**Western European Journal of Modern Experiments and Scientific Methods**
Volume 3, Issue 2, February, 2025
https://westerneuropeanstudies.com/index.php/1
ISSN (E): 2942-1896 Open Access| Peer Reviewed


# INTERPRETATION OF THE CONCEPT IN ONTOLOGY AND THESAURUS

**Kadirova Zebo Gulboyevna**
Lecturer at the National University of Uzbekistan
Email: qodirovazebo5450@gmail.com

**Abstract.** Today, a number of researches are being conducted in Uzbek linguistics on computer linguistics, including machine translation, corpus technology, computer lexicography, and the development of linguistic foundations of software applications, processing of lexicographic texts, and linguostatistical analysis, to a certain extent. With the increase in the flow of information, there is a need to search for new methods of its storage, presentation, formalization, and systematization, as well as automatic processing. Ontology is notable for being the basis for the implementation of a search system based on semantic relationships between information. This article classifies ontological models and analyzes the components of the thesaurus model. In addition, the differences in the concept of a concept in ontology and thesaurus are studied. While the thesaurus organizes terms based on synonyms, hierarchical relationships, and associative links, ontology provides a semantic basis for concepts, defining their properties.
**Keywords:** ontology, thesaurus, ontological knowledge model, thesaurus knowledge model, concept, taxonomy

Introduction: In world linguistics, the achievements of applied linguistics are being used to study the relationships between lexical units. Semantic analysis is being studied using computer technologies and methods.

Currently, the task of representing the semantic information available in the language in a user-friendly and multifunctional way is an urgent issue, which encourages researchers to look for new approaches to solving problems associated with creating such a description. The use of computer resources by linguists has opened up a number of new opportunities, which has led to the emergence of projects based on a wide terminological base, such as thesaurus, WordNet, ontology, interconnected by various semantic relationships.

The use of thesaurus, WordNet, ontological models in the systematic study of lexical units, in elucidating the semantic relationships between lexemes, allows us to shed light on the essence of field terms as a product of linguistic consciousness.

In Uzbek linguistics, professors A. Pulatov [10], [11], S. Muhamedova [9], N. Abdurakhmonova [1], [2] conducted scientific research in the field of computer linguistics, including scientific and practical research. In the doctoral (DSc) dissertation of N. Abdurakhmonova, it is appropriate to separately note the importance of machine translation, corpus linguistics, ontology and semantic technologies of computer linguistics in the development of the field. M. Abjalova's doctoral (DSc) dissertation expressed the scientific and theoretical foundations of creating a language ontology. In addition, O. Abdullayeva, A. Eshmominov, D. Akhmedova, B. Mengliyev, G. Toirova, N. Ataboyev conducted scientific research in the field.

In Central Asia, A. The works of Sharipbay, B. Ergesh, G. Elibayeva, N. Israilova, P. Bakasova, R. Niyazova, S. Kudubayeva, R. Turebayaeva, A. Aktayeva, L. Davletkireeva, A. S. Mukanova, L. Zhetkinbay, N. Abdurakhmanova reflect issues such as ontological modeling,

Western European Journal of Modern Experiments and Scientific Methods
Volume 3, Issue 2, February, 2025
https://westerneuropeanstudies.com/index.php/1
ISSN (E): 2942-1896 Open Access| Peer Reviewed


ontological structures, system structure, hierarchical classification, and semantic relationships between concepts.

Methods: The ontological modeling method was used to cover the topic, the classification method was used to create an ontological model of medical terms, and statistical analysis methods were used. Taxonomic, hierarchical classification, and semantic relationships between medical units were expressed using the protege tool.

Results: The results of this scientific research serve to develop, improve and properly regulate the lexicon, terminology of the Uzbek language, its components, medical terms. At the same time, it contributes to a certain extent to the issue of pragmatics of terms, that is, their correct use.

The creation of an ontological model of medical terms in the research work is of important practical importance, contributing to the introduction of new information technologies into the Uzbek language (creation of computer ontological dictionaries) and its enrichment with new information resources. In addition, the results of the research will serve as a resource not only for scientific research in the field of linguistics, medicine, but also for students, conducting scientific research in the field of medicine. In addition, the research work, as a practical result, will serve to enrich the **http://uzbekcorpus.uz/** database.

