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The Impact of the Intersection Between Computational Linguistics and Various Disciplines

Yufan Yuan

Zhejiang Hangzhou Zhejiang University of Science and Technology 310000

Abstract: With the continuous development of modern social science and technology, the integration of linguistics and computers has formed computational linguistics. In the process of continuous development, computational linguistics has formed a certain degree of interdisciplinary impact on other disciplines. This article will discuss what computational linguistics is and its impact on the intersection of different disciplines.

Keywords: Computational linguistics; Cross-influence; Different disciplines; What is it

First of all, many people will have a question, what computational linguistics is? Computational linguistics is an interdisciplinary discipline, and the intersection between various disciplines is mainly divided into two different types, namely, close intersection and distant intersection. To briefly summarize, close intersection refers to the disciplines and fields generated by the intersection between two similar disciplines. For example, the intersection between computers and mathematics can be called close intersection, or similar to the intersection between various sub disciplines under the social sciences.

As for distant crossing and distant crossing disciplines, such as disciplines formed by the intersection of natural science and social science, there are significant differences in theories, methods, and other aspects of their source disciplines. Source disciplines from different fields may adopt different research methods, making it more difficult to integrate their knowledge, and the competition and game between source disciplines more obvious. Subject development is fast, and source disciplines that can better meet the needs of interdisciplinary disciplines gradually gain the upper hand in the competition; Subject development is slow, and source disciplines that cannot well meet the needs of interdisciplinary disciplines will gradually be weakened or even eliminated [1].

From this, it can be seen that there is also a competitive relationship between the intersection of various disciplines, with the survival of the fittest. Computational linguistics, as a discipline formed by the intersection of computer and linguistics, exists as an interdisciplinary discipline, while computer and linguistics exist as source sciences. Although computational linguistics is gaining the upper hand at present, it does not mean that the knowledge of linguistics or computer science in computational linguistics will be completely eliminated in the future. Personally, the meaning of "survival of the fittest" refers to the fact that the proportion of knowledge and methods obtained from source science will decrease after computational linguistics forms an independent disciplinary research system based on the two source sciences, Because it already has its own independent system and research methods.

After a general understanding of what computational linguistics is, we can understand the impact of the intersection between computational linguistics and other disciplines from the basis of computational linguistics. They may not necessarily form any new disciplines, but the impact of computational linguistics on them is far-reaching.

In fact, the discipline with the most obvious impact of computational linguistics, I personally believe, should be in English teaching. What impact has the interaction between computational linguistics and foreign language teaching produced?

Foreign language teaching includes basic links such as listening, speaking, reading, writing, and translation. The role of corpus can be fully played in these five links. Written language corpus is suitable for teaching reading, writing, and translation, while oral language corpus is more suitable for teaching listening and speaking; In addition, corpus plays a prominent role in lexicography, textbook compilation, language testing, and other aspects. [2] The careful integration, division, and labeling of language materials in

a corpus can definitely make people's use of foreign languages more systematic and high-speed. When sorting out the knowledge of these materials, it must be very logical, not only for the integration of materials, but also for the translation software born of computational linguistics, Through searching within the corpus and translating and restructuring the original sentence based on the sentence syntax generated by the constructed mathematical model, machine translation has been able to achieve a high accuracy rate with continuous improvement and development, bringing a lot of help to human life and other aspects. When people want to make changes and correct errors in their written articles, they can use the artificial intelligence translation born of computational linguistics to help them. Although machines currently cannot make perfect changes, they can definitely help people improve their writing accuracy and efficiency.

At the same time, there is the birth of voice interaction, which is generated by the interaction between computational linguistics, acoustics, and foreign language teaching. A speech synthesis system automatically converts text information input to a computer into speech signals. Its working principle can be described as follows: The system extracts corresponding speech fragments from a speech database based on a speech model, and then combines, adjusts, and modifies them, Finally, a satisfactory voice output is generated for text input. Companies such as Kingsoft PowerWord have such speech synthesis engines on their websites. Because a speech database can capture native speakers' pronunciation, a speech synthesis system can generate corresponding native speakers' speech fragments for various text fragments, thereby helping foreign language learners to correct their pronunciation and improve their listening proficiency. [3] In addition to helping foreign language learners, the use of voice interaction has also been applied to mobile phones, cars, and computers. Currently, Siri in mobile phones and speech recognition in cars are within the scope of its application. The development of the future world shows that computational phonetics will inevitably have a very broad application in the future world. For example, ChatGPT, which has become very popular recently, as an artificial intelligence and has achieved the degree to which it can even help humans write a complete paper based on keywords, it is obvious that it cannot be separated from the contributions of computational linguistics. Someone has done an experiment before. If ChatGPT is used to participate in China's college entrance examination, how many scores will it receive? What is striking is that the final score of ChatGPT can already be admitted to undergraduate universities in China, and its functions continue to grow and optimize with everyone's use of it, ChatGPT's corpus is constantly being enriched, and it is being used to solve more and more problems,which is an important development direction of computational linguistics in the future.

