e-Pedalion: The transformation of a Christian cultural heritage text into a textual database of Orthodox Canon Law

Dimitra SARAKATSIANOU, Ph.D. Candidate, Applied Informatics Department, University of Macedonia, Greece
Georgia KOLONIARI, Assistant Professor, Applied Informatics Department, University of Macedonia, Greece

1. Introduction

Although about 2 millennia have passed since the appearance of the first Greek Orthodox Christian canonical texts, there is a lack of direction towards their systematic presentation using new technologies. One of the few relevant efforts that have been made is the digitization of the printed canonical collections and their free availability on the internet. But these canonical texts, for the Orthodox Church, have a special value because, on one hand, they are the main sources of Orthodox Canon Law (or in a broader term, Ecclesiastical Law), and on the other hand, determine its identity over the centuries. The most famous collection of Orthodox Greek Canonical Texts is the Rudder (Pedalion), which is available in Greek and English. This book (Agapius the Monk & Nicodemus the Hagiorite, 1957) presents in a systematic way the Canons of the Eastern Orthodox Church, which was written by Agapius the Monk and St. Nicodemus the Hagiorite.

Obviously, the Pedalion is a religious item of world cultural heritage because it concerns all the Orthodox Christian people worldwide. This has historical, cultural, legal, and religious value. Undoubtedly, the religious heritage is one of the largest pieces of the broader cultural heritage. Indeed, in recent years the protection of religious heritage has been at the heart of scientific and technological research. Cultural heritage preservation, as well as the diffusion of it to the audience (general or specialist), are two main goals of the consequent efforts. Various technologies have been utilized for its effective protection such as: "artificial intelligence, virtual reality, multimedia, broadband network, and databases" (Zhou et al., 2012, p. 1).

Based on the above, this article presents the transformation of the Pedalion into a textual database of Orthodox Canon Law. In this way, the transition from the unstructured information of this text collection to the corresponding structured data of an information system will be achieved. In practice, this religious script is annotated with semantic information (metadata) which are organized and correlated with each other based on their significance and logical relations. This best practice, on the one hand, presents a unified view of the semantic content of the Canons, and on the other hand, emphasizes their connected nature. The catalyst contribution of the proposed database is that it will be the digital methodological research tool of the scholars of Canon Law, which is missing—to the

extent of our knowledge—to this day, and which will lead the field of Canon Law to the new digital age. The online content of this vertical application could be, in a second phase, the background in order Semantic Web technologies (e.g. ontologies, semantic graph databases) (Cardoso, 2007) to help AI systems (e.g. knowledge system, deduction system) to understand the content of the Canons and to perform case-based reasoning. In particular, an interesting and very relevant perspective is the use of knowledge graphs. A knowledge diagram is a knowledge representation and reasoning technology that combines features from three data management technologies, graphs, databases, and knowledge databases. Organizing the derived ontological entities into a knowledge graph can promote further interlinking and interpreting the data while also supporting semantic queries. Ultimately, this project could be characterized as an innovative initiative in the field of Orthodox Canon Law and the Orthodox Church in general.

2. The Pedalion

The Pedalion based on its content can be divided into five broad sections: 1) First pages-Prolegomena about Canons, 2) Presentation of Canons (Main Body), 3) Concise and Accurate Instructions Concerning Marriages, 4) Forms of Some Letters 5) Table of contents and topics. The second section, which will be transformed into a textual database, contains four types of Canons: Apostolic Canons, Ecumenical Synodical Canons, Local Synodical Canons, and Patristic Canons. In Table 1, the main sections which synthesize the organizational structure of the Canons are presented. Some of these sections always appear and some do not.

Table 1. Canons organizational structure

No.	Section	Section description	Section existence
1	Number of Canon	Number of Canon	Always
2	Canon prototype	Prototype text of Canon	Sometimes
3	Concordant Canons	Systematic citation of concordant Canons	Sometimes
4	Interpretation of Canon	Interpretation of Canon	Always
5	Concord of Canon	Brief presentation of the concord of the Canon	Sometimes
6	Footnote	Enrichment of text with literary notes or interpretive clarifications	Sometimes

3. Methodology

The methodology applied for the development of the textual database follows the basic international principles for the development of relational databases (Ramakrishnan & Gehrke, 2000). In other words, the relational data model is used to organize the database data, which consists of two components: (a) tables (or entities) with their attributes and records and b) the relations of the tables that are implemented through their common features. This article summarizes the design of the database, based on which, at a later time, the corresponding database will be created in a web-based environment, so that the data of Orthodox Canon Law become accessible to the audience.

