WORLDLY KNOWLEDGE
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCHERS
ISSN : 3030-332X IMPACT FACTOR (Research bib) – 7,293

Shohsanam Tursunboyeva

Independent researcher

shohsanamxontursunboyeva@gmail.com

SEMANTICS AND COMPUTATIONAL SEMANTIC

Annotation: This article leads to research semantics and computational semantics meaning, and their importance. These terms are learnt by various sources with methodological research.

Key words: language, semantics, computational semantics, computational linguistics, NLP.

Language is the foundation of human communication, and its structure, meaning, and use have been studied extensively within the field of semantics. Semantics, in linguistic terms, refers to the study of meaning—how words, phrases, and sentences convey information, thoughts, and ideas. It encompasses various layers of meaning, including lexical semantics (meaning of individual words), sentence semantics (how sentence structure affects meaning), and discourse semantics (how context shapes understanding across sentences).

In recent years, the integration of semantics into computational systems has given rise to the field of computational semantics. This branch of study seeks to formalize and model the meaning of language in ways that can be processed by computers, facilitating tasks such as machine translation, natural language understanding, and information retrieval. By bridging the gap between human linguistic intuition and computational algorithms, computational semantics provides insights into how meaning can be represented, manipulated, and understood by machines. Firstly, it should be demonstrated that the full meaning of semantics and computational semantics. The meaning of semantics and computational semantics lies primarily in their focus and methodology:

Semantics:

- **Definition**: Semantics is a branch of linguistics and philosophy that studies the meaning of words, phrases, and sentences in human language. It explores how language conveys meaning, how different words relate to each other, and how context affects interpretation.
- **Focus**: The focus of semantics is on understanding meaning from a human perspective. It examines topics such as lexical meaning (the meaning of individual words), compositional meaning (how words combine to form meaningful sentences), and pragmatic meaning (how context and intention shape interpretation).
- **Methods**: Semantics relies on linguistic theory, philosophy, logic, and cognitive approaches to analyze how meaning is structured and interpreted by human beings. It is often concerned with formal theories of meaning, like truth-conditional semantics, which links the meaning of sentences to conditions under which they are true or false.

Computational Semantics:

- **Definition**: Computational semantics, on the other hand, is a field of artificial intelligence and computational linguistics that aims to enable computers to understand, process, and generate meaning from language. It applies formal semantic theories and computational models to represent linguistic meaning in a machine-readable way.
- **Focus**: The focus here is on developing algorithms and systems that can perform semantic tasks, such as understanding the meaning of texts, answering questions, or generating coherent and

contextually appropriate responses. It involves encoding linguistic meaning into formats that machines can process, often using formal logic, semantic parsing, or neural networks.

- **Methods**: Computational semantics uses tools such as machine learning, natural language processing (NLP), knowledge graphs, and formal languages (like predicate logic) to represent meaning. It also addresses practical challenges like handling ambiguity, polysemy (multiple meanings of a word), and incorporating context into machine understanding.

In essence, semantic processing is at the core of language understanding. It comprises a myriad of related tasks, which need to be tackled in order to grasp the meaning of texts[1]. semantics provides the theoretical framework for meaning, while computational semantics brings that understanding into practical application for machines, driving innovation in AI and enhancing human-computer interaction. Semantics is the study of meaning in language. It can be applied to entire texts or to single words. In linguistics, semantics is the subfield that studies meaning. Semantics can address meaning at the levels of words, phrases, sentences, or larger units of discourse. One of the crucial questions which unites different approaches to linguistic semantics is that of the relationship between form and meaning[2]

In short, while semantics is about understanding meaning for humans, computational semantics is about making meaning interpretable for machines.

Computational semantics is one of the most essential parts of computational linguistics research. Computational semantics is a relatively new discipline that combines insights from formal semantics, computational linguistics, and automated reasoning. The aim of computational semantics is to find techniques for automatically constructing semantic representations for expressions of human language, representations that can be used to perform inference. [3]This study refers how to automatize the process of constructing and reasoning with meaning representations of natural language expressions. It consequently plays an important role in natural-language processing and computational linguistics. In these following areas the meanings of this term in different references are given:

- Computational semantics is concerned with computing the meanings of linguistic objects such as sentences, text fragments, and dialogue contributions. As such it is the interdisciplinary child of semantics, the study of meaning and its linguistic encoding, and computational linguistics, the discipline that is concerned with computations on linguistic objects.[4]
- Computational semantics performs automatic meaning analysis of natural language. Research in computational semantics designs meaning representations and develops mechanisms for automatically assigning those representations and reasoning over them. Computational semantics is not a single monolithic task but consists of many subtasks, including word sense disambiguation, multi-word expression analysis, semantic role labeling, the construction of sentence semantic structure, coreference resolution, and the automatic induction of semantic information from data.[5] (Oxford research encyclopedia)

In conclusion, semantics and computational semantics are essential fields that bridge human language understanding and machine interpretation. Semantics provides the theoretical framework for analyzing

[1] Computational semantic analysis of language: SemEval-2007 and beyond | Language Resources and Evaluation (springer.com)
[2] Kroeger, 2019: 4; Betti,
Igaab & Al-Ghizzi, 2018: 264

[3] Computational Semantics Patrick BLACKBURN, Johan BOS
[4] (PDF) Computational Semantics (researchgate.net)
[5] Computational Semantics | Oxford Research Encyclopedia of Linguisticsc

meaning, while computational semantics translates these theories into practical models for AI and natural language processing. Together, they enable advancements in machine translation, information retrieval, and human-computer interaction, contributing to more sophisticated, context-aware technologies. Continued research in both areas will enhance our understanding of language and further develop intelligent systems capable of processing complex, nuanced meaning.

