A METHOD OF BUILDING AN ONTOLOGY OF CORPORATE INFORMATION LIBRARY OBJECTS

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Annotation: *One of the key goals of the "artificial intelligence" concept, which is gaining traction in information technology and society, is to perform understandable thinking operations with computer systems and their technical components. It entails establishing a real-world interaction between human and computer actions.*
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1. Introduction

One of the main tasks of the concept of "artificial intelligence", which is becoming part of information technology and society, is to perform comprehensible thinking operations using computer systems and their technical devices. It consists of creating a real process of interaction between human actions and the computer (computers).

Intelligent communication systems can be used to create user queries in their libraries. This requires the methods of artificial intelligence-based software modules, the architecture corresponding to that style, information flow models, communication methods, and algorithms to assist users in creating or shaping the queries outlined in the previous section.

Throughout our research, the architectures of software modules that facilitate the formation of queries using systems will be of 3 types. These include:

1. Generation of questions corresponding to the user's request;
2. Choose from a set of sorted questions;
3. Selection of questions in the form of "mixed" (generation).

Fundamental analysis in architecture refers to the identification of an object in the core of a query by giving linguistic, stylistic, morphological processing (correcting word errors and finding the owner based on word construction) to the text entered in natural language.

Technological analysis in architecture is defined as the identification of Wi-Fi in the core of a query by providing technological processing (finding each owner of the word, excluding word-formers) to the text entered in the natural language.

In this architecture, the user accepts the query as a question and has two requirements:

1. Build an ontology for the subject area;
2. Algorithm for determining the proximity of two objects (classes).

The intellectual environment, on the other hand, is a classified subject area consisting of the class, the interdependence, properties, and phenomena of the subclasses in which the methods and ontologies of knowledge construction are built, as described in the first chapter.

This architecture is the process by which any IMT implements a mode of operation based on communication scenarios. In contrast to the above architecture, it uses a knowledge and database based on the level of closeness of the questions and answers. Also, on the basis of the analysis, the cores of the query are identified and the objects are selected for the exact question or answer. Then, based on this object, a close question and answer are determined. The proximity of objects is determined by their properties depending on the range values and data types.

This latter architecture is a cross-linked hybrid version of the above two architectures. In this case, after the analysis, on the basis of the ontology of the intellectual environment, the object is identified and their proximity (similarity) is found. If the proximity of an object is high ($s \to 0$), the corresponding answer to that object is constructed based on the properties of the ontology and transmitted to the user in the form of a question. If the proximity of the object is low ($s \to 1$), the question corresponding to that object is selected from the database based on the knowledge base and presented to the user in the form of a question.

Based on the above architectures, the following can be suggested as mathematical support for building an intellectual environment and making decisions in it:

1. Mathematical support of the decision-making hierarchy based on formal logical knowledge;
2. Mathematical software based on logical semantic connections and production knowledge;
3. Frame knowledge-based mathematical software;
4. Mathematical support based on the construction of ontological knowledge;

It is necessary to build an intellectual environment for the formation of queries and to identify methods of intellectual processing based on ontological knowledge in it.

The expression of ontologies is important to ensure that there is natural communication when creating queries. It is expedient to construct ontologies for each object of libraries and to determine the proximity of these objects, to combine objects.

It has been found that an individual approach can be implemented in systems of architectural process iteration. That is, the basic communication methods of the systems are based on:

1. Question - answer;
2. Targeted communication;
3. Purposeless communication;

This requires the construction of ontologies for each area, the creation of methods for creating intellectual communication scenarios for the organization of communication in their systems, as well as methods for determining the proximity of their objects.

Building an ontology of corporate information library objects serves to express knowledge and create an intellectual environment. In the intellectual environment, decision-making is based on the intellectual processing of data. From this point of view, in order to create intellectual communication systems that help in the formation of queries, copies of intellectual environment classes, i.e., working with objects, should cover all aspects of thinking in relation to the object.

The construction of an ontology for a subject area is understood on the basis of the following trinity

$$O =< X, R, F >$$

$X = \{x_1, x_2, \dots, x_n\}, n = |X| -$ The number of classes assigned in the subject area;

$R = \{r_1, r_2, \dots, r_k, \dots, r_m\}$, $R : x_1 \times x_2 \times \dots \times x_n$, $m = |R|$ - The number of interactions of a given class of objects in a subject area.

