textual data), that is part of management software database most used in the world. This tool provides a work environment because of the wide variety of elements based on language SQL (Structured Query Language) that he provides. While the interface to manage data MYSQL performed on a server PHPMyAdmin (PMA) constitutes "an excellent tool for server administration MySQL »[4]. This handy interface allows you to run, easily and without much knowledge in the area of databases, many requests such as creation of data table, inserts, updates, deletes, changes in the structure of the database. This system is very useful for backing up a database as SQL file and easily transfer their data.

**IV. DESIGN AND PRODUCTION**

After the analysis phase, it is possible to develop a conceptual data model that integrates the different reference tables and which taking into account the needs of users leaving a possible subsequent changes if necessary.

**E. The Conceptual Data Model:**

The database is structured around entities. These entities are used to organize in a relevant and practical way the information on the "Domus" of Roman Tunisia. Each entity must have a code corresponds to a unique identifier for each object. See figure 5 below;
Take the case of this two entities, which have the following properties:

- For Domus: Denomination, Floor underground, Upstairs, Total surface area of the Domus, urban type, maximum length Domus, maximum width Domus, Orientation Domus, Delimitation Position Domus, general presentation.
- For sites: Current name, Latin name, area of town, area of the city, Year of inscription by UNESCO, Registered by UNESCO, current urban Configuration, Punic, Azimuth Domus.

**F. The Logiciel and Physical Data Models:**

Creating tables compatible with the PhpMyadmin it is possible. Entities are translated into tables, shown in figure 6.

Data Dictionary provides a description of all structural elements of relational database. It is mainly used to obtain information on the structure of the database and check the syntax and privileges on a query SQL. See figure 7 below;

**V. APPLICATION OPERATIONS**

The application is coupled to a software of database (Mysql). This database software also works on the principle of client and server. In fact when we install the MySQL software under Windows, we install two separate components seamlessly. A MySQL client and MySQL sever, on the same machine. Mysql Client is software that allows us to ask questions to our database (figure). And SQL server is software that is attuned client and furnishes data corresponding to the request [5]. See figure 8 below;

Our base is structured into 22 main tables allowing the storage and management of data, tables were created to limit the redundant information and separate the information. See figure 9 below;
VI. CONCLUSION

This study is used to establish a database of "Domus" of Roman Tunisia from 146 BC until 439 before from heterogeneous data need rigor and planning during the analysis phase. Thus, the application obtained allows easy use of different data and gives it a capacity for evolution to begin future studies of visualization and simulation information. This work will be a successful management tool that will facilitate the evolution of the heritage inventory, making a significant effort to deploy research to scientific and professional communities of the domain and the general public.

REFERENCES