Introduction To Natural Language Semantics

Formal Semantics and Pragmatics for Natural Languages Franz Guenthner 2012-12-06 The essays in this collection are the outgrowth of a workshop, held in June 1976, on formal approaches to the semantics and pragmatics of natural languages. They document in an astoundingly uniform way the developments in the formal analysis of natural languages since the late sixties. The avowed aim of the workshop was in fact to assess the progress made in the application of formal methods to semantics, to confront different approaches to essentially the same problems on the one hand, and, on the other, to show the way in relating semantic and pragmatic explanations of linguistic phenomena. Several of these papers can in fact be regarded as attempts to close the 'semiotic circle' by bringing together the syntactic, semantic and pragmatic properties of certain constructions in an explanatory framework thereby making it more than obvious that these three components of an integrated linguistic theory cannot be as neatly separated as one would have liked to believe. In other words, not only can we not elaborate a syntactic description of (a fragment of) a language and then proceed to the semantics (as Montague pointed out already forcefully in 1968), we cannot hope to achieve an adequate integrated syntax and semantics without paying heed to the pragmatic aspects of the constructions involved. The behavior of polarity items, 'quantifiers' like any, conditionals or even logical particles like and and or in non-indicative sentences is clear-cut evidence for the need to let each component of the grammar inform the other.

Natural Language Processing with Python Steven Bird 2009-06-12 This book offers a highly accessible introduction to natural language processing, the field that supports a variety of language technologies, from predictive text and email filtering to automatic summarization and translation. With it, you'll learn how to write Python programs that work with large collections of unstructured text. You'll access richly annotated datasets using a comprehensive range of linguistic data structures, and you'll understand the main algorithms for analyzing the content and structure of written communication. Packed with examples and exercises, Natural Language Processing with Python will help you: Extract information from unstructured text, either to guess the topic or identify "named entities" Analyze linguistic structure in text, including parsing and semantic analysis Access popular linguistic databases, including WordNet and treebanks Integrate techniques drawn from fields as diverse as linguistics and artificial intelligence This book will help you gain practical skills in natural language processing using the Python programming language and the Natural Language Toolkit (NLTK) open source library. If you're interested in developing web applications, analyzing multilingual news sources, or documenting endangered languages -- or if you're simply curious to have a programmer's perspective on how human language works -- you'll find Natural Language Processing with Python both fascinating and immensely useful.

Linguistic Fundamentals for Natural Language Processing Emily M. Bender 2013-06-01 Many NLP tasks have at their core a subtask of extracting the dependencies—who did what to whom—from natural language sentences. This task can be understood as the inverse of the problem solved in different ways by diverse human languages, namely, how to indicate the relationship between different parts of a sentence. Understanding how languages solve the problem can be extremely useful in both feature design and
error analysis in the application of machine learning to NLP. Likewise, understanding cross-linguistic variation can be important for the design of MT systems and other multilingual applications. The purpose of this book is to present in a succinct and accessible fashion information about the morphological and syntactic structure of human languages that can be useful in creating more linguistically sophisticated, more language-independent, and thus more successful NLP systems. Table of Contents:

Acknowledgments / Introduction/motivation / Morphology: Introduction / Morphophonology / Morphosyntax / Syntax: Introduction / Parts of speech / Heads, arguments, and adjuncts / Argument types and grammatical functions / Mismatches between syntactic position and semantic roles / Resources / Bibliography / Author's Biography / General Index / Index of Languages

Introduction to Natural Language Semantics
Henriëtte de Swart 1998-01-01 This introduction is concerned with the semantics of natural languages. The text examines what issues semantics, as a theory of meaning, should address: determining what the meanings of words of the language are and how to semantically combine elements of a language to build up complex meanings. Logical languages are then developed as formal metalanguages to natural language. Subsequent chapters address propositional logic, the syntax and semantics of (first-order) predicate logic as an extension of propositional logic, and generalized quantifier theory. Going beyond extensional theory, de Swart relativizes the interpretation of expressions to times to account for verbal tense, time adverbials, and temporal connectives, and introduces possible worlds to modal intensions, modal adverbs, and modal auxiliaries.

