Briefly Noted

An Introduction to Language Processing with Perl and Prolog

Pierre M. Nugues
(Lund University)

Springer (Cognitive technologies series, edited by Dov Gabbay and Jörg Siekmann), 2006, xx+513 pp; hardbound, ISBN 978-3-540-25031-9, $109.00, €90.90

This comprehensive NLP textbook is strongly algorithm-oriented and designed for talented computer programmers who might or might not be linguists. The book occupies a market niche in between that of Jurafsky and Martin (2008) and my own humble effort (Covington 1994); it resembles the latter in approach and the former in scope. Perhaps more than either of those, Nugues's book is also useful to working professionals as a handbook of techniques and algorithms.

Everything is here—everything, that is, except speech synthesis and recognition; phonetics receives only a four-page summary. Those wanting to start an NLP course by covering phonetics in some depth should consider Coleman (2005) as well as Jurafsky and Martin (2008).

After a brief overview, Nugues covers corpus linguistics, markup languages, text statistics, morphology, part-of-speech tagging (two ways), parsing (several ways), semantics, and discourse. "Neat" and "scruffy" approaches are deftly interleaved and compared. Unification-based grammar, event semantics, and tools such as WordNet and the Penn Treebank are covered in some detail. The syntax section includes dependency grammar and even the very recent work of Nivre (2006), as well as partial parsing and statistical approaches. Many important algorithms are presented ready to run, or nearly so, as Prolog or Perl code. If, for example, you want to build a Cocke–Kasami–Younger parser, this is the place to look for directions.

Explanations are lucid and to-the-point. Here is an example. Nugues is discussing the fact that, if you sample a corpus for *n*-grams, some will not occur in your sample at all, but it would be a mistake to consider the unseen ones to be infinitely rare (frequency 0). Thus the counts need to be adjusted:

> Good-Turing estimation … reestimates the counts of the *n*-grams observed in the corpus by discounting them, and it shifts the probability mass it has shaved to the unseen bigrams.

The formula follows, but the reader approaches it equipped with the unforgettable image of someone shaving excess material off the peaks and bulges of a histogram and spreading it into the valleys.

This is an ambitious textbook, and, in my opinion, too much for one semester; it must be used selectively. If nothing is skipped, then besides getting a thorough course in natural language processing (except phonetics), the student is expected to learn both Perl and Prolog along the way, aided by a 50-page Prolog handbook in Appendix A. My experience is that Prolog is very hard to learn on the fly; in fact, extensive experience with other languages may be a disadvantage because Prolog is so different. Nonetheless, all the information needed to learn Prolog is here. Perl is treated more casually because it lends itself much more easily to incremental learning.

Other minor quibbles are possible. On page 31, *automata* is used as singular. On page 69, the treatment of RTF, TeX, and LaTeX is so short that the student will come away largely unaware of what each of them is actually designed for. This is not pernicious, however, as the student will realize that he or she is inadequately informed.

Nonetheless, this is an unusually useful and well-written book, and I plan to recommend it to my students as well as using it myself as a handbook.—*Michael A. Covington, The University of Georgia*

References

Coleman, John. 2005. *Introducing Speech and Language Processing.* Cambridge, UK: Cambridge University Press.

Covington, Michael A. 1994. *Natural Language Processing for Prolog Programmers.* Englewood Cliffs, NJ: Prentice Hall.

Jurafsky, Daniel, and James H. Martin. 2008. *Speech and Language Processing,* 2nd edition. Upper Saddle River, NJ: Prentice Hall.

Nivre, Joakim. 2006. *Inductive Dependency Parsing.* Dordrecht, The Netherlands: Springer.

