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What is Computational Linguistics?

Computational linguistics (CL) is the study of computational aspects of language. Concerned with linguistics and computer science CL belongs to the cognitive sciences and overlaps with the study of artificial intelligence (AI), a branch of computer science that develops computational models of human cognition.

The applied component of CL focuses on the practical outcome of modeling human language use. The goal is to create software prototypes that have some knowledge of human language. Such prototypes are urgently needed for improving human-machine interaction since the main obstacle in the interaction between human and computer is one of communication (keep this item in mind when we discuss the use of HPSGs). Today's computers do not understand our language, and humans have difficulties to understand the computer's language, which does not correspond to the structure of human thought.

Natural language interfaces enable the user to communicate with the computer in German, English or another human language. Some applications of such interfaces are database queries, information retrieval from texts and expert systems. Current advances in recognition of spoken language improve the usability of many types of natural language systems. Communication with computers using spoken language will have a lasting impact upon the work environment, opening up completely new areas of application for information technology.

Although existing CL programs are far from achieving human ability, they have numerous possible applications. Even if the language the machine understands and its domain of discourse are very restricted, the use of human language can increase the acceptance of software and the productivity of its users.

Much older than communication problems between human beings and machines are those between people with different mother tongues. One of the original goals of applied computational linguistics was fully automatic translation between human languages. From bitter experience scientists have realized that they are far from achieving this. Nevertheless, computational linguists have created software systems which can simplify the work of human translators and clearly improve their productivity.

The future of applied computational linguistics will be determined by the growing need for user-friendly software. Even though the successful simulation of human language competence is not to be expected in the near future, computational linguists have numerous immediate research goals involving the design, realization and maintenance of systems which facilitate everyday work, such as grammar checkers for word processing programs.

Theoretical CL takes up issues in formal theories. It deals with formal theories about the linguistic knowledge that a human needs for generating and understanding language. Today these theories have reached a degree of complexity that can only be managed by employing computers. Computational linguists develop formal models simulating aspects of the human language faculty and implement them as computer programmes. These programmes constitute the basis for the evaluation and further development of the theories. In addition to linguistic theories, findings from cognitive psychology play a major role in simulating linguistic competence. Within psychology, it is mainly the area of psycholinguistics that examines the cognitive processes constituting human language use.

The special attraction of computational linguistics lies in the combination of methods and strategies from the humanities, natural and behavioural sciences, and engineering.

SEE ALSO: http://www.aclweb.org/archive/what.html which contains:

* Chapter 1 of Christopher D. Manning and Hinrich Sch|tze, 1999, Foundations of Statistical Natural Language Processing, MIT Press, Cambridge, MA.
* Chapter 1 of Daniel Jurafsky and James H. Martin, 2000, Speech and Language Processing, Prentice Hall, Upper Saddle River, New Jersey.