Linguistic Fundamentals for Natural Language Processing II
Emily M. Bender
2019-11-06 Meaning is a fundamental concept in Natural Language Processing (NLP), in the tasks of both Natural Language Understanding (NLU) and Natural Language Generation (NLG). This is because the aims of these fields are to build systems that understand what people mean when they speak or write, and that can produce linguistic strings that successfully express to people the intended content. In order for NLP to scale beyond partial, task-specific solutions, researchers in these fields must be informed by what is known about how humans use language to express and understand communicative intents. The purpose of this book is to present a selection of useful information about semantics and pragmatics, as understood in linguistics, in a way that's accessible to and useful for NLP practitioners with minimal (or even no) prior training in linguistics.

Introduction to Natural Language Semantics
Henriëtte de Swart 1998-06-28 This introduction examines the semantics of natural languages.

Introduction to Montague Semantics
D. R. Dowty 2012-12-06 In this book we hope to acquaint the reader with the fundamentals of truth conditional model-theoretic semantics, and in particular with a version of this developed by Richard Montague in a series of papers published during the 1960's and early 1970's. In many ways the paper 'The Proper Treatment of Quantification in Ordinary English' (commonly abbreviated PTQ) represents the culmination of Montague's efforts to apply the techniques developed within mathematical logic to the semantics of natural languages, and indeed it is the system outlined there that people generally have in mind when they refer to "Montague Grammar". (We prefer the term "Montague Semantics" inasmuch as a grammar, as conceived of in current linguistics, would contain at least a phonological component, a morphological component, and other subsystems which are either lacking entirely or present only in a very rudimentary state in the PTQ system.) Montague's work has attracted increasing attention in recent years among linguists and philosophers since it offers the hope...
semantics can be characterized with the same formal rigor and explicitness that transformational approaches have brought to syntax. Whether this hope can be fully realized remains to be seen, but it is clear nonetheless that Montague semantics has already established itself as a productive paradigm, leading to new areas of inquiry and suggesting new ways of conceiving of theories of natural language. Unfortunately, Montague's papers are tersely written and very difficult to follow unless one has a considerable background in logical semantics.

*Natural Language Processing in Prolog* Gerald Gazdar 1989 Explains how computers can be programmed to recognize the complex ambiguities of human language. Addresses: current techniques in syntax, semantics, and pragmatics; program listings showing applications in Prolog; and question answering and inference. Targeted at professionals in the artificial inte.

*Linguistic Semantics* John Lyons 1995-11-30 This successor to Language, Meaning and Context provides an invaluable introduction to linguistic semantics.

*Speech & Language Processing* Dan Jurafsky 2000-09

*Natural Language Understanding* James Allen 1995 From a leading authority in artificial intelligence, this book delivers a synthesis of the major modern techniques and the most current research in natural language processing. The approach is unique in its coverage of semantic interpretation and discourse alongside the foundational material in syntactic processing.

*Semantics of Natural Language* D. Davidson 2012-12-06

*Quantification in Natural Languages* Emmon Bach 1995-02-28 This extended collection of papers is the result of putting recent ideas on quantification to work on a wide variety of languages. A central perspective of many of the papers follows the recognition of two broad types of quantificational strategies, one associated with nominal structures and determiners, the other with adverbial and other non-nominal expression ('D-quantifiers' and 'A-quantifiers'). The papers demonstrate both the unity and the variety of natural language quantificational forms and meanings. Many of the papers also shed new light on questions of language typology and syntactic and morphological variation. The languages discussed include English, Dutch, Italian, American Sign Language, Hindi, and a number of languages of Australia, Greenland, and the Americas. These comparative studies provide initial data for a typology of quantificational structures in natural languages, with important implications for the study of universal grammar. The book consists of research papers aimed at linguists, philosophers, and psychologists interested in semantics and linguistic form. An introduction presents a sketch of the background of this research and some of the central issues discussed, with pointers toward the included papers.

*Abstract Objects and the Semantics of Natural Language* Friederike Moltmann 2013-03-28 Friederike Moltmann presents an original approach to philosophical issues to do with abstract objects. She focuses on natural language, and finds that reference to abstract objects such as properties, numbers, and propositions is much more restricted than is generally thought, and she offers a substantially new ontological picture.

