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Recent advances in spoken language understanding

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This presentation will review the state of the art in spoken language understanding.

After a brief introduction on conceptual structures, early approaches to spoken language understanding (SLU) followed in the seventies are described. They are based on augmented grammars and non stochastic parsers for interpretation.

In the late eighties, the Air Travel Information System (ATIS) project made evident problems peculiar to SLU, namely, frequent use of ungrammatical sentences, hesitations, corrections and errors due to Automatic Speech Recognition (ASR) systems. Solutions involving statistical models, limited syntactic analysis, shallow parsing, were introduced.

Automatic learning of interpretation models, use of finite state models and classifiers were also proposed; Interesting results were found in such areas as concept tags detection for filling slots in frame systems, conceptual language models, semantic syntax-directed translation, stochastic grammars and parsers for interpretation, dialog event tagging.

More recent approaches combine parsers and classifiers and reconsider the use of probabilistic logics. Others propose connectionist models and latent semantic analysis.

As interpretation is affected by various degrees of imprecision, decision about actions should depend on information states characterized by the possibility of having competing hypotheses scored by confidence indicators. Proposed confidence measures at the acoustic, linguistic and semantic level will be briefly reviewed.

Applications, portability issues and the research agenda of the European project LUNA will be described.