Bibliography:

1. Erk, K. (2018, January 24). Computational Semantics. Oxford Research Encyclopedia of Linguistics. Retrieved 11 Oct. 2024, from https://oxfordre.com/linguistics/view/10.1093/acrefore/9780199384655.001.0001/acrefore-9780199384655-e-331.
2. Agirre, Eneko, Lluís Màrquez & Richard Wicentowski. 2009. Computational semantic analysis of language: SemEval-2007 and beyond. Language Resources and Evaluation 43(2). 97–104. http://dx.doi.org/10.1007/ s10579-009-9091-2
3. Bunt, Harry & Muskens, Reinhard. (1999). Computational Semantics. 10.1007/978-94-011-4231-1_1.
4. Kroeger, 2019: 4; Betti, Igaab & Al-Ghizzi, 2018: 264
5. Mamatov, G. B. R. (2024). IMPLEMENTATION OF THE EDUCATION SYSTEM OF EUROPEAN COUNTRIES. Innovations in Technology and Science Education, 3(19), 135-139.
6. Bozorova, G. M., Mamatov, R. R., Adaxamjonov, A. A., & Jaloldinov, M. S. (2024). THE USE OF INFORMATION TECHNOLOGY IN THE FORMATION OF PROFESSIONAL COMPETENCE OF FOREIGN LANGUAGE TEACHERS. Science and innovation, 3(Special Issue 19), 352-354.
7. Mukhammadalievna, B. G. (2023). THEORETICAL VIEWS ON PROVERB IN GERMAN AND UZBEK. International journal of advanced research in education, technology and management, 2(4).
8. Аблаева, Н. К. (2024). ПРОБЛЕМЫ ИЗУЧЕНИЯ ЛИТЕРАТУРЫ В СОВРЕМЕННОЙ ШКОЛЕ. INTERNATIONAL JOURNAL OF RECENTLY SCIENTIFIC RESEARCHER'S THEORY, 2(5), 152-156.
9. Аблаева, Н. К. (2024). РОЛЬ ПРИРОДЫ В ДРАМЕ ОСТРОВСКОГО «ГРОЗА». MODERN PROBLEMS IN EDUCATION AND THEIR SCIENTIFIC SOLUTIONS, 8(8), 176-181.
10. Аблаева, Н. К. (2024). ИСПОЛЬЗОВАНИЕ ФОЛЬКЛОРНЫХ ЭЛЕМЕНТОВ В БАЛЛАДЕ В. ЖУКОВСКОГО «СВЕТЛАНА». YANGI O ‘ZBEKISTON, YANGI TADQIQOTLAR JURNALI, 1(3), 129-132.
11. Аблаева, Н., & Джуманиязова, И. (2024). ВОЗМОЖНОСТИ КОРПУСНОЙ ЛИНГВИСТИКИ В ИЗУЧЕНИИ РУССКОГО СЛОВООБРАЗОВАНИЯ. «CONTEMPORARY TECHNOLOGIES OF COMPUTATIONAL LINGUISTICS», 2(22.04), 520-524.
12. Аблаева, Н. К. (2024). НРАВСТВЕННО-ФИЛОСОФСКАЯ ПРОБЛЕМА В ТВОРЧЕСТВЕ ЛН Толстого (на примере романа" Война и мир"). JOURNAL OF SCIENTIFIC RESEARCH, MODERN VIEWS AND INNOVATIONS, 1(1), 24-27.
13. Маджидова, Р. У., Мухитдинова, Х. С., & Оманов, П. Х. РОЛЬ ЛИНГВОСТРАНОВЕДЧЕСКИХ МУЛЬТИМЕДИЙНЫХ СРЕДСТВ В ПРЕПОДАВАНИИ УЗБЕКСКОГО ЯЗЫКА КАК ИНОСТРАННОГО. ‘‘ЎЗБЕКИСТОН ОЛИМЛАРИ ВА ЁШЛАРИНИНГ ИННОВАЦИОН ИЛМИЙ-АМАЛИЙ ТАДҚИҚОТЛАРИ’’7-ҚИСМ, 149.
14. Маджидова, Р. У. (2019). Антропоцентризм и аксиологическая картина мира. Наука, техника и образование, (6 (59)), 67-71.
15. Majidova, R. U. (2023). LANGUAGE AS A COMMUNICATION TOOL: UNDERSTANDING ITS FUNCTIONS AND IMPLICATIONS. " GERMANY" MODERN SCIENTIFIC RESEARCH: ACHIEVEMENTS, INNOVATIONS AND DEVELOPMENT PROSPECTS, 9(1).
16. Маджидова, Р. (2018). РЕЧЕВОЕ ПОВЕДЕНИЕ ЧЕЛОВЕКА В СОЦИОЛИНГВИСТИЧЕСКОЙ И ПСИХОЛИНГВИСТИЧЕСКОЙ ТРАКТОВКАХ. Farg'ona davlat universiteti, (1), 20-20.