These serve to create a pattern for the interaction of classes. In general, class relations are divided into general relations (rules are created, in part, on the basis of definite relations) and definite, definite relations;

F: X timesR is a limited set of functions that interprets given classes and or relationships. In special cases it is used as a set of interpretive functions to create a broad glossary, dictionary, i.e. X classes. In general, the definition of class xi depends on class xi-1. In this case, the relationship between xi class and xi-1 class is determined by the Rk relation, which in turn requires consideration of the properties of the class;

The method of building an ontology for a subject area consists of two steps:

Conduct preliminary analyzes for the subject field and determine the characteristics for class properties;

Build an ontograph model for the subject field. In this case, the ontograph is a graphic, the ends of which are the classes (objects) of the subject field and the arcs are the relationship between them. A graph is a one-way oriented graph with several arcs entering and exiting one of the three.

The first stage. When constructing an ontology, two types of properties are used for the subject area, and they differ from each other:

Property value. This is the relationship between the classes created and the data type or character types;

Property-object. This is the relationship between the two classes created.

There are many ways to limit relationships in character identification. To do this, it is necessary to determine the upper class and its range. Properties can also be created based on special (sub-properties) available properties.

More complex constraints can be imposed on features. This allows you to create a hierarchy of properties, such as classes in the subject area.

Some characteristics of properties are introduced in order to use the most optimal methods for decision-making in intellectual processing based on properties. A logical model of some of the proposed characteristics is used to introduce the conversions. They are:

For the sub feature of these properties, the following is appropriate:

If the R relation is transitive, then the R-1 inverse relation is also transitive.

If the relationship R1, R2 is transitive, then the relationship $R = R1 \cap R2$ is also transitive.

Symmetry property. If the relation R \ left (a, b \ right) = R \ left (b, a \ right) is appropriate for any a, b given in set X, then the relation property R is symmetric.

Functionality feature. If the property R is defined functionally, for an arbitrary a, b and c: R = a, b) and R (a, c) the relation b = c is equal, ie \ forall \ a, b, c \ \ in X : R \ left (a, b \ right) ^Ra, c → b = c

Inverse property. If property P1 is defined as property P2, then P1 (x, y) or P2 (y, x) is calculated for all x and y. It should be noted that the inverse property takes the name of the property as an argument.

Inverse functionality property If the property P is defined as inverse functionality, then for any a, b and c the equation b = c from the relation R (b, a) and R (c, a)

In addition to defining additional characteristics of properties, it is possible to constrain properties for a current object in a variety of ways. The creation of an ontology for this is done on the basis of the capabilities of the languages.

2. Conclusions

There are languages and software tools for creating ontologies based on semantic networks. The most commonly used language is the Web Ontology Language (OWL), which supports the following features:

- formal identification of classes and the properties of these classes;
- identify objects (object-copies, representation of classes) and their properties;
- determine the definition of classes and objects according to a given formal syntax;
- OWL format - the simplest and most convenient flexibility with RDF , RDF Schema , XML format;

The most basic elements of OWL ontology are the language of class, feature, class representation (object and copies), and their relationship.

The basic concepts in the subject area should be structured on the basis of classes and have a “tree-like” structure with different taxonomic connections. Any object or event must be a class member in the OWL.

References

1. Anagnostopoulos A., Andrei Z., Kunal P. Effective and efficient classification on a search-engine model. 2006. In Proc. CIKM, -P. -208-217.
2. Arlitsch K., Obrien P., Rossmann B. Managing Search Engine Optimization: An Introduction for Library Administrators. Journal of Library Administration. Feb2013, Vol. 53 Issue 2-3, -p. -177-188.
3. Azevedo C., Iacob M., Almeida J., Van S., Pires L., Guizzardi G. Modeling resources and capabilities in enterprise architecture: A well-founded ontology-based proposal for ArchiMate. Information Systems. Dec2015, Vol. 54, -P. -235-262.
4. Bhat N. A., Ganaie Sh. A. E-resources: use and search strategies adopted by users of Dr Y.S. Parmar University of Horticulture and Forestry. Collection Building. 2016, Vol. 35 Issue 1, -P. -16-21.
5. Cai F., Rijke M. Learning from homologous queries and semantically related terms for query auto completion. Information Processing & Management. Jul2016, Vol. 52 Issue 4, -P. -628-643.
6. Cheang B., Chu S. OR/MS journals evaluation based on a refined PageRank method: an updated and more comprehensive review. Scientometrics. Aug2014, Vol. 100 Issue 2, -P. -339-361.
7. Muminov B.B. Methods of information retrieval and cash algorithms. Transactions of the international scientific conference “Perspectives for the development of information technologies ITPA – 2014” 4-5 November, 2014. 194-196 p.
8. Muminov B.B. The model of logical semantic searching. Proceedings of the uzbek-japan symposium on ecotechnologies “Innovation for sustainability-harmonizing science technology and economic development with human and natural environment” 14 may Tashkent – 2016, 72-77 p. [9]

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