



## Alms-Giving (Zakat) Ontology in the Pillars of Islam

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### ABSTRACT

Ontology is a conceptualizing concept agreement in a context that can be shared or reused to support interoperability between systems. Ontological assessment is of paramount importance in order to evaluate an ontology development so that the ontological definition that is being built can be accessed by providing appropriate, available alternatives for re-use. This study focuses on the construction of ontology in the concept of tithe/ alms-giving (zakat) in the Pillars of Islam. This alms-giving (zakat) ontology was developed using the Engineering Methodology and assessed in terms of its functionality. The main result of this ontology was the ease of obtaining the verses of the Quran and the sources of certified books relating to alms-giving (zakat).

**Key words :** Ontology, zakat, Alms-giving, pillar of islam.

### 1. INTRODUCTION

The literature on "Artificial Intelligence" contains many ontological definitions; in which many are in conflict with each other. For the purpose of this guide, ontology is a formal explicit description of a concept in the domain of the discourse class (sometimes called the concept), in which the nature of each concept describes the various features and properties of certain slots (sometimes called roles or properties), as well as restrictions on a fact slot (sometimes called a role restriction).

Ontology can form the basis of knowledge in the application of various systems or other requirements such as search engines or decision support systems. Protégé, KAON and Apollo are examples of ontology editors currently in use in the development of ontology. These ontology editors are rather difficult to use and require skilled knowledge to apply, but with the integration of various tools in facilitating the generation and visualization of ontology, the development of ontology becomes easier. At present, ontology is an important factor in generating semantic information.

Alms-giving (zakat) is the fifth pillar of Islam. Alms-giving (zakat) refers to spending a fixed portion of one's wealth for the poor and needy in the society. Giving money for charity is very good, but unlike charity, alms-giving (zakat) is different

because it is obligatory to all Muslims and is given in the amount that has been calculated [1], [2].

Alms-giving (zakat) is based on the income and value of all the property of a person. It is commonly 2.5% (or 1/40) of the total amount of Islamic savings and the wealth that is above the minimum amount that a Muslim must have before being obliged to zakat known as 'nisab', as well as other aspects of alms-giving (zakat). Amount collected is paid through the zakat collectors, and given to poor people, new converts, Islamic scholars, and others.

According to a hadith, refusal to pay or insults against those who perform alms-giving (zakat) is a sign of hypocrisy and Allah will not accept the prayers of these people. The Sunnah (the way of the prophet) also explains God's judgement [8], [9] for those who refuse or fail to perform alms-giving (zakat). On the Judgement Day, those who do not pay zakat will be held responsible and punished.

Some people consider zakat (alms) on debt is affordable, while others do not. The same arguments arise for business assets and women's jewellery. Some people need the minimum 'nisab' for the accountability of alms-giving (zakat), while some do not. Similar types of differences are also about the disbursement of alms (zakat). Some classical physicists argue that any Muslim who consciously refuses to pay zakat is an apostate, because the failure to believe that alms-giving (zakat) is a religious obligation (fardhu) is a form of distrust (kufr), and he/ she must be executed.

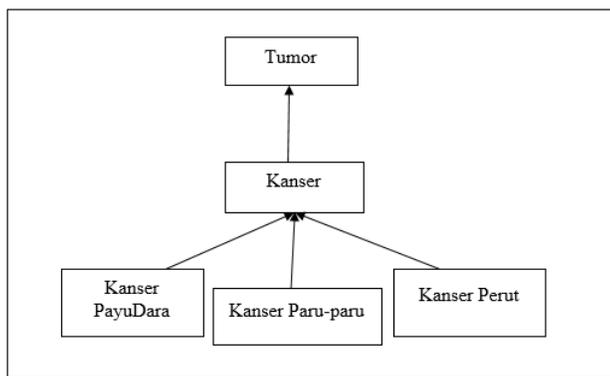
### 2. LITERATURE REVIEW

Ontology can be defined as a group of terms (concepts) and their definitions are expressed in natural language (Kalinichenko et al., 2003). Ontology may take many forms, but it should involve the terminology, and some specifications of its meaning. This includes the definitions and indications of how the concepts relate to collectively imposed structures of the domain and constrain the possible terms of interpretation [6], [7]. It refers to collective vocabulary to facilitate knowledge, communication, storage, search and sharing in knowledge management systems. Ontology defines a set of representative terms, referred to as concepts, which depicts abstract ideas in the targeted world which may be related to each other. For example, in the ontology that represents all living things, "humans" and "mammals" may be the two concepts and these two concepts may be related to

relationship. The term "ontology" was first used in philosophy to imply the study and discussion of existence. In computer science, this term refers to the conceptual specification (Gruber, 1993) so ontology is a description (such as a formal specification of a program) concepts and relationships that exist within the domain.