Discussion: A. Alekseev [5], N. Lukashevich [7], B. Dobrov have been effective in the fields of world computer linguistics and information technology in the creation of ontology based on semantics, the formation of a hierarchical classification of lexical units, the creation of a terminological base by field, the study of semantic relations, the development of linguistic ontologies based on thesaurus dictionaries.

Ontology as a model is a set of concepts related to a particular field [12].

The ontological model is presented in the works of T. A. Gavrilova, F. V. Khoroshevsky. Ontology is recognized as an ordered triad of elements.

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

Here C is a set of limited concepts (concepts, terms) of the subject, O represents the domain ontology; R is a finite set of relations between the concepts of a given subject area; F is a set of interpretation (axiomatization) functions defined on the concepts or relations of the final ontologies.

If the set C in the domain ontology O is naturally a finite set, then the same relation is established with the sets R and F. In this case, R and F must also be finite sets.

Let R = 0 and F = 0. Then the ontology O is transformed into a simple dictionary

$$\text{Dictionary: } O = V = <C, \{\}, \{\}>.$$

$$R = 0$$

$$\text{If } F \neq 0,$$

Let $C = C1 \cup C2$ and $C1 \cap C2 \neq 0$, where C1 is the set of terms to be explained; C2 is the set of explaining terms.

$$\text{Let } \exists(x \in C1, y1, y2, \ldots yk \in C2) \text{ be such that}$$

$$x = f(y1, y2, \ldots yk), \text{ where } f \in F.$$

The intersection of C1 and C2 excludes cyclic interpretations, and the inclusion of k arguments in the consideration of the function is intended to provide a more complete interpretation [8].

The components of the ontological model described by N. Sukanova are as follows.

$$O = < X, R, \Phi >$$

Western European Journal of Modern Experiments and Scientific Methods
Volume 3, Issue 2, February, 2025
https://westerneuropeanstudies.com/index.php/1
ISSN (E): 2942-1896 Open Access| Peer Reviewed


X is a set of concepts (concepts, terms) presented to the ontology within the framework of the domain. In ontology, the concept is used as a synonym for class. Classes consist of sets of individuals. Classes are divided into internal Classes. For example, "institut" concept *talaba, guruh, fakultet, o'qituvchi, soha* related to words.

***R-*** relationships between concepts within a domain. For example, talaba_guruh, guruh_fakultet, talaba_fakultet. The character (property) between concepts can be expressed as follows (Figure 1);

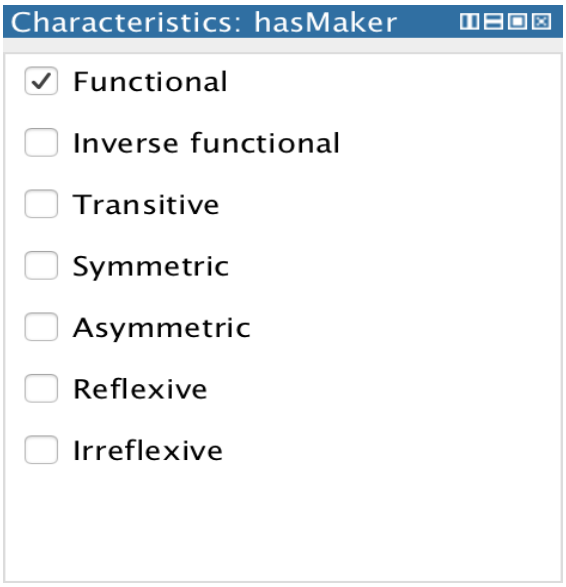


**Figure 1. Types of properties of elements**

Functional – if a concept is functional, then there can be several objects connected by it. For example, each person has a mother. If person A is the mother of person B, and person C is the mother of person B, then it follows that A and C must be the same person. It should be noted that if A and C are different persons, the above statement leads to a contradiction.

Inverse relation (inverse functional) – The opposite of a functional property, for example, if property A is present in element B, property A will not be present in element C.

Transitive – if the property is transitive, then element A is connected to element B. And if element B is connected to element C, then A is also connected to C.