*Introduction to Semantics* Thomas Ede Zimmermann 2013-05-28 This textbook helps undergraduate students of language and linguistics taking their first steps in one of the core areas of grammar, introducing them to the basic ideas, insights, and techniques of contemporary semantic theory. Required.
special background knowledge, the book starts with everyday observations about word meaning and use, and then highlights the role of structure in the analysis of the meanings of phrases and clauses, zooming in on the fascinating and vexing question of how speakers manage to meaningfully communicate with sentences and texts they have never come across before. At the same time, the reader becomes acquainted with the modern, functionalist characterization of linguistic meaning in terms of reference (extension) and information (intension), and learns to apply technical tools from formal logic to analyzing the meaning of complex linguistic expressions as being composed by the meanings of their parts. Each of the nine main chapters contains a variety of exercises for self-study and classroom use, with model solutions in the appendix. Extensive English examples provide ample illustration.

**From Discourse to Logic** Hans Kamp
2012-09-27 Preface This book is about semantics and logic. More specifically, it is about the semantics and logic of natural language; and, even more specifically than that, it is about a particular way of dealing with those subjects, known as Discourse Representation Theory, or DRT. DRT is an approach towards natural language semantics which, some thirteen years ago, arose out of attempts to deal with two distinct problems. The first of those was the semantic puzzle that had been brought to contemporary attention by Geach’s notorious “donkey sentences” - sentences like If Pedro owns some donkey, he beats it, in which the anaphoric connection we perceive between the indefinite noun phrase some donkey and the pronoun it may seem to conflict with the existential meaning of the word some. The second problem had to do with tense and aspect. Some languages, for instance French and the other Romance languages, have two morphologically distinct past tenses, a simple past (the French Passe Simple) and a continuous past (the French Imparfait). To articulate precisely what the difference between these tenses is has turned out to be surprisingly difficult.

**Compositional Semantics** Pauline I. Jacobson
2014 This book provides an introduction to compositional semantics and to the syntax/semantics interface. It is rooted within the tradition of model theoretic semantics, and develops an explicit fragment of both the syntax and semantics of a rich portion of English. Professor Jacobson adopts a Direct Compositionality approach, whereby the syntax builds the expressions while the semantics simultaneously assigns each a model-theoretic interpretation. Alongside this approach, the author also presents a competing view that makes use of an intermediate level, Logical Form. She develops parallel treatments of a variety of phenomena from both points of view.
comparisons. The book begins with simple and fundamental concepts and gradually builds a more complex fragment, including analyses of more advanced topics such as focus, negative polarity, and a variety of topics centering on pronouns and binding more generally. Exercises are provided throughout, alongside open-ended questions for students to consider. The exercises are interspersed with the text to promote self-discovery of the fundamentals and their applications. The book provides a rigorous foundation in formal analysis and model theoretic semantics and is suitable for advanced undergraduate and graduate students in linguistics, philosophy of language, and related fields.

**An Introduction to Language Processing with Perl and Prolog** Pierre M. Nugues 2006-11-22 This book teaches the principles of natural language processing and covers linguistics issues. It also details the language-processing functions involved, including part-of-speech tagging using rules and stochastic techniques. A key feature of the book is the author's hands-on approach throughout, with extensive exercises, sample code in Prolog and Perl, and a detailed introduction to Prolog. The book is suitable for researchers and students of natural language processing and computational linguistics.


**Representation Learning for Natural Language Processing** Zhiyuan Liu 2020-07-03 This open access book provides an overview of the recent advances in representation learning theory, algorithms and applications for natural language processing (NLP). It is divided into three parts. Part I presents the representation learning techniques for multiple language entries, including words, phrases, sentences and documents. Part II then introduces the representation techniques for those objects that are closely related to NLP, including entity-based world knowledge, sememe-based linguistic knowledge, networks, and cross-modal entries. Lastly, Part III provides open resource tools for representation learning techniques, and discusses the remaining challenges and future research directions. The theories and algorithms of representation learning presented can also benefit other related domains such as machine learning, social network analysis, semantic Web, information retrieval, data mining and computational biology. This book is intended for advanced undergraduate and graduate students, post-doctoral fellows, researchers, lecturers, and industrial engineers, as well as anyone interested in representation learning and natural language processing.

