1. Record Nr. UNINA9910830695403321

Autore	Levinson Stephen E
Titolo	Mathematical models for speech technology [[electronic resource] /] / Stephen E. Levinson
Pubbl/distr/stampa	Chichester, West Sussex, England ; ; Hoboken, NJ, USA, : John Wiley, c2005
ISBN	1-280-27512-X 9786610275120 0-470-02091-1 0-470-02090-3
Descrizione fisica	1 online resource (283 p.)
Disciplina	006.4/54/015118 006.454015118 410.15118
Soggetti	Speech processing systems Computational linguistics Applied linguistics - Mathematics Stochastic processes Knowledge, Theory of
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. [243]-255) and index.
Nota di contenuto	Mathematical Models for Speech Technology; Contents; Preface; 1 Introduction; 1.1 Milestones in the history of speech technology; 1.2 Prospects for the future; 1.3 Technical synopsis; 2 Preliminaries; 2.1 The physics of speech production; 2.1.1 The human vocal apparatus; 2.1.2 Boundary conditions; 2.1.3 Non-stationarity; 2.1.4 Fluid dynamical effects; 2.2 The source-filter model; 2.3 Information-bearing features of the speech signal; 2.3.1 Fourier methods; 2.3.2 Linear prediction and the Webster equation; 2.4 Time-frequency representations; 2.5 Classification of acoustic patterns in speech 2.5.1 Statistical decision theory2.5.2 Estimation of class-conditional probability density functions; 2.5.3 Information-preserving transformations; 2.5.4 Unsupervised density estimation - quantization; 2.5.5 A note on connectionism; 2.6 Temporal invariance and

stationarity; 2.6.1 A variational problem; 2.6.2 A solution by dynamic programming; 2.7 Taxonomy of linguistic structure; 2.7.1 Acoustic phonetics, phonology, and phonotactics; 2.7.2 Morphology and lexical structure; 2.7.3 Prosody, syntax, and semantics; 2.7.4 Pragmatics and dialog; 3 Mathematical models of linguistic structure
3.1 Probabilistic functions of a discrete Markov process3.1.1 The discrete observation hidden Markov model; 3.1.2 The continuous observation case; 3.1.3 The autoregressive observation case; 3.1.4 The semi-Markov process and correlated observations; 3.1.5 The non-stationary observation case; 3.1.6 Parameter estimation via the EM algorithm; 3.1.7 The Cave-Neuwirth and Poritz results; 3.2 Formal grammars and abstract automata; 3.2.1 The Chomsky hierarchy; 3.2.2 Stochastic grammars; 3.2.3 Equivalence of regular stochastic grammars and discrete HMMs; 3.2.4 Recognition of well-formed strings
3.2.5 Representation of phonology and syntax4 Syntactic analysis; 4.1 Deterministic parsing algorithms; 4.1.1 The Dijkstra algorithm for regular languages; 4.1.2 The Cocke-Kasami-Younger algorithm for context-free languages; 4.2 Probabilistic parsing algorithms; 4.2.1 Using the Baum algorithm to parse regular languages; 4.2.2 Dynamic programming methods; 4.2.3 Probabilistic Cocke-Kasami-Younger methods; 4.2.4 Asynchronous methods; 4.3 Parsing natural language; 4.3.1 The right-linear case; 4.3.2 The Markovian case; 4.3.3 The context-free case; 5 Grammatical Inference
5.1 Exact inference and Gold's theorem5.2 Baum's algorithm for regular grammars; 5.3 Event counting in parse trees; 5.4 Baker's algorithm for context-free grammars; 6 Information-theoretic analysis of speech communication; 6.1 The Miller et al. experiments; 6.2 Entropy of an information source; 6.2.1 Entropy of deterministic formal languages; 6.2.2 Entropy of languages generated by stochastic grammars; 6.2.3 Epsilon representations of deterministic languages; 6.3 Recognition error rates and entropy; 6.3.1 Analytic results derived from the Fano bound; 6.3.2 Experimental results
7 Automatic speech recognition and constructive theories of language

Sommario/riassunto

Mathematical Models of Spoken Language presents the motivations for, intuitions behind, and basic mathematical models of natural spoken language communication. A comprehensive overview is given of all aspects of the problem from the physics of speech production through the hierarchy of linguistic structure and ending with some observations on language and mind. The author comprehensively explores the argument that these modern technologies are actually the most extensive compilations of linguistic knowledge available.Throughout the book, the emphasis is on placing all the material in