Ontology can also be defined as a conceptual hierarchy that matches the hierarchical data structure within a given domain. This structure encompasses the relationship between conceptual relationships, which can imply transitive and reflexive relationships (Hotho et al., 2011). The concepts that are not specific domains are described in the basis of ontology.

Here is an example of ontology in the "cancer" domain. There are several types of cancers; breast cancer, lung cancer, stomach cancer, and so on. We can say that breast cancer is a type of cancer, and we can refer it as a sub- concept of a "cancer". We can also say that "cancer" is a sub-concept of a "tumour", because cancer is a malignant tumour. An example of ontology in the "cancer" domain is shown in Figure 1.



**Figure 1:** Example of ontology in the ‘cancer’ domain

\*Tumour, Cancer, Breast cancer, Lung cancer, Stomach Cancer

Table 1 shows the comparison of existing researches. In the existing ontology, studies revealed two researches of alms-giving (zakat), analyzed by Hazaruddin Harun, Nazib Nordin, Azham Hussain (Ontology Management Ontology) [5] and Hajj by Nawal Masoud S. Dinhid (Ontology Application for Hajj) [4].

**Table 1:** Comparison between existing research and current study on alms-giving (zakat) ontology

| Research  | Alms-giving (zakat) management ontology[5]   | Application ontology for Hajj [4] | Alms-giving (zakat) ontology in the pillars of Islam |
|-----------|--|-----------------------------------|--|
| Data used | Focus on management (collection and payment) | Focus on the knowledge of Hajj    | Focus on the knowledge and management of             |

|             |                     |                              |                                |
|-------------|---------------------|------------------------------|--------------------------------|
|             |                     | alms-giving (zakat)          |                                |
| Methodology | <i>Methontology</i> | <i>Prototype Methodology</i> | <i>Engineering Methodology</i> |

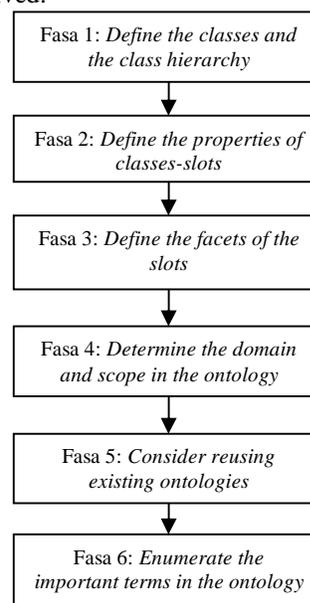
Ontology methodology is a very important guide in creating an ontology based on the representation of the declarative knowledge. The key point of ontology acts as the fundamental source in understanding an issue. Therefore, ontology will help users to understand about alms-giving (zakat).

### 3. METHODOLOGY

There are many methods that specifically address the development and maintenance of ontology. In order to develop ontology based on the Quran, it needed to undergo various levels of development process. The selected methodology was “Engineering Methodology”.

The most important stage was to identify the best subject or topic to focus on and to understand all the best data sources for future use in this scope of studies [11], [12]. The second stage was the ontological development process which involved designing and implementation. The ontology was developed based on the information collected by the domain experts and was assigned to ontology experts in a set of concepts, relationships and definitions. Hence methodology was done by using the phase in engineering methodology.

This Ontology used the engineering methodology. Phase 1 specified the domain and the scope of the ontology, while phase 2 considered reusing existing ontology. Phase 3 described the important terms in ontology. Phase 4 specified the classes and class hierarchy. Phase 5 defined the class-slot properties. Lastly, Phase 6 determined the slot aspect. Figure 2 shows the phases involved while Table 2 shows the activities involved.



