

Ontology of Monotheism

Road map to reach the OntoM

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***Abstract.** This paper reports my qualifying working stage PhD research project. Our target is to develop the Ontology of Monotheism, an ontology to join the fundamental texts of the major monotheistic religions. We will base our research on Philosophy and Linguistics theories to accomplish our aim with Knowledge Engineering tools. We expect to generate an ontology to enhance comprehension among people from these religious denominations.*

1. Introduction

In 1868, Allan Kardec (1804-1869), founder of Spiritism, published *La Genèse, les miracles et les prédictions selon le spiritisme* and pointed the Christian-Spiritist doctrine as the third grand revelation; Moses promulgated the first one, the law of Sinai registered on Torah, and the Gospel originated from the Christ as the second revelation [Kardec 2013a, chapter 1]. If this premise is true, there is a didactic-pedagogic connection between the Torah, the Holy Bible and the Spiritist Pentateuch, linking Judaism and Christianity, two of the most influent monotheistic religions nowadays. Following this further, I have deduced that if God is only One, Islam, the other influent monotheistic religion, can be connected in the same way: another revelation registered on the Quran. How can these foundational texts be studied and analyzed without religious biases? By means of Artificial Intelligence tools such as ontologies — this is our bet.

1.1. Research object

My choices included texts in Brazilian Portuguese version of the Torah [Templo Israelita Brasileiro Ohel Yaacov 2001], translated by rabbi Meir Matzliah Melamed, the Jerusalem Bible [Bazaglia 2010], published under the guidance of *École Biblique de Jérusalem*, the Noble Quran [Profeta Muhammad 1999], translated by Dr. Helmi Nasr, and the Spiritist Pentateuch [Kardec 2013a, Kardec 2013b, Kardec 2013c, Kardec 2013d, Kardec 2013e], French originals worked out by Dr. Evandro Noleto Bezerra. This set of books is our research object, a non-structured database.

1.2. Overall goal and motivation

This project aims to develop an ontology using monotheistic institutional texts as a database. We intend to implement a core or domain ontology to model the concepts

expressed in the books, a foundational ontology as suggested by Guizzardi and colleagues. They have proposed Unified Foundational Ontology (UFO) — “to provide conceptual clarification in complex domains” [Guizzardi et al. 2015], such as our proposal. We aim to provide the scientific community with a technological artifact, in the sense that will be possible to produce knowledge engineering cooperative agents using this ontology as a basis. Monotheism is a singular phenomenon on reality and we can use ontologies to understand it, to comprehend this phenomenon. Even built over the same paradigm – One God only – the religious denominations inside Judaism, Christianity and Islam never had come to a common conceptualization. Fundamentalism is growing inside monotheism because of literal interpretations of the Holy Scriptures. It denies scientific discoveries due to belief in the Book of Genesis’ text, for example. The influence of these fundamentalists groups is significant. Democracy, pluralism and international peace became secondary concerns [Armstrong 2009]; the priority is to fight in the name of God. We intend to develop the Ontology of Monotheism to define a vocabulary, a set of related concepts, to make possible the exchange of queries and assertions among cooperative agents "conform to ontological commitments which are agreements to use the shared vocabulary in a coherent and consistent manner" [Gruber and Olsen 1994]. The OntoM is the first step to unite the basis texts of the greatest religions in world and could have bring more understanding, perhaps tolerance, to this domain.

1.3. Originality

I carried out a systematic literary review on this subject over four scientific databases: Scopus, BDTD, Scielo and EGC. The more significant database on the search — Scopus —, considered the keyword “ontolog*” as a basis in the subject areas of Computer Science, Engineering and Multidisciplinary included in the documents’ title, abstract and keywords, as shown in Table 1.

Table 1. Literary review on April 2018 [Developed by author]

Item	Keywords	Docs
1	ontolog* quran	60
2	ontolog* bible	4
3	ontolog* torah	0
4	ontolog* kardec	0
5	ontolog* monotheis*	0

The search for ontologies published on the Internet displayed three occurrences [Dukes 2017, Hakkoum 2018, Linked Data Center 2018]. The brief review above points to the originality of our proposal.