**Language and the Learning Curve:
A New Theory of Syntactic Development**

Anat Ninio
(Hebrew University of Jerusalem)

Oxford University Press, 2006, xiv+206 pp;
hardbound, ISBN 0-19-929981-1/
978-0-19-929981-2, £55.00; paperbound,
ISBN 0-19-929982-X / 978-0-19-929982-9,
£24.95

Ninio proposes a provocative theory of early
syntactic development. According to her the-
ory, children do not create any abstract rep-
resentation of language in the form of rules
or schemas, nor do they develop any sys-
tematic *linking rules* between syntax and
semantics. Instead, they learn a lexicalist syn-
tax. Syntactic development consists of learn-
ing, for each individual word, the potential
predicate–argument relations and their ap-
propriate syntactic realizations. Semantic va-
lency (the potential semantic relations of a
word with other items) and syntactic valency
(the ways to express those relations in sen-
tences) are learned for each word separately.
The syntactic structure of a sentence is pro-
jected from the lexical valency of words by re-
cursively applying a single binary operation,
Merge, which combines the Head (the predi-
cate word) to its Dependent (the argument).

Ninio argues that the elimination of the
abstract rules from the process of syntactic
development is supported by evidence from
child language research. Examination of the
learning curves (i.e., performance vs. experi-
ence) for different syntactic patterns shows
no sudden change in children's productiv-
ity with a particular syntactic pattern, or in
their ability to generalize that pattern to novel
items. At the same time, learning a syntac-
tic pattern speeds up with experience. The
learning curves have an accelerating nonlin-
ear shape, which suggests that the acquired
item-specific syntactic forms facilitate the ac-
quisition of the same syntactic form for new
items. Ninio suggests that, even though the
knowledge of syntax is item-specific, lexical
items are not isolated. Instead, they are in-
terconnected via *transfer*, the ability to extend
what has been learned in one context to new
contexts by analogy. The notion of transfer is

supposed to explain children's nonlinear
learning curve, as well as their ability to gen-
eralize their lexical knowledge to novel items.
However, the details of this central mech-
anism are left unspecified: it is not clear
how and under which constraints the trans-
fer between two items can take place. More-
over, one expects that the interplay be-
tween the item-specific knowledge and the
transfer of learning be used to explain some
well-studied stages of language learning in
children, including imitation, (over)generali-
zation, and recovery from making overgen-
eralization errors. (This so-called U-shaped
learning curve is quite distinct from the non-
linear learning curve that gives the book its
title.)

Another radical proposal by Ninio is that
semantic similarity plays no role in early syn-
tactic development. More specifically, trans-
fer of learning, and therefore generalization,
is based solely on a similarity of form. The de-
velopmental evidence provided for this claim
is intriguing. For example, in the priming
experiments where training on a large set
of verbs that appear in transitive sentences
helps to elicit transitive usages from chil-
dren on novel nonce verbs, the semantic sim-
ilarity between the training and the testing
verbs does not affect the rate of generaliza-
tion. However, there are many studies show-
ing that both children and adults use some
kind of mapping between form and mean-
ing in comprehension tasks. For example,
preferential-looking studies show that infants
choose one novel action over another based
on the form of the sentence introducing the
action (e.g., Naigles 1990; Fisher 2002). Sim-
ilarly, adult subjects predict certain semantic
properties for the arguments of a novel verb
based on the form of the sentence the verb
appears in (e.g., Gleitman 1990; Kako 2006).
In the absence of any abstract rules, these
findings can be explained only through a gen-
eralization mechanism that takes into account
both syntactic and semantic similarity.

Despite the vagueness of some of the
suggested mechanisms and occasional in-
sufficient analysis, Ninio's book presents a
thought-provoking account of syntactic de-
velopment that can be of especial interest
to the computational linguistics community.
Its proposed view of syntax could be val-
idated through computational modeling. If

it turns out that the proposed theory is indeed compatible with empirical data, the underlying ideas could be directly applied to the representation and use of syntactic knowledge in different computational linguistic applications.—*Afra Alishahi, University of Toronto*

References

Fisher, C. 2002. Structural limits on verb mapping: The role of abstract structure in 2.5-year-olds' interpretations of novel verbs. *Developmental Science*, 5(1):55–64.