**Introduction to Arabic Natural Language Processing** Nizar Y. Habash 2022-06-01 This book provides system developers and researchers in natural language processing and computational linguistics with the necessary background information for working with the Arabic language. The goal is to introduce Arabic linguistic phenomena and review the state-of-the-art in Arabic processing. The book discusses Arabic script, phonology, orthography, morphology, syntax and semantics, with a final chapter on machine translation issues. The chapter sizes correspond more or less to what is linguistically distinctive about Arabic, with morphology getting the lion's share, followed by Arabic script. No previous knowledge of Arabic is needed. This book is designed for computer scientists and linguists alike. The focus of the book is on Modern Standard Arabic; however, notes on practical issues related to Arabic dialects and languages written in the Arabic script are presented in different chapters. Table of Contents: What is "Arabic"? / Arabic Script / Arabic Phonology and Orthography / Arabic Morphology / Computational Morphology Tasks / Arabic Syntax / A Note on Arabic Semantics / A Note on Arabic and Machine Translation
Introduction to Natural Language Processing
Jacob Eisenstein 2019-10-01
A survey of computational methods for understanding, generating, and manipulating human language, which offers a synthesis of classical representations and algorithms with contemporary machine learning techniques. This textbook provides a technical perspective on natural language processing—methods for building computer software that understands, generates, and manipulates human language. It emphasizes contemporary data-driven approaches, focusing on techniques from supervised and unsupervised machine learning. The first section establishes a foundation in machine learning by building a set of tools that will be used throughout the book and applying them to word-based textual analysis. The second section introduces structured representations of language, including sequences, trees, and graphs. The third section explores different approaches to the representation and analysis of linguistic meaning, ranging from formal logic to neural word embeddings. The final section offers chapter-length treatments of three transformative applications of natural language processing: information extraction, machine translation, and text generation. End-of-chapter exercises include both paper-and-pencil analysis and software implementation. The text synthesizes and distills a broad and diverse research literature, linking contemporary machine learning techniques with the field's linguistic and computational foundations. It is suitable for use in advanced undergraduate and graduate-level courses and as a reference for software engineers and data scientists. Readers should have a background in computer programming and college-level mathematics. After mastering the material presented, students will have the technical skill to build and analyze novel natural language processing systems and to understand the latest research in the field.

Knowledge of Meaning
Richard K. Larson 1995
Many textbooks in formal semantics are all versions of, or introductions to, the same paradigm in semantic theory: Montague Grammar. Knowledge of Meaning is based on different assumptions and a different history. It provides the only introduction to truth-theoretic semantics for natural languages, fully integrating semantic theory into the modern Chomskyan programme in linguistic theory and connecting linguistic semantics to research elsewhere in cognitive psychology and philosophy. As such, it better fits into a modern graduate or undergraduate programme in linguistics, cognitive science, or philosophy. Furthermore, since the technical tools it employs are much simpler to teach and to master, Knowledge of Meaning can be taught by someone who is not primarily a semanticist.
Introduction To Natural Language Semantics

Processes, Beliefs, and Questions S. Peters
2012-12-06 SECTION I In 1972, Donald Davison and Gilbert Hannan wrote in the introduction to the volume Semantics of Natural Language: "The success of linguistics in treating natural languages as formal syntactic systems has aroused the interest of a number of linguists in a parallel or related development of semantics. For the most part quite independently, many philosophers and logicians have recently been applying formal semantic methods to structures increasingly like natural languages. While differences in training, method and vocabulary tend to veil the fact, philosophers and linguists are converging, it seems, on a common set of interrelated problems. " Davidson and Harman called for an interdisciplinary dialogue of linguists, philosophers and logicians on the semantics of natural language, and during the last ten years such an enterprise has proved extremely fruitful. Thanks to the cooperative effort in these several fields, the last decade has brought about striking progress in our understanding of the semantics of natural language. This work on semantics has typically paid little attention to psychological aspects of meaning. Thus, psychologists or computer scientists working on artificial intelligence were not invited to join the forces in the influential introduction of Semantics of Natural Language. No doubt it was felt that while psychological aspects of language are important in their own right, they are not relevant to our immediate semantic concerns. In the last few years, several linguists and logicians have come to question the fundamental anti-psychological assumptions underlying their theorizing.