2. Background Theories

Nicola Guarino and colleagues [Guarino et al. 2009] have elucidated the relationships occurring from the phenomena of reality until an ontology. Figure 1 shows the relationship among stages to make a good ontology. Five knowledge areas are involved in our thesis for the development of OntoM: Religious Studies, Philosophy, Phenomenology, Linguistics and Ontology Engineering. We are conducting interdisciplinary research whose object is inside the field of religion.

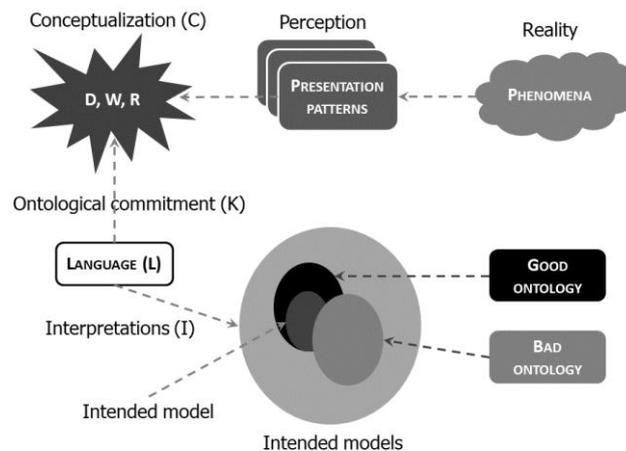


Figure 1. The relationships between phenomena occurring in reality, their perception (at different times), their abstracted conceptualization, the language used to talk about such conceptualization, its intended models, and an ontology [Guarino et al. 2009, p. 9]

2.1. Religious Studies

Our research is non-denominational as regards the phenomenon of the monotheistic institutional texts that generated Judaism, Christianity and Islam. Religious Studies is the starting point of our research, given the literary *corpus* we are using; and because the evaluation of the final ontology is also where the research finishes. In the **evaluation phase**, we intend to submit the result of our inferences drawn from *Ontology of Monotheism* to religion experts.

2.2. Philosophy

As shown in Figure 1, the phenomenon of reality is the beginning. A set of agents (commonly human) observes such a phenomenon and maps the patterns of presentation in parts. These parts constitute the reification of objects, which are modeled to represent a conceptualization [Isotani and Bittencourt 2015]. This **perception phase** requires a philosophical approach. We have chosen Edgar Morin and his *The Method* [Morin 2011a, Morin 2011b, Morin 2012a, Morin 2012b, Morin 2013, Morin 2015] to do this because of the breadth of his theory of complex thought. Morin elucidates the complexity of knowledge and proposes a non-rigid method to research and develop. The complexity of monotheism's domain is the real challenge to confront.

2.3. Phenomenology

According to Martin Heidegger (1889-1976), “philosophy is a universal and phenomenological ontology that begins from a hermeneutics of presence [of the being]” [Heidegger 2015, p. 534, our translation]. This German philosopher has written one of the most significant work about the sense of the being. Heidegger structured his *fundamental ontology* in his essential book *Being and Time* [Heidegger 2015], where he presented temporality and the being, and the existence of the being into the world, among other concepts. He worked out, indeed, a conceptualization of essential phenomena of reality and we think this theory will be helpful to us. In our point of view,

monotheism’s texts were revealed because of and towards *the being* over the past four thousand years. That is why the Heideggerian epistemic view applies to our thesis at its **conceptualization phase**.

2.4. Linguistics

Linguistics has contributed to Ontology Engineering since the beginning. Linguistics is the field that offers a basis to figure out the context of discourse. Stephen Levinson explained the concept of *time deixis*, for example, by distinguishing between *coding time* — the moment of producing an enunciation — and *receiving time* — the moment of reception [Levinson 2007, p.89]. This kind of knowledge is convenient when one deals with millenary texts. Linguistics and Ontology Engineering are our background for a **technological phase** that completes the pathway from conceptualization to ontology.