Gleitman, L. 1990. The structural sources of verb meanings. *Language Acquisition*, 1:135–176.

Kako, E. 2006. Thematic role properties of subjects and objects. *Cognition*, 101:1–42.

Naigles, L. 1990. Children use syntax to learn verb meanings. *Journal of Child Language*, 17:357–374.

Advances in Natural Multimodal Dialogue Systems

Jan van Kuppevelt, Laila Dybkjær, and Niels Ole Bernsen (editors)
(University of Southern Denmark)

Springer (Text, speech, and language technology series, edited by Nancy Ide and Jean Véronis, volume 30), 2005, ix+373 pp; hardbound, ISBN 978-1-4020-3032-4, $179.00

"The chapters in this book jointly contribute to what we shall call the field of natural and multimodal interactive systems engineering. This is not yet a well-established field of research and commercial development but, rather, an emerging one in all aspects. It brings together, in a process that, arguably, was bound to happen, contributors from many different, and often far more established, fields of research and industrial development. To mention but a few, these include speech technology, computer graphics, and computer vision. The field's rapid expansion seems driven by a shared vision of the potential of new interactive modalities of information representation and exchange for radically transforming the world of computer systems, networks, devices, applications, and so on, from the GUI (graphical user interface) paradigm into something which will enable a far deeper and much more intuitive and natural integration of computer systems into people's work and lives.

"Jointly, the chapters present a broad and detailed picture of where natural and multimodal interactive systems engineering stands today. The book is based on selected presentations made at the International Workshop on Natural, Intelligent, and Effective Interaction in Multimodal Dialogue Systems held in Copenhagen, Denmark, in 2002 and sponsored by the European CLASS project. CLASS was initiated on the request of the European Commission with the purpose of supporting and stimulating collaboration among Human Language Technology (HLT) projects as well as between HLT projects and relevant projects outside Europe. The purpose of the workshop was to bring together researchers from academia and industry to discuss innovative approaches and challenges in natural and multimodal interactive systems engineering."—*From the editors' preface*

The contents of the volume are as follows:
"Natural and multimodal interactivity engineering—directions and needs" by Niels Ole Bernsen and Laila Dybkjær
"Social dialogue with embodied conversational agents" by Timothy Bickmore and Justine Cassell
"A first experiment in engagement for human–robot interaction in hosting activities" by Candace L. Sidner and Myroslava Dzikovska
"FORM" by Craig H. Martell
"On the relationships among speech, gestures, and object manipulation in virtual environments: Initial evidence" by Andrea Corradini and Philip R. Cohen
"Analysing multimodal communication" by Patrick G.T. Healey, Marcus Colman, and Mike Thirlwell
"Do oral messages help visual search?" by Noëlle Carbonell and Suzanne Kieffer
"Geometric and statistical approaches to audiovisual segmentation" by Trevor Darrell, John W. Fisher, III, Kevin W. Wilson, and Michael R. Siracusa

"The psychology and technology of talking
   heads: Applications in language learning"
   by Dominic W. Massaro
"Effective interaction with talking animated
   agents in dialogue systems" by Björn
   Granström and David House
"Controlling the gaze of conversational
   agents" by Dirk Heylen, Ivo van Es,
   Anton Nijholt, and Betsy van Dijk
"MIND: A context-based multimodal
   interpretation framework in conversational
   systems" by Joyce Y. Chai, Shimei Pan,
   and Michelle X. Zhou
"A general purpose architecture for
   intelligent tutoring systems" by Brady
   Clark, Oliver Lemon, Alexander
   Gruenstein, Elizabeth Owen Bratt,
   John Fry, Stanley Peters, Heather
   Pon-Barry, Karl Schultz, Zack
   Thomsen-Gray, and Pucktada
   Treeratpituk
"MIAMM—A multimodal dialogue system
   using haptics" by Norbert Reithinger,
   Dirk Fedeler, Ashwani Kumar,
   Christoph Lauer, Elsa Pecourt, and
   Laurent Romary
"Adaptive human–computer dialogue"
   by Sorin Dusan and James Flanagan
"Machine learning approaches to human
   dialogue modelling" by Yorick Wilks,
   Nick Webb, Andrea Setzer, Mark Hepple,
   and Roberta Catizone

