

Briefly Noted

Wired for Speech: How Voice Activates and Advances the Human–Computer Relationship

Clifford Nass and Scott Brave
(Stanford University)

Cambridge, MA: The MIT Press,
2005, xix+296 pp; hardbound,
ISBN 0-262-14092-6, \$32.50

Spoken dialogue systems have received increased interest because they are potentially much more natural and powerful methods of communicating with machines than are current graphics-based interfaces. *Wired for Speech* presents basic research in the psychological and sociological aspects of voice synthesis and recognition. Its major lesson is that people attribute human characteristics to spoken dialogue systems for reasons related to human evolution. But although it contains interesting basic research, the book is mainly aimed at giving technological or marketing advice to those seeking to use voice interfaces when creating commercial applications.

The book is oriented around a series of simple experiments designed to show just how pervasive psychological and social influences can be on the opinions and behaviors of people confronted with voice interfaces. Each chapter describes a basic research hypothesis, introduces an experiment to test it, and discusses its implications for designing voice interfaces: gender, personality, accent, ethnicity, emotion, number of distinct voices, use of “I” by the system, voices in concert with faces, mixed synthetic and recorded voices, context, and the effects of errors in human–computer cooperation.

Although *Wired for Speech* is very accessible, especially to the non-scientist, it is written with an unusual bibliography style for an academic book: All references and details are given in a notes section at the end of the book, making up one third of the content. This narrative exposition style will probably not satisfy either type of reader: Scientists will be frustrated at the imprecision in argumentation, lack of detail in the book itself, and continually having to refer to the notes. The lack of detail also prevents the book from serving as a reference work. Meanwhile those needing advice when implementing voice

interfaces will be puzzled at references to Chomsky, Grice, and Zemplin. Thus the book seems to suffer from not knowing its audience well, which is odd as this is precisely the lesson that the book tries to impart.

Another complaint from the scientific point of view is the obsession this particular book has with casting every experimental result as advice for the business and marketing side of voice interfaces, typically concentrating on Web-based e-marketing examples such as buying books on line. Most of the experiments have sample sizes of between 40 and 50, but the authors seem ready to invite multi-billion-dollar businesses to immediately base their deployed systems on these results.

Finally, and fundamentally, this book represents research on psychology and sociology, and the impact of these approaches on the interactions between people and machines. It contains very little linguistic content (for instance, text-to-speech system (TTSs) are described only in terms of their ability to modify pitch, pitch range, volume, etc.) and some of the linguistic detail is wrong, such as the discussion on dialects in the chapter on accent, race, and ethnicity, as well as lexical alignment.

Wired for Speech may hold a strong place in the literature on practical advice for human–computer interaction, but computational linguistics readers should get this book only if they want to do research on implementations of spoken dialogue systems and be aware of potential complications when designing experiments that will use such systems.—
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[M. Lothaire (pseud.)]

Applied Combinatorics on Words

M. Lothaire (pseud.)

Cambridge, UK: Cambridge University Press
(Encyclopedia of mathematics and its
applications, volume 105), 2005, xv+610 pp;
hardbound, ISBN 0-521-84802-4, \$125.00

Applied Combinatorics on Words is a coherently built sequence of chapters on the applications of formal languages and automata theory, particularly finite state. The term *word* in the title refers to what often is called a string (or ordered sequence) of symbols (from a finite set). Combinatorics are the operations over

such strings and sets thereof, including algorithms for, for example, recognition, manipulation, combination, and matching of such strings. The name *Lothaire* is a nom de plume for a group of authors.

The book is meant primarily for mathematics and computer science students and scholars. As the authors note in the preface to the book, the book does not present formal language and automata theory, and the reader is referred to other, more suitable books. What the book does provide is a mathematical (albeit limited) viewpoint on (formal) language processing: It contains many of the standard finite-state models, their representations, algorithms, and statistical enrichments as often employed in morphological processing, speech recognition, bioinformatics (applications on biological sequences), mathematics, theoretical physics, and number theory.

Basically, there are two chapters on topics related to computational linguistics: "Symbolic natural language processing" (by E. Laporte) and "Statistical natural language processing" (by M. Mohri). The term *natural language processing* in both chapters refers

largely to processing at the (sub)word level (morphological processing and speech recognition, respectively). The chapter by Mohri on statistical NLP constitutes an elegant introduction to the mathematical formulation of weighted automata (using semirings) and their application within speech recognition, and is highly recommended for the computational linguistics student and scholar. Unfortunately, the book contains little to nothing about higher-level linguistic processing (symbolic or statistical) as it has been practiced in the computational linguistics community over the last decade, e.g., statistical parsing, statistical machine translation, and other applications. Seen from a wide computer science perspective, the book may serve as a quick reference for standard mathematical definitions and algorithms on finite-state automata and their many applications. In short, this book could be of some interest to a reader seeking a well-formulated but dense overview of some of the major applications of weighted finite-state automata.—*Khalil Sima'an, Institute for Logic, Language and Computation, University of Amsterdam*