The field of natural language processing (NLP) has changed dramatically in recent years. Indeed, when we visited the topic five years ago, we concentrated on theoretical developments such as knowledge representation. Today, the combination of pressure from U.S. government funders—in particular, the specific goals of various ARPA programs—and the Zeitgeist itself have pushed NLP toward specific applications, systems evaluation, and above all, larger-scale language processing systems.

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Theoretical issues remain very important, but there is growing skepticism about the importance of small-scale, research systems and whether many of them are genuinely original, as opposed to being notational variants in a field not very aware of its own history. Rumor has it the word “hermeneutics” is now regularly heard in the corridors of Palo Alto research centers and that may be a sure sign of desperation among some of the more theoretically oriented.
The shift in U.S.-based work has been driven to a considerable degree by closer integration within the ARPA speech and language community. The evidence includes pressure to integrate speech and written language R&D, to rediscover statistical methods and reopen liaisons with traditional information retrieval work, and to make use of large text corpora, including existing machine-readable dictionaries as a way of producing larger systems faster. All this has been allied to a renewed U.S. government interest in work on languages other than English, that has gone as far as funding a variety of approaches to machine translation after an interval of many years.

The new interests have also taken institutional forms, such as the foundation of the Linguistic Data Consortium at the University of Pennsylvania and the Consortium for Lexical Research at New Mexico State University, with the help of government funds. The emphasis has been on consolidation of past work; on an openness to cooperation, including international resources and research; and, more importantly, on practical NLP systems that can be evaluated and benchmarked by improvements, such as natural language front ends to databases, translation, and the rapid extraction of information from text on a large scale.

Speech is undoubtedly natural language: linguists who would not be trusted within NLP on any other topic have always assured us that speech is the very essence of language. However, speech research was substantially treated in the last survey published in Communications (August 1990). In this issue we shall include it only in the context of recent work; for example, at IBM, speech methodology has been successfully incorporated into NLP, particularly into machine translation based on large multilingual corpora.

As we will emphasize in this section, the shift to more applications-driven work is not confined to the U.S. In Japan, NLP has been central to the Fifth Generation project of government-funded cooperative work on applications. Japanese NLP has been made more central within artificial intelligence as a whole than it is in the U.S. and Europe, and machine translation has none of the negative connotations that still cling to it to some degree on other continents. The Electronic Dictionary Research Center was also founded in Tokyo to emphasize the role of large lexicons for cooperative NLP research.

In Europe, there was the Eurotra machine translation project, funded for a decade by the European Economic Union in an attempt to reproduce a machine translation system with at least the quality of the System. This has not been achieved, though the effects on cooperative work and training have been substantial. It is still unclear whether Eurotra’s limited progress has been a management problem or a result of the particular theoretical and representative schemes that were chosen for the work. More productive have been the large-scale lexical projects, like Aquillex and Genelex, that have the same motivations as the work in the U.S. and Japan, but with a very different flavor and approach resulting from the intensive international cooperation required for support from the Economic Union.

The move to the large scale, to applications, and to evaluation in NLP is worldwide at the moment. Clearly, it is an attempt to see what can be gained concretely from all the advances that have been developed in systems and hardware, as well as theoretical and representational techniques, over the last decades.

It is true that some of the applications surveyed here contain what are little more than bags of tricks, as our authors would readily admit. However, it is worth remembering Bar-Hillel’s famous squib, when he claimed it would be bags of tricks and not theory that would advance computational linguistics in the future. Nonetheless, those simple methods soon hit limits, and what is now under intense discussion is whether greater advances than we have so far seen will come from theoretical breakthroughs or from optimization of the techniques already to hand. The answer is not yet known, but this opposition splits the field into those who see it as more like chemistry, awaiting discoveries, presumably from linguistics, and those who see it as engineering, needing patient and persistent optimization.

The structuring of this special section has given rise to some problems: For one thing, the contrast to previous work and the prominence of application-oriented work dictates many of the topics and techniques we should cover. The remaining problem was whether work we describe should be classified by tasks, resources, or techniques.

In the end, we have opted for a combination of these. Thus, our featured articles are really a taxonomy by resources. Had we divided the area only by techniques, then connectionism would certainly have had a separate focus, since its methods have been applied to many traditional areas of language analysis, such as speech, morphology, and lexical disambiguation. Instead, it is scattered across several articles.

One division that was never considered was that of traditional linguistic levels, such as syntax, morphology, or text analysis. That division no longer corresponds to anything empirical. However, more theoretically oriented work is not ignored here, and some of it is admirably described by Wiebe, Hirst, and Horton.

The articles presented here represent an inevitable compromise among resources, techniques, and task areas. I believe it’s the right mix for this particular moment. ☞