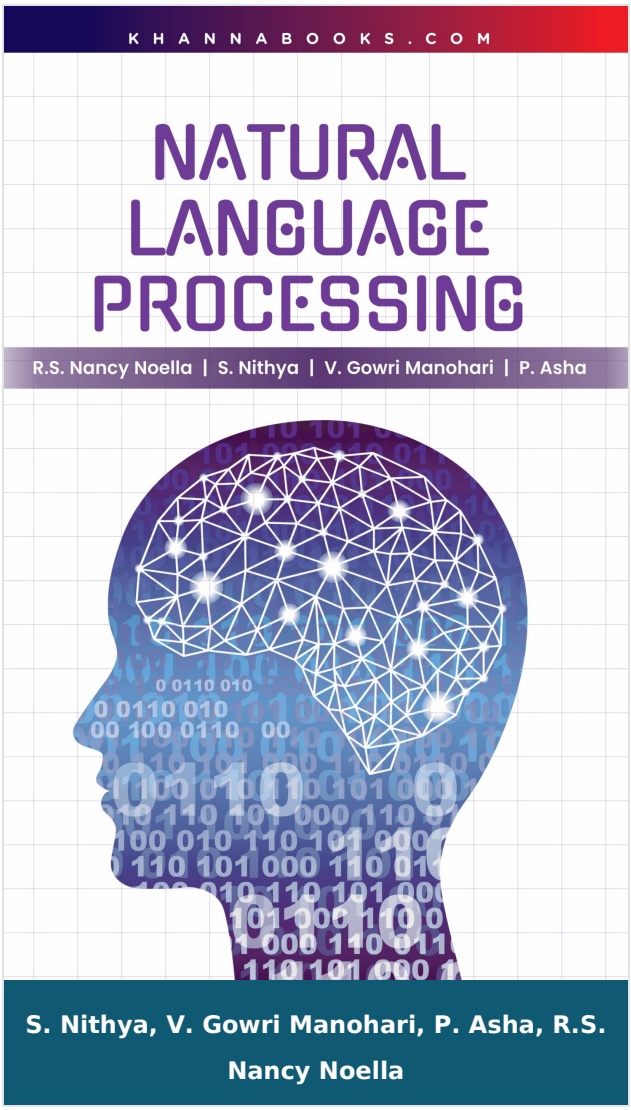

Natural Language Processing

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Product Description

This comprehensive text is an essential guide to the rapidly evolving field of Natural Language Processing (NLP), which sits at the dynamic intersection of linguistics, computer science, and artificial intelligence. The core theme is mastering the ability for computers to understand, interpret, and generate human language, a capability that powers modern AI applications from virtual assistants and machine translation to sentiment analysis and chatbots.

Designed to be a balanced and holistic resource, the book successfully bridges the critical gap between theoretical foundations and practical implementation. It systematically covers fundamental concepts like text preprocessing, tokenization, and language modeling, ensuring readers build a strong conceptual base. The practical value lies in its commitment to demystifying complex concepts, providing readers with the necessary tools to build, optimize, and deploy robust NLP systems effectively.

The text offers in-depth coverage of state-of-the-art architectures like transformers, BERT, and GPT, complemented by practical, hands-on examples using industry-standard frameworks such as PyTorch, TensorFlow, and Hugging Face. Furthermore, it extensively covers the entire phases of NLP—from lexical and syntactic processing to semantic interpretation and discourse analysis—ensuring a thorough understanding of the whole pipeline. The primary audience for this text is students seeking foundational knowledge, researchers looking to refine their expertise, and practitioners aiming to implement real-world NLP solutions. It is an indispensable resource for anyone dedicated to exploring and innovating in this exciting and interdisciplinary domain.

Salient Features:

• Foundational Concepts: Provides clear explanations of core NLP techniques, including tokenization, embedding, and language modeling, covering the phases of NLP from

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lexical to pragmatic analysis.

• State-of-the-Art Models: Includes in-depth coverage of current advancements, exploring transformer architectures, BERT, GPT, and other cutting-edge, highly efficient models for language tasks.

• Hands-on Implementation: Offers practical, hands-on examples using popular industry frameworks such as PyTorch, TensorFlow, and the Hugging Face library for real-world development.

• Syntactic-Semantic Pipeline: Explores the key NLP phases of syntactic parsing and semantic interpretation, including grammar, ambiguity resolution, and the use of Logical Forms.

• Context and Discourse: Dedicated coverage of World Knowledge and Discourse Structure, including knowledge representation techniques and the analysis of coherence and reference resolution.

• Real-World Applications: Features case studies and projects demonstrating the practical deployment of NLP in industry, covering applications like machine translation and sentiment analysis.

• Parsing & Grammar: Delves into advanced parsing techniques, including Probabilistic Parsing, Feature Structures, Augmented Grammars, and the Symbolic Approach to computation.

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