Essential Ambiguity: The Role of Context in Natural-language Processing

Barbara J. Grosz
Harvard University

Communication in natural languages depends on the use of contextual information to elaborate what has been literally said, removing ambiguity and further specifying content. In *The Lives of a Cell*, Lewis Thomas [Lewis1974, p. 94] wrote that “ambiguity seems to be an essential, indispensable element for the transfer of information from one place to another by words, where matters of real importance are concerned.” In their initial introduction to situation theory, Barwise and Perry [Barwise and Perry1983, p. 32] emphasize another facet of this property of language: “But what is important, after all, is the fact that expressions, whether simple or complex, can be recycled, can be used over and over again in different ways, places, and times and by different people, to say different things. This is what we mean by the efficiency of language.”

This essential and powerful feature of natural languages has presented one of the major challenges to natural-language processing research. It is well known that context is important at every level of analysis, from interpretation of the speech signal and identification of word meaning to composition of phrase or sentence meaning and the determination of utterance intention within a discourse. But questions of exactly what “context” encompasses, how to represent context, and when and how to utilize contextual information have yet to be fully answered. Significant research issues remain in determining appropriate ways to represent and reason about context so that the “ambiguity” that Thomas considers so powerful will increase rather than decrease the “efficiency of language” (in Barwise and Perry’s sense) for computer systems.

This talk will examine some of the major context-dependencies that arise in language use, describe techniques from natural-language processing research for utilizing context in interpretation and generation, and discuss open research issues.

References