Symmetric – if the relationship between two individuals is symmetric: For example, if element A is in a sibling relationship with element B, then element B is also in a sibling relationship with element A.

Asymmetric – if a property connects element A to element B, then element B cannot connect element A with that property.

Reflexive – a property is reflexive when it connects an element to itself. For example, Jasur knows Salim as an individual, Jasur may know other individuals, and Salim in turn knows several individuals.

Irreflexive – if a property is irreflexive, then it is defined as a property that connects individual A to individual B. For example, Alice is the mother of Bobur, and Alice cannot have the maternal property without Bobur, and Bobur cannot have the child property without Alice.

The interpretation of φ-concepts or ontology relations is a finite set of functions. The role of the interpretation function is that it represents an algorithmic description of the term.

Father=male and parent_child some Person

Western European Journal of Modern Experiments and Scientific Methods
Volume 3, Issue 2, February, 2025
https://westerneuropeanstudies.com/index.php/1
ISSN (E): 2942-1896 Open Access| Peer Reviewed


The entire set of relations in ontology is divided into a special group - taxonomy:

$$O=T=<X, \{is\_a\}, \{\}>$$

The concept of taxonomic structures is understood as a hierarchical system of relations. Here is_a means being an element of a class or being a class within a class. Is_a denotes a semantic relation.

"Element A is a member of class B" can be given by the logical (implication) formula: A -> B - If A is, then B is also.

Thus, from the definition of ontology, it follows that its main components are: classes, concepts, relations, axioms, taxonomy.

As mentioned above, in describing ontology, object properties alone are not enough; an important step is to carry out an analysis of lexico-semantic connections and determine lexico-semantic relationships between concepts.

While the term concept was used in linguistics as a synonym for the word concept until the 1980s, today its interpretation has expanded compared to the term concept [6]. In the context of ontology, a concept is a basic unit of meaning that represents an object, class or category of objects.

In the context of a thesaurus, a concept is a term or set of terms that represent a certain meaning. In order to facilitate understanding and obtaining information, semantic relationships are established between terms.

The main type of relationship used in an information retrieval thesaurus is a hierarchical relationship, which establishes a common link between two descriptors. A lower descriptive concept is included in the structure until the higher descriptive one is included. Also, a part-whole relationship can be established as a hierarchical relationship in an information retrieval thesaurus.

There is also an associative relationship between the descriptors of an information retrieval thesauri, indicating additional descriptors necessary for indexing or searching for information. The main goal of developing information retrieval thesauri is to use their units (descriptors) to describe the main topics of documents in the process of manual indexing. Therefore, it is important that the set of descriptors of an information retrieval thesauri allows you to describe the subject of documents in the subject area.

The basic units of thesauri are terms, which are divided into descriptive (descriptors) and non-descriptors (ascriptors). By their nature, descriptors correspond to the main concepts of the subject area[7].

N. Lukashevich expressed the thesaurus model as follows:

$$IPT = <D_{th}, T, R_H, R_A, A_T >,$$

$D_{th}$ – a set of descriptors of a specific subject area, *th* here are the areas necessary to represent the main topics in the field of science;

T – a set of domain terms:

$D_{th}$, $R_H$ – hierarchical relations of the information retrieval thesaurus;

$R_A$ – associative relations of the information retrieval thesaurus;

$A_T$ – axioms of hierarchical relations.

Although the thesaurus is used to organize knowledge from an ontological knowledge base, it differs in its conceptual foundations and functionality.

Western European Journal of Modern Experiments and Scientific Methods
Volume 3, Issue 2, February, 2025
https://westerneuropeanstudies.com/index.php/1
ISSN (E): 2942-1896 Open Access| Peer Reviewed


Thesaurus is a dictionary that organizes words or terms according to their meanings and relationships. Thesaurus is used to group and link words in information retrieval, information retrieval, by identifying synonyms and hierarchical relations between related terms.

An ontology is a formal and structured knowledge model that represents the concepts, relationships, and rules in a domain. It is used in artificial intelligence, semantic webs, and knowledge modeling.

| Feature | Thesaurus | Ontology |
|---|---|---|
| Main function | Words and their meanings | Concepts and relationships |
| Structure | Simple hierarchy | Complex relationships |
| Logical reasoning | – | Based on formal semantics |
| Purpose of use | In information search engines | Knowledge modeling, Semantic Web, artificial intelligence |

Concepts do not exist independently of each other, but are interconnected [4].