The application of computational linguistics goes far beyond that, and it is also helpful for cultural research. Ren Shaotang of the United States wrote a book called "Food Linguistics", in which he studied the culture, history, and other aspects behind food through the expression of language. This is a very interesting thing, and it opens up a new path, such as studying why Apple is called "apple" through computational linguistics, The use of computers to study the linguistic and phonetic changes of the word "apple", as well as its symbols and eating methods in different eras, as well as the occurrence, frequency, and representation of apple in literary works, is studied by integrating these data into a large data model, The same method is not only applicable to food, but also can be used for archaeological research, such as scientific data statistics and analysis of ancient Greece, Rome, ancient Chinese phonetic culture, and many other aspects. From this, it can be seen that its help in cultural research is also very useful.

In the other hand, I would also like to talk about the impact of computational linguistics on linguistics. Although linguistics may no longer be considered the impact of interaction among other disciplines for computational linguistics, as one of the source disciplines of computational linguistics, linguistics and computational linguistics have mutual forces and influence each other. In particular, computational linguistics has formed a very significant and far-reaching impact on linguistics, I have to mention this point. First of all, linguistics mainly consists of morphology, syntax, semantics, lexicology, and other aspects. Next, I will discuss the main impact of computational linguistics on these aspects.

Computational linguistics first had an impact on syntax. The famous mathematical logician Basil proposed categorical grammar, which established a set of formal syntax and calculus rules. Through finite step calculus, one can determine whether a sentence is grammatical or not. In morphology, a computer-based automatic morphological analysis scheme can include a stem dictionary, a system for describing morphological changes and word formation rules. There are both inflections and derivatives. [4] In this way, given the stem during analysis, the computer can automatically list all its changes; As for semantics, in the application of computational linguistics, some theories directly use semantic models as guidance, supplemented by syntactic checking, breaking the traditional pattern of using syntactic models as guidance, supplemented by semantic checking, and achieving the integration of syntax, semantics, and semantics in natural language processing. [5]Computational linguistics is no different from the development of syntax, which has taken a significant leap forward in syntax and semantics. Compared to people choosing to turn to dictionaries to think about how to analyze the structure of a sentence and conduct contextual research based on its semantics, using computers is

definitely more convenient.

Finally, in terms of lexicology, computational linguistics introduces the method of "unit segmentation" through computer models and programming to segment languages, such as words, words, and sentences, and then applies these units to the places they need. This not only improves the speed of language retrieval, but also makes the compilation of some knowledge dictionaries more convenient. There is no doubt that, With the amazing statistical capabilities of computers, the compilation efficiency of each segmented word and the words it can combine to form has improved more than a little compared to human manual work. For example, in some studies of classical literature, word segmentation by computers can lead to the discovery of many new words, which are preprocessed through preliminary segmentation and interpretation of the corpus, and then calculated using N-gram algorithm, Combined with methods such as "left and right information entropy" and "mutual information", it is even possible to discover new words in classical literature and incorporate them into the big data statistics of the computer itself. Although this method is not particularly mature at present, in the future era of continuous development of technology, the segmentation method of computational linguistics to study literature must be one of the mainstream trends and means.

The above is a brief overview of the profound but interesting discipline of computational linguistics and its impact on the interaction with other disciplines in today's society. Although this discipline has not existed for that long, it seems to be a new discipline, But from the point of view of its current function, it has produced a very huge force in social development, its existence is not only equivalent to the innovation of computer technology, but also symbolizes the future era towards the direction of high-tech gradual development, but also a representative of social progress, inherited from linguistics, innovation in science and technology, this discipline is a perfect combination of traditional historical disciplines and modern science and technology, the future will appear more disciplines similar to computational linguistics, It will surely carry a more important role in the future development of society and may have more functions to discover in the future.

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