4. Database design

The creation of the e-Pedalion database is intended to provide the necessary information about resources (Collections, Sources, Canons, textual data) of Orthodox Christian Canon Law. The textual database meets the following main specifications:

*   incorporates textual data from the Pedalion, the official Collection of Canons of Orthodox Christian Canon Law. However, its design envisages its future expansion, ie the import of other data from other relevant Collections.

*   provides textual data in two languages, Greek (original) and English, based on the respective Collections available in these languages.

*   has as a basic data description language Greek, however, its design provides for multilingual data description support.

For the correct design of the database, the current situation has been taken into account. This concerns the way in which a collection of Canon Law is formed, as well as the way the Canons are presented within it. Thus, the conceptual database design centers around the Canon of a Collection associating it with other entities such as the Collection it is included in, the Source it belongs to and so on. Figure 1 shows the basic database entities and the relationships among them.
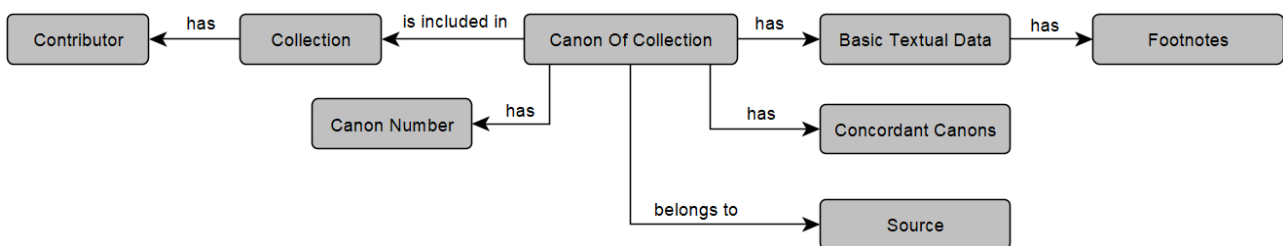

Fig.1. Basic entity relationships

5. Conclusion

The Pedalion is a Christian cultural heritage text, which contains canonical orders (called Canons) which are the sources of Orthodox Canon Law. These Canons rule the whole life of the Orthodox Christian Church, and at the same time determine its religious identity. It is, therefore, an item of interest to both the scientific and the general audience. On the internet one can find several digital items of the Pedalion in the form of images or texts. Nevertheless, the unstructured information of the texts cannot satisfy the various information needs of the readers, as a result of which tasks such as finding, identifying, grouping, and presenting resources based on specific criteria. The rich semantic data contained in this text can be used in decision-making in canonical research (or more generally in the government of the Orthodox Church) whether it is done by humans or machine-based agents. In this context, an attempt was made to transform the Pedalion into a bilingual textual database, which, on the one hand, it will support the information needs of its users in various ways, and on the other hand, will allow a deeper understanding of the texts. It is safe to say that the semantic enrichment of existing canonical data is a data exploitation effort, which is an important step in the adoption of Semantic Web technologies in the field of Canon Law and not only.

Funding

Author Contributions

Please list the contributions of the project participants here, according to the CRediT system. See specific descriptions of the role here: (http://credit.niso.org/). You can omit non-applicable roles.

Conceptualization: <Sarakatsianou Dimitra>

Data curation: <Sarakatsianou Dimitra>

Funding acquisition: <Koloniari Georgia>

Investigation: < Sarakatsianou Dimitra>

Methodology: <Sarakatsianou Dimitra, Koloniari Georgia>

Project Administration: <Koloniari Georgia>

Resources: <Sarakatsianou Dimitra>

Software: < Sarakatsianou Dimitra>

Supervision: <Koloniari Georgia>

Validation: <Koloniari Georgia>

Visualization: <Sarakatsianou Dimitra>

Writing – original draft: <Sarakatsianou Dimitra>

Writing – review & editing: <Koloniari Georgia>

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