Meaning and Grammar Gennaro Chierchia 2000
This self-contained introduction to natural language semantics addresses the majortheoretical questions in the field. The authors introduce the systematic study of linguistic meaning through a sequence of formal tools and their linguistic applications. Starting with propositional connectives and truth conditions, the book moves to quantification and binding, intensionality and tense, and so on. To set their approach in a broader perspective, the authors also explore the interaction of meaning with context and use (the semantics-pragmatics interface) and address some of the foundational questions, especially in connection with cognition in general. They also introduce a few of the most accessible and interesting ideas from recent research to give the reader a bit of the flavor of current work in semantics. The organization of this new edition is modular; after the introductory chapters, the remaining material can be covered in flexible order. The book presupposes no background in formal logic (an appendix introduces the basic notions of set theory) and only a minimal acquaintance with linguistics. This edition includes a substantial amount of completely new material and has been not only updated but redesigned throughout to enhance its user-friendliness.

An Advanced Introduction to Semantics Igor Mel’čuk 2020-04-02 Presents, in simple and clear terms, the way in which humans express their ideas by talking.

Natural Language Semantics Brendan S. Gillon 2019-03-12 An introduction to natural language semantics that offers an overview of the empirical domain and an explanation of the mathematical concepts that underpin the discipline. This textbook offers a comprehensive introduction to the fundamentals of those approaches to natural language semantics that use the insights of logic. Many other texts on the subject focus on presenting a particular theory of natural language semantics. This text instead offers an overview of the empirical domain (drawn largely from standard descriptive grammars of English) as well as the mathematical tools that are applied to it. Readers are shown where the concepts of logic apply, where they fail to apply, and where they might apply, if suitably adjusted. The presentation of logic is completely self-contained, with concepts of logic used in the book presented in all the necessary detail. This includes propositional logic, first order predicate logic, generalized quantifiers
theory, and the Lambek and Lambda calculi. The chapters on logic are paired with chapters on English grammar. For example, the chapter on propositional logic is paired with a chapter on the grammar of coordination and subordination of English clauses; the chapter on predicate logic is paired with a chapter on the grammar of simple, independent English clauses; and so on. The book includes more than five hundred exercises, not only for the mathematical concepts introduced, but also for their application to the analysis of natural language. The latter exercises include some aimed at helping the reader to understand how to formulate and test hypotheses.

Semantics Ronnie Cann 2009-05-14 The study of meaning in language has developed dramatically over the last fifty years. Semantics is distinctive as it not only presents a general introduction to the topic, including the most recent developments, but it also provides a unique perspective for addressing current issues. It opens by introducing readers to the study of logic (natural deduction) as the background against which developments have taken place. This demonstrates the link between semantics and the study of reasoning and how this view can provide new solutions to the puzzles that have plagued the approaches presented in other textbooks. The major subject areas of semantics are discussed, including quantification, anaphora and discourse, tense and aspect, ellipsis and context, and word meaning. The book also presents state-of-the-art research in topics at the forefront of semantics.

Understanding Natural Language Terry Winograd 1972 Overview of the language understanding program; Comparison with previous programs; A grammar for english; An introduction to lisp; A description of programmar; Deduction, problem solving, and planner; The blocks world; Semantics; Referenices; Appendices.

Formal Semantics and Pragmatics for Natural Language Querying James Clifford 2004-03-25 Connects the semantics of databases to that of natural language, and links them through a common view of the semantics of time.

Natural Language Processing Epaminondas Kapetanios 2013-11-14 This book introduces the semantic aspects of natural language processing and its applications. Topics covered include: measuring word meaning similarity, multi-lingual querying, and parametric theory, named entity recognition, semantics, query language, and the nature of language. The book also emphasizes the portions of mathematics needed to understand the discussed algorithms.

