Introduction
Hierarchical structures are pervasive in computer science because they are a fundamental means for modeling many aspects of reality and for representing and managing a wide corpus of data and digital resources. One of the most important hierarchical structures is the tree.

Our work takes into major consideration the role and impact of the tree in computer science and investigates its applications starting from the following pivotal question:

"Is the tree always the most advantageous choice for modeling, representing and managing hierarchies?"

Our aim is to analyze the nature and use of hierarchical structures and determine the most suitable way of employing them in different contexts of interests. We concentrate our work mainly on the scientific field of Digital Libraries. Digital Libraries are the compound and complex systems which manage digital resources from our cultural heritage belonging to different cultural organizations such as libraries, archives and museums and which provide advanced services over these digital resources. In particular, we point out a focal use case within this scientific field based on the modeling, representation, management and exchange of archival resources in a distributed environment.

The NESTOR Framework

We propose the NESTOR (NESted Set for Object heirArchies) Framework which is composed of two main components: the NESTOR Model and the NESTOR Prototype.

The NESTOR Model [2,3,7] is the core of the NESTOR Framework because it defines the set data models on which every component of the framework relies. It defines two set data models that we have called the "Nested Set Model (NS-M)" and the "Inverse Nested Set Model (INS-M)." We formally define these two set data models by showing how we can model and represent hierarchies throughout collections of nested sets. We show how these models add some features with respect to the tree while maintaining its full expressive power.

The NESTOR Model is presented from a formal point-of-view and then envisioned in a practical application context defined by the NESTOR Prototype. In order to describe the prototype we rely on the archive use case, and propose an application for modeling, representing, managing and sharing of archival resources.

Case Study: The Digital Archives

We take into consideration the hierarchical inner structure of archives by considering the solutions proposed in the literature for modeling, representing, managing and sharing the archival resources.

Archives are usually modeled by means of a tree structure and the model used to represent the hierarchies is bounded by the specific technology of choice adopted for its instantiation e.g. the XML. In the archival context the tree structure is commonly instantiated by means of a unique XML file - i.e. the Encoded Archival Description (EAD) - which mixes up the hierarchical structure elements with the content elements [5,6].

It is not straightforward to apply standard Digital Library technologies such as OAI-PMH (Open Archives Initiative – Protocol for Metadata Harvesting) and the Dublin Core to digital archives. A consequence of this fact is the difficulty in accessing and sharing archival resources with a variable granularity in a distributed environment [6].

Our solution is based on a joint use of the NESTOR Model and Digital Library technologies such as OAI-PMH and the Dublin Core [3,4,6].

SIAR: A User-Centric Digital Archive System

We provide a concrete implementation of the described models and methodologies in the context of the informative system called SIAR (Sistema Informativo Archivistico Regionale) that we designed and developed for the management of the archival resources of the Italian Veneto Region [8,9].