**Figure 2:** Phases in the “Engineering Methodology”

**Table 2:** Phases and activities in the “Engineering Methodology”

| Phase  | Activity   |
|--|--|
| • Define the classes and the class hierarchy     | • Explaining using terminologies that describe the state of the object   |
| • Define the properties of classes-slots         | • Explaining the internal concept of the structure   |
| • Define the facets of the slots                 | • Interpreting the condition and its characteristics   |
| • Determine the domain and scope of the ontology | • What is the scope used in the ontological domain?<br>• What is the use of ontology?<br>• What kinds of questions that will be answered using ontology? |
| • Consider reusing existing ontologies           | • Using concepts that are likely to be similar to existing ontologies  |

**4. ANALYSIS AND ONTOLOGY OUTLINE/ DESIGN**

This chapter specifically describes the design and analysis of ontology contents in order for it to work well so that users can fully understand the use and also the concept of this ontology in its application. Ontology development is a process that describes in detail how the data placed in this alms-giving (zakat) ontology meet the requirements of zakat and in relation to zakat. Figure 3 shows the major headings in alms-giving (zakat) Ontology.

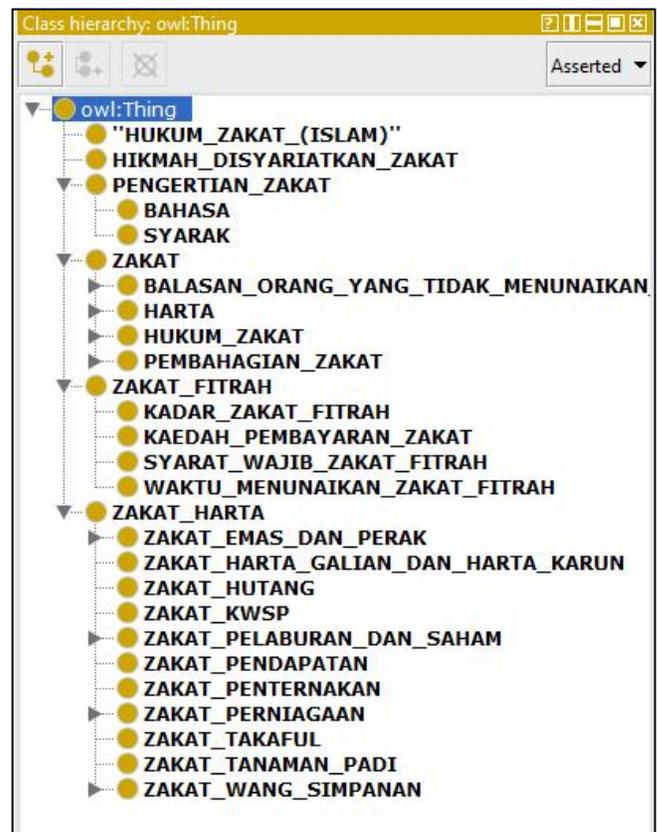


**Figure 3:** Domains in the alms-giving (zakat) ontology

- \*The alms-giving (zakat) law (Islam)
- The philosophy of alms-giving (zakat)
- Definition of alms-giving (zakat)
- Alms-giving (zakat)
- Tithes
- Property alms

Figure 4 and Figure 5 show the alms-giving (zakat) Ontology that was developed from Figure 3. Data entered was obtained from the sources of Quran translation and certified books.

Figure 6 shows two parts; one is taken from the sources of books and another one is from the Quranic translations.



**Figure 4:** Titles in alms-giving (zakat)

- \* The alms-giving (zakat) law (Islam)
- The philosophy of alms-giving (zakat)
- Definition of alms-giving (zakat)
- Syarak (Islamic Law, based on Islamic teachings)
- Terminology
- Alms-giving (zakat)
- Punishment for those who do not pay zakat
- Property alms
- The alms-giving (zakat) law
- Distribution of alms (zakat)
- Tithes
- Tithe rates
- Alms (zakat) payment method
- Obligatory terms of tithes
- Time allocated to pay tithes
- Property alms
- Gold and silver alms
- Minerals and treasure alms
- Zakat (alms) on debt
- EPF alms
- Investment alms
- Income alms
- Farming/ livestock alms
- Business alms
- Takaful (Islamic insurance system) alms
- Agricultural (paddy) alms