In information science, paradigmatic and syntagmatic relations are distinguished, which concern semantic relations [3]. This distinction dates back to Ferdinand de Saussure.

The most important of the relations in ontology is the taxonomic relation. Taxonomy is a process related to classification or categorization. It usually consists of two parts: the development of a basic scheme of classes (taxonomy) and the division of objects into classes (classification).

The main taxonomic relations are distinguished as is-a and has-a. The is-a relation is contrasted with the has-a (has_a) relation between types (classes).

Ontology ensures the efficiency of information use and introduces new concepts and terms into use without making them obsolete. The ontology being created as part of https://uzbekcorpus.uz aims to act as an intermediary between the user and the database, to implement effective searches in the database, and to organize searches based on the meaning of textual information.

Conclusion: In summary, while both ontologies and thesauri serve as tools for organizing knowledge, they differ significantly in their conceptual structure and application. A thesaurus primarily helps to organize and improve search for terminology, while an ontology represents a structured description of knowledge with explicit relationships and reasoning capabilities. This distinction is crucial in choosing an appropriate knowledge model in areas such as data integration, semantic search, and artificial intelligence. While a thesaurus is a word-based structure for organizing terms, an ontology is based on a concept that defines relationships that are structured based on logical reasoning.

**Bibliography:**

1. Abdurakhmonova N. Uzbek ontology of Uzbek language as example of
2. adjective // Шестая Международная конференция по компьютерной обработке тюркских языков 363 “TurkLang-2018”. (Труды конференции) – Ташкент: Издательско-полиграфический дом, 2018. – 320 с.
3. Abduraxmonova N.O‘zbek tili elektron korpusining kompyuter modellari:
4. filol. Fan. doktori diss. Avtoref. – Toshkent, 2021. – 72 b.;
5. Peters I., Weller K. Paradigmatic and syntagmatic relations in knowledge

Western European Journal of Modern Experiments and Scientific Methods
Volume 3, Issue 2, February, 2025
https://westerneuropeanstudies.com/index.php/1
ISSN (E): 2942-1896 Open Access| Peer Reviewed


6. organization systems. Information – Wissenschaft und Praxis, 2008. 59(2), - P 100–107.
7. Wolfgang G. Stock Concepts and semantic relations in information science.
8. //Journal of the American Society for Information Science and Technology. 2010. Vol. ***61, Issue 10, - P 1951-1969. https://doi.org/10.1002/asi.21382***
9. Аликсеев А., Лукашевич Н., Добров Б. Лингвистическая онтология –
10. тезаурус Рутез. – Open Semantic texnologies for intelligent systems. 2013. – pp. 153-158
11. Демьянков В.З. Понятие и концепт в художественном литаратуре и в
12. научном языке // Вопросы филологии. –Москва, 2001. -№ 1. –С. 35-47.
13. Лукашевич Н.В., Добров Б.В. Проектирование лингвистических
14. онтологий для информационных систем в широких предметных областях. (2015). 1(15), 47–69.
15. Лутошкина, Н. В. Модели знаний и онтологии. – Красноярск, 2021. –
16. 80 с.
17. Мухамедов С.А., Пиотровский Г.Г. Инженерная лингвистика и опыт
18. системно – статистического исследования узбекских текстов. – Т.: Фан, 1986; Махмудов М.А., Пиотровская А.А., Садыков Т. Система машинного анализа и синтеза тюркской словоформы // Переработка текста методами инженерной лингвистики. – Минск, 1982.
19. Пўлатов А., Мўминова Т., Пўлатова И. Дунёвий ўзбек тили. Ўзбек
20. тилида феъл шакллари ва уларнинг рус, инглиз тилидаги кўринишлари. – Тошкент: Университет, 2003.;
21. Пўлатов А. Компьютер лингвистикаси. – Тошкент, 2011.
22. Цуканова Н. И. Онтологическая модель представления и организации
23. знаний. – М.: Горячая линия – Телеком, – 2015. – С. 21-34.