2.5. Ontology engineering

At the beginning of the technological phase, we intend to use UFO (Unified Foundational Ontology), “which has been designed with the specific purpose of serving as a foundational theory for conceptual modeling” [Guizzardi and Wagner 2010, p.195]. Giancarlo Guizzardi and Gerd Wagner proposed UFO [Guizzardi and Wagner 2004] and delivered an ontological level modeling language: OntoUML [Guizzardi and Wagner 2012]. Once we reach the intended model, we can go towards the *Ontology of Monotheism* (OntoM) with an epistemological language like Ontology Web Language (OWL), considered the ontology language of the Web and used for developing applications based on Semantic Web [Isotani and Bittencourt 2015].

3. Road map

Figure 2 summarizes our intended route to achieve the OntoM as described.

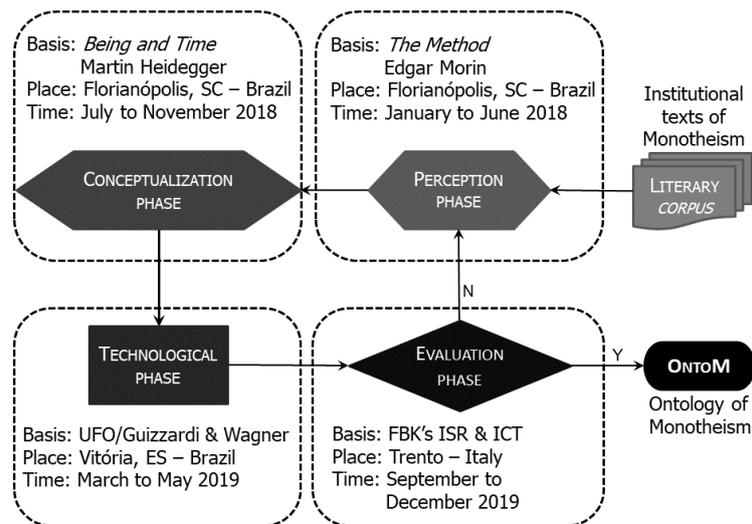


Figure 2. Phases of research [Developed by author]

I have negotiated with the *Ontology and Conceptual Modeling Research Group* (NEMO) from the Federal University of Espírito Santo (UFES), in the city of Vitória

(ES), Brazil, for a research visiting period and they timely accepted me from March to May 2019. We made this choice because “two scientific contributions that are at the core of NEMO’s research program are the foundational theory UFO (Unified Foundational Ontology) and the [...] well-founded conceptual modeling language OntoUML” [Computer Science Department 2018]. I became interested in Fondazione Bruno Kessler (FBK) [Fondazione Bruno Kessler 2017] as soon as I came across the two research centers related with my thesis, the *Centro per le Scienze Religiose* (ISR) [Centro per le Scienze Religiose 2018] and the Center for Information and Communication Technology (ICT) [Center for Information and Communication Technology 2018]. FBK's professors have processed my request and I received a positive reply from them.

4. Conclusion and acknowledgements

I am grateful to PPGE/GC/UFSC, NEMO/UFES and ISR-ICT/FBK. Thanks a lot to CAPES, a government agency linked to the Brazilian Ministry of Education in charge of promoting high standards for post-graduate courses, that supports me with a monthly scholarship since 2016. My PhD Qualifying Exam will be in November 2018 and I intend to dedicate 2019 for two PhD Sandwich, both approved. I have the funds to accomplish the national one at UFES; the other one at FBK demands an International PhD Sandwich Scholarship and I am not certain whether I will be granted the scholarship I need for a 4-month stay in Italy. I would appreciate any suggestions you could kindly give me about agencies I could apply for to obtain funds. I project the presentation and defense of my doctoral thesis for May 2020.