Representation and Inference for Natural Language Patrick Blackburn 2005 How can computers distinguish the coherent from the unintelligible, recognize new information in a sentence, or draw inferences from a natural language passage? Computational semantics is an exciting new field that seeks answers to these questions, and this volume is the first textbook wholly devoted to this growing subdiscipline. The book explains the underlying theoretical issues and fundamental techniques for computing semantic representations for fragments of natural language. This volume will be an essential text for computer scientists, linguists, and anyone interested in the development of computational semantics.

Elements of Formal Semantics Yoad Winter 2016-04-08 Introducing some of the foundational concepts, principles and techniques in the formal semantics of natural language, Elements of Formal Semantics outlines the mathematical principles that underlie linguistic meaning. Making use of a wide range of concrete English examples, the book presents the most useful tools and concepts of formal semantics in an accessible style and includes a variety of practical exercises so that readers can learn to utilise these tools effectively. For readers with an elementary background in set theory and linguistics.
an interest in mathematical modelling, this fascinating study is an ideal introduction to natural language semantics. Designed as a quick yet thorough introduction to one of the most vibrant areas of research in modern linguistics today this volume reveals the beauty and elegance of the mathematical study of meaning.

Knowledge Representation and the Semantics of Natural Language Hermann Helbig 2006-01-27
Natural Language is not only the most important means of communication between human beings, it is also used over historical periods for the preservation of cultural achievements and their transmission from one generation to the other. During the last few decades, the flood of digitalized information has been growing tremendously. This tendency will continue with the globalization of information societies and with the growing importance of national and international computer networks. This is one reason why the theoretical understanding and the automated treatment of communication processes based on natural language have such a decisive social and economic impact. In this context, the semantic representation of knowledge originally formulated in natural language plays a central part, because it connects all components of natural language processing systems, be they the automatic understanding of natural language (analysis), the rational reasoning over knowledge bases, or the generation of natural language expressions from formal representations. This book presents a method for the semantic representation of natural language expressions (texts, sentences, phrases, etc.) which can be used as a universal knowledge representation paradigm in the human sciences, like linguistics, cognitive psychology, or philosophy of language, as well as in computational linguistics and artificial intelligence. It is also an attempt to close the gap between these disciplines, which to a large extent are still working separately.

Arabic Natural Language Processing Nizar Y. Habash 2009-11-15
This book provides system developers and researchers in natural language processing and computational linguistics with the necessary background information for working with the Arabic language. The goal is to introduce Arabic linguistic phenomena and review the state-of-the-art in Arabic processing. The book discusses Arabic script, phonology, orthography, morphology, syntax and semantics, with a final chapter on machine translation issues. The chapter sizes correspond more or less to what is linguistically distinctive about Arabic, with morphology getting the lion's share, followed by Arabic script. No previous knowledge of Arabic is needed. This book is designed for computer scientists and linguists alike. The focus of the book is on Modern Standard Arabic; however, notes on practical issues related to Arabic dialects and languages written in the Arabic script are presented in different chapters. Table of Contents:
What is "Arabic"? / Arabic Script / Arabic Phonology and Orthography / Arabic Morphology / Computational Morphology Tasks / Arabic Syntax / A Note on Arabic Semantics / A Note on Arabic and Machine Translation

This 1992 collection explores the syntax/semantics interface, introducing the disciplines of computational linguistics and formal semantics.

From Discourse to Logic Hans Kamp 2013-03-14
Preface This book is about semantics and logic. More specifically, it is about the semantics and logic of natural language.
more specifically than that, it is about a particular way of dealing with those subjects, known as Discourse Representation Theory, or DRT. DRT is an approach towards natural language semantics which, some thirteen years ago, arose out of attempts to deal with two distinct problems. The first of those was the semantic puzzle that had been brought to contemporary attention by Geach's notorious "donkey sentences" - sentences like If Pedro owns some donkey, he beats it, in which the anaphoric connection we perceive between the indefinite noun phrase some donkey and the pronoun it may seem to conflict with the existential meaning of the word some. The second problem had to do with tense and aspect. Some languages, for instance French and the other Romance languages, have two morphologically distinct past tenses, a simple past (the French Passe Simple) and a continuous past (the French Imparfait). To articulate precisely what the difference between these tenses is has turned out to be surprisingly difficult.