COMPUTATIONAL LINGUISTICS AND INTERDISCIPLINARY PERSPECTIVES FOR ENGINEERING

Larysa Lomakina

Senior Lecturer,

National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

Recently, interest in language has gone beyond the limits of linguistic problems. Modern linguistics includes a huge number of directions, topics, and it is very difficult to determine its boundaries. However, it is well known that phonetics, phonology, syntax and semantics are at the center of interest of linguistics, which together constitutes the grammar of a language. A relatively new and rapidly developing section of linguistics is pragmatics, which, in turn, is associated with semantics and other sections of linguistics. Psycholinguistics studies the connection between languages and thinking, sociolinguistics is the science of language and society, applied linguistics is associated with the use of linguistics in teaching languages, computational – studies the use of computers to copy a language, etc. All these sections are closely related to each other. Recently, sociolinguistics, formed within the mother science of linguistics, but through interaction with related fields, has attracted more and more interest.

Modern applied linguistics (AL) is almost as diverse as the field of human practical activity. It studies the methods of solving practical problems associated with the use of language – teaching, translation, terminological activities and other.

Applied linguistics is based not only on the achievements of a common linguistic theory, but also affects its development. Usually, special research is needed to solve practical problems that make up the main content of the AL.

The main directions of AL: fixation and storage of speech information – the creation of alphabets and writing, spelling, practical transcription and transliteration (mainly in relation to geographical names and proper names), the creation of information languages; transmission of speech information – translation theory (mainly scientific and technical), creation of automatic translation systems; automatic speech recognition and synthesis, theory of teaching a non-native language, deaf education

(deaf-and-dumb language learning), the theory of speech intelligibility (to optimize the transmission of speech through communication channels); automation of intellectual activity related to the use of language – the creation of artificial intelligence systems (automated) information search systems, systems for automatic annotation and information reference systems; the use of language in medicine – neurolinguistics (speech pathology, aphasia as a means of diagnosing brain damage), etc.

Particular attention is paid to the interaction of linguistics with technical sciences. An interdisciplinary approach should be understood as a way of interaction between sciences when knowledge is achieved only when combining the efforts of individual sciences. Interdisciplinarity combines various theoretical assumptions, methodologies and practices that come from the disciplines involved in scientific research. This means, first of all, the cooperation of various scientific fields, the circulation of general concepts for understanding a certain phenomenon. The deepening of interdisciplinarity implies the inclusion in the "partnership" of new combinations of multidirectional sciences, which were not previously involved in solving such problems.

Applied linguistics is currently on the rise. The most promising area of modern applied linguistics is computational linguistics associated with hypertext technologies that appeared with the development of the global Internet. Another direction is also associated with computer technologies – computer design of text and its components. The software allows you to combine printed text and graphic elements of the original layout into a single unit. In this case, the text acts as an element of the image, and the image as part of the text.

Computer or computing linguistics is focused on the use of computer tools: programs, computer technology organizations and language data processing.

As a special direction, computational linguistics appeared in the 60s. This term is a tracing of the English "computational linguistics". The English equivalent can be translated both as a computer and as a computational one.

The most important conceptual categories of computer linguistics are such knowledge structures as "frames", "scenarios", "plans". The most important areas here

are the development of information and search engines, the compilation of automatic dictionaries and machine translation systems, automatic speech recognition and synthesis, the development of automatic annotation methods, referencing and translation, development of expert systems.

Computational linguistics competence also includes a machine or automatic translation (text transformation in one language to an equivalent text in another language). The term computer linguistics is wider than the term computing linguistics, as it sets a general orientation towards the use of computers for solving a variety of scientific and practical problems, without limiting ways to solve these problems. The term computational linguistics can be understood more narrowly, since even with a broad interpretation of the concept of computation, such aspects of solving linguistic problems as, for example, the representation of knowledge, the organization of language data banks, the psycholinguistic aspects of human-computer interaction, etc. Thus, it can be considered that the term computer linguistics (in its internal form) is broader than computational linguistics.

Computational linguistics is the scientific and engineering discipline that deals with understanding of written and spoken language from a computational point of view and creating artifacts that usefully process and construct a language, either in bulk or interactively. Since language is a mirror of the mind, computerized understanding of language also provides insight into thinking and intelligence. And since language is our most natural and most versatile medium of communication, linguistically literate computers will greatly facilitate our interaction with machines and software of all kinds and give us access to vast text and other resources in ways that truly fit our Internet needs.

The theoretical goals of computational linguistics include the formulation of grammatical and semantic structures for characterizing languages in ways that provide a computationally controlled implementation of syntactic and semantic analysis; the discovery of processing methods and teaching principles that use both structural and distribution (statistical) properties of the language; and developing cognitively and

neurobiologically plausible computational models of how language processing and learning can occur in the brain.

It should be noted that practical goals are very diverse. The most common are the following: a quick efficient text searching; question answering (QA); correct machine translation (MT); text and speech analysis; text summarization; interactive agents for specific tasks (shopping, troubleshooting, travel planning, scheduling, medical consultations, etc.); the creation of computing systems with human abilities.

The methods used in theoretical and practical studies of computational linguistics are often based on theories and researches of theoretical linguistics, computer science, philosophical logic, cognitive science. Until the 1970s, these methods were theoretically neutral, and the main task was to develop practical methods for applications such as MP and simple quality control.

In machine translation, the central issues were lexical structure and content, the characterization of "sublanguages" for certain areas (for example, weather reports), and translation from one language to another (for example, the use of special graph transformation grammars or transfer grammars). In QA, the problem was in the characterization of templates of questions encountered in a specific area, and the relationship of these question templates with forms in which the answers can be stored, for example, in a relational database (Schubert, 2020).

The interdisciplinary structure of Igor Sikorsky Kyiv Polytechnic Institute's education content is based on the involvement of predominantly natural and technology sciences (nanotechnology, biotechnology, aerospace technologies), which can be "raised" only with the participation of a group of faculties – through appropriate research and educational programs.

At Igor Sikorsky Kyiv Polytechnic Institute, traditional interdisciplinarity was implemented in the educational process in 18 branches of knowledge, 42 specialties and 168 specializations, harmonized with almost all fundamental, applied, engineering sciences (Sydorenko,Yudkova & Kovtun, 2018).

In accordance with the modern needs of both the country and Igor Sikorsky Kyiv Polytechnic Institute, new solutions could be sought on the basis of deepening interdisciplinarity in the content formation of the educational process.

References

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