References

- Armstrong, K. (2009) “Em nome de Deus: o fundamentalismo no judaísmo, no cristianismo e no islamismo”, Companhia das Letras, São Paulo.
- Bazaglia, P. (Ed.) (2010) “Bíblia de Jerusalém”, Paulus, São Paulo. Rev. edition.
- Center for Information and Communication Technology (2018) “Data Knowledge Management”, <https://ict.fbk.eu/units/dkm/>.
- Centro per le Scienze Religiose (2018) “Mission”, <https://isr.fbk.eu/en/about-us/mission/>.
- Computer Science Department (2018) “Ontology and Conceptual Modeling Research Group”, <https://nemo.inf.ufes.br/>.
- Dukes, K. (2017) “The Quranic Arabic Corpus”, <http://corpus.quran.com/>.
- Fondazione Bruno Kessler (2017) “About FBK”, <https://www.fbk.eu/en/about-fbk/>.
- Gruber, T. R. and Olsen, G. R. (1994) “An Ontology for Engineering Mathematics”, In: Fourth International Conference on Principles of Knowledge Representation and Reasoning, Edited by Jon Doyle, Piero Torasso, and Erik Sandewall, Gustav Stresemann Institut, Bonn, Germany, Morgan Kaufmann.
- Guarino, N., Oberle, D. and Staab, S. (2009) “What Is an Ontology?”, In: Handbook on Ontologies Second Edition, Edited by Steffen Staab and Rudi Studer, Springer-Verlag Berlin Heidelberg, p. 1-17.

- Guizzardi, G. and Wagner, G. A (2004) “Unified Foundational Ontology and some Applications of it in Business Modeling”, In: CAiSE Workshops, vol. 3, p. 129-143.
- Guizzardi, G. and Wagner, G. (2010) “Using the Unified Foundational Ontology (UFO) as a Foundation for General Conceptual Modeling Languages”, In: Theory and Applications of Ontology: Computer Applications, Edited by Poli R., Healy M. and Kameas A., Springer, Dordrecht, p. 175-196.
- Guizzardi, G. and Wagner, G. (2012) “Tutorial: Conceptual Simulation Modeling with Onto-UML”, DOI 10.1109/WSC.2012.6465328.
- Guizzardi, G., Wagner, G., Almeida, J. P. A. & Guizzardi, R. S. S. (2015) “Towards ontological foundations for conceptual modeling: The unified foundational ontology (UFO) story”, In: Applied Ontology, vol. 10, p.259-271, <https://content.iospress.com/articles/applied-ontology/ao157>. DOI 10.3233/AO-150157.
- Hakkoum, A. (2018) “Quran ontology”, <http://www.quranontology.com/>.
- Heidegger, M. (2015) “Ser e Tempo”, Vozes, Petrópolis, RJ, 10th edition.
- Isotani, S. and Bittencourt, I. I. (2015) “Dados Abertos Conectados”, NIC.br, <http://ceweb.br/livros/dados-abertos-conectados/>.
- Kardec, A. (2013) “O livro dos espíritos”, FEB, Brasília, 4th edition.
- Kardec, A. (2013) “O livro dos médiuns”, FEB, Brasília, 2nd edition.
- Kardec, A. (2013) “O evangelho segundo o espiritismo”, FEB, Brasília, 2nd edition.
- Kardec, A. (2013) “O céu e o inferno”, FEB, Brasília, 2nd edition.
- Kardec, A. (2013) “A gênese”, FEB, Brasília, 2nd edition.
- Levinson, S. C. (2007) “Pragmática”, Martins Fontes, São Paulo, 1st edition.
- Linked Data Center (2018) “Bible Ontology”, <http://bibleontology.com/>.
- Morin, E. (2011) “O método 4: as ideias: habitat, vida, costumes, organização”, Sulina, Porto Alegre, 6th edition.
- Morin, E. (2011) “O método 6: ética”, Sulina, Porto Alegre, 4th edition.
- Morin, E. (2012) “O método 3: o conhecimento do conhecimento”, Sulina, Porto Alegre, RS, 4th edition.
- Morin, E. (2012) “O método 5: a humanidade da humanidade”, Sulina, Porto Alegre, 5th edition.
- Morin, E. (2013) “O método 1: a natureza da natureza”, Sulina, Porto Alegre, RS, 3rd edition.
- Morin, E. (2015) “O método 2: a vida da vida”, Sulina, Porto Alegre, RS, 5th edition.
- Profeta Muhammad (1999) “Tradução do sentido do Nobre Alcorão para a língua portuguesa”, Complexo Rei Fahd, Al-Madinah Al-Munauarah, Arábia Saudita.
- Templo Israelita Brasileiro Ohel Yaacov (Ed.) (2001) “Torá – A Lei de Moisés”, Sefer, São Paulo, Rev. edition.