Savings alms

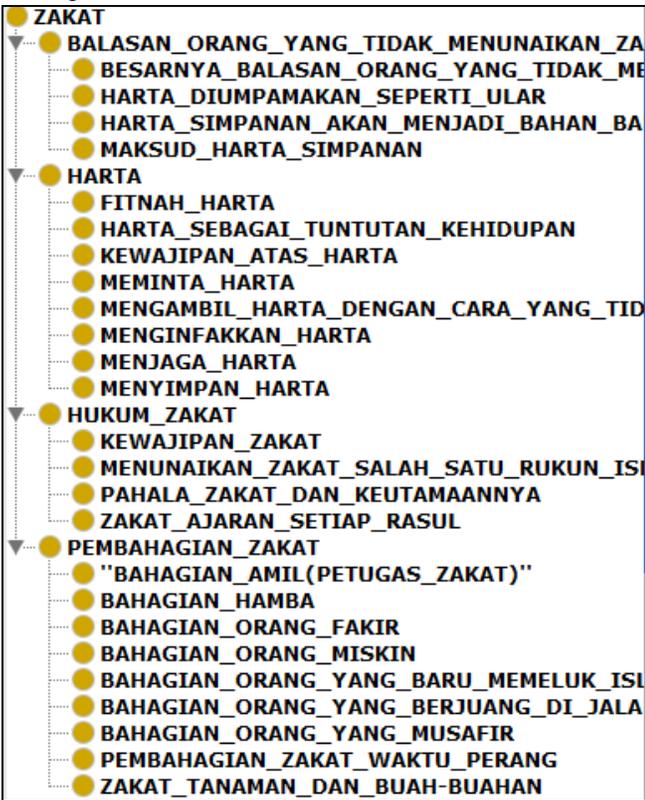


Figure 5: Titles in alms-giving (zakat)

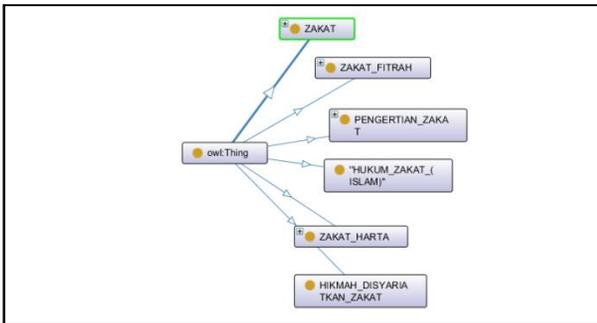


Figure 6: Alms-giving (zakat ontology)

- \*Alms-giving (zakat)
- Tithes (zakat fitrah)
- Definition of alms-giving (zakat)
- The alms-giving (zakat) law (Islam)
- Property alms
- The philosophy of alms-giving (zakat)

4.1 Testing

Functional testing was done to ensure that the ontology works accordingly and smoothly. Ontology provided the information that the users were searching for after it has functioned properly. Figure 7 and Figure 8 show the alms-giving (zakat) Ontologies that have been developed using the Protege application.

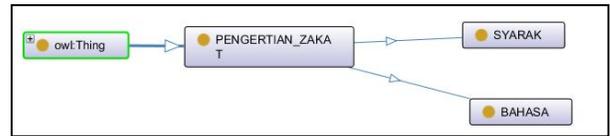


Figure 7: Example of alms-giving (zakat) Ontology

- \*Definition of alms-giving (zakat)
- Syarak (Islamic Law, based on Islamic teachings)
- Terminology

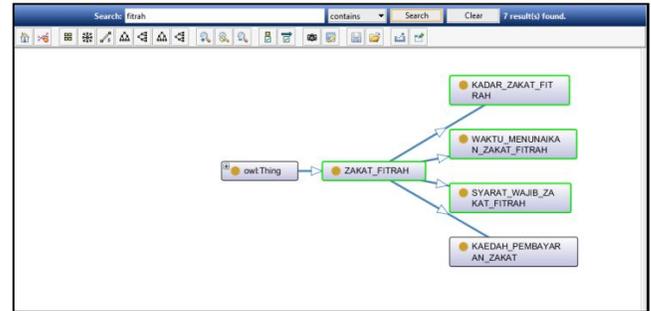


Figure 8: Example of alms-giving (zakat) Ontology

- \*Tithes (zakat fitrah)
- The rate of tithes
- Time allocated to pay tithes

Users who would be applying this ontology are those involved in the alms-giving (zakat) management as well as those who seek information about alms-giving (zakat). The main result of this ontology was the resolution reached in finding the information on alms-giving (zakat). This information was derived from the ontology function which was the main function in this ontology.

5. CONCLUSION

It is hoped that this developed ontology can help various parties, especially those who want to know more about alms-giving (zakat). This alms-giving (zakat) ontology provided authentic information relating to alms-giving (zakat). It was able to achieve its predetermined objectives. In the development of ontology, various data and information were used in order to meet the needs of the consumers. However, there may be some weaknesses of this ontology that require further improvements.

All in all, although planning has already been set up to develop the Zakat Ontology in Islamic Pillars, there are still some constraints in this system that need to be restored to a higher standard.

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