Evaluation of Text and Speech Systems

Laila Dybkjær, Holmer Hemsen,
and Wolfgang Minker (editors)
(University of Southern Denmark
and University of Ulm)

Springer (Text, speech, and language
technology series, edited by Nancy Ide
and Jean Véronis, volume 37),
2007, xxiii+288 pp; hardbound,
ISBN 978-1-4020-5815-4, $149.00

"This book has its point of departure in
courses held at the Tenth European Lan-
guage and Speech Network (ELSNET) Sum-
mer School on Language and Speech
Communication which took place at NISLab
in Odense, Denmark, in July 2002. The topic
of the summer school was 'Evaluation and
Assessment of Text and Speech Systems.'

"Nine (groups of) lecturers contributed to
the summer school with courses on evalua-
tion of a range of important aspects of text
and speech systems, including speaker rec-
ognition, speech synthesis, talking animated
interface agents, part-of-speech tagging and
parsing technologies, machine translation,
question-answering and information retriev-
al systems, spoken dialogue systems, lan-
guage resources, and methods and formats
for the representation and annotation of
language resources. Eight of these (groups
of) lecturers agreed to contribute a chapter to
the present book. Since we wanted to keep all
the aspects covered by the summer school, an
additional author was invited to address the
area of speaker recognition and to add speech
recognition, which we felt was important
to include in the book. Although the point
of departure for the book was the ELSNET
summer school held in 2002, the decision to
make a book was made considerably later.
Thus the work on the chapters was only
initiated in 2004. First drafts were submitted
and reviewed in 2005 and final versions were
ready in 2006."—*From the editors' preface*

The contents of the volume are as follows:
"Speech and speaker recognition evaluation"
   by Sadaoki Furui
"Evaluation of speech synthesis" by
   Nick Campbell
"Modelling and evaluating verbal and
   non-verbal communication in talking
   animated interface agents" by Björn
   Granström and David House
"Evaluating part-of-speech tagging and
   parsing" by Patrick Paroubek
"General principles of user-oriented
   evaluation" by Margaret King
"An overview of evaluation methods
   in TREC ad hoc information retrieval
   and TREC question answering"
   by Simone Teufel
"Spoken dialogue systems evaluation"
   by Niels Ole Bernsen, Laila Dybkjær,
   and Wolfgang Minker
"Linguistic resources, development, and
   evaluation of text and speech systems"
   by Christopher Cieri
"Towards international standards for
   language resources" by Nancy Ide
   and Laurent Romary

Text Entry Systems: Mobility, Accessibility, Universality

I. Scott MacKenzie and Kumiko Tanaka-Ishii (editors)
(York University, Toronto and University of Tokyo)

San Francisco: Morgan Kaufmann Publishers, 2007, x+332 pp; paperbound, ISBN 978-0-12-373591-1, $49.95, £28.99, €41.95

"Advances in technology have helped create a connected world, and this is none more apparent than in the area of text entry. The growing popularity and success of textual communication has inspired a variety of text entry systems, modalities, and users. There is a text entry system that will meet the needs of all kinds of users—a teen sending an IM with her phone, a businessman checking e-mail on his blackberry, or a visually impaired woman using a Braille keyboard on her PDA. The capabilities and modalities of text entry are widespread and evolving.

"*Text Entry Systems* is a guidebook on the details and foundations of text entry methods, the effectiveness of current modes of text entry, advances in technology, and the creation of new systems. Authoritative researchers from the fields of HCI, handwriting recognition, speech recognition, computational linguistics, natural language processing, universal access, industrial design, cognitive science, and image processing all provide their expertise. They address the wide reach of this technology, including design for various languages and accommodations for those with special physical conditions, using specific examples and offering solutions."—*From the publisher's announcement*

Publications Received

Books listed below that are marked with a † have been selected for review in a future issue, and reviewers have been assigned to each.

Authors and publishers who wish their publications to be considered for review in *Computational Linguistics* should send a copy to the book review editor, Graeme Hirst, Department of Computer Science, University of Toronto, Toronto, Ontario, Canada M5S 3G4. All relevant books received will be listed, but not all can be reviewed. Technical reports (other than dissertations) will not be listed or reviewed. Authors should be aware that some publishers will not send books for review (even when instructed to do so); authors wishing to enquire as to whether their book has been received for review may contact the book review editor.

Readers who wish to be considered as book reviewers for the journal should contact the book review editor, outlining their qualifications, by e-mail at *gh@cs.toronto.edu* or at the address above.

Words and Intelligence II: Essays in Honor of Yorick Wilks
Khurshid Ahmad, Christopher Brewster, and Mark Stevenson (editors)
(Trinity College, Dublin and University of Sheffield)
Springer (Text, Speech and Language Technology series, edited by Nancy Ide and Jean Véronis, volume 36), 2007, xiv+279 pp; hardbound, ISBN 978-1-4020-5832-5, $139.00

The Categorization of Spatial Entities in Language and Cognition
Michel Aurnague, Maya Hickmann, and Laure Vieu
(CNRS–Université de Toulouse–Le Mirail, CNRS–Université de Paris VIII, and CNRS–Université Paul Sabatier, Toulouse III) John Benjamins Publishing
(Human Cognitive Processing series, edited by Marcelo Dascal et al., volume 20), 2007, viii+371 pp; hardbound, ISBN 978-90-272-2374-6, $144.00, €120.00

Semi-Supervised Learning
Olivier Chapelle, Bernhard Schölkopf, and Alexander Zien
(Max Planck Institute for Biological Cybernetics, Tübingen)
The MIT Press, 2007, xiii+506 pp; hardbound, ISBN 978-0-262-03358-9, $50.00, £32.95

**Chomsky's Universal Grammar:
An Introduction**
V.J. Cook and Mark Newson
(University of Newcastle upon Tyne
and Eötvös University)
Blackwell Publishing, 2007, vii+326 pp;
hardbound, ISBN 978-1-4051-1186-7, $89.95;
paperbound, ISBN 978-1-4051-1187-4,
$39.95

Corpus Linguistics 25 Years on
Ronberta Facchinetti (editor)
(University of Verona)
Rodopi (Language and Computers: Studies
in practical linguistics, edited by Christian
Mair et al., volume 62), 2007, v+385 pp;
hardbound, ISBN 978-90-420-2195-2,
€80.00

†**Errors and Intelligence in
Computer-Assisted Language Learning:
Parsers and Pedagogues**
Trude Heift and Mathias Schulze
(Simon Fraser University and University
of Waterloo)
Routledge (Routledge series in computer-
assisted language learning, edited by
Carol Chappelle), 2007, xviii+283 pp;
hardbound, ISBN 978-0-415-36191-0,
$115.00

Word Frequency and Lexical Diffusion
Betty S. Phillips
(Indiana State University)
Palgrave Macmillan (Palgrave studies
in language history and language change,
edited by Charles Jones), 2007, xiv+252 pp;
hardbound, ISBN 978-1-4039-3232-7, $80.00

**Prosodic Orientation in English
Conversation**
Beatrice Szczepek Reed
(University of Nottingham)
Palgrave Macmillan, 2006, xiv+331 pp;
hardbound, ISBN 978-0-230-00872-4, $80.00

Language, Discourse, and Social Psychology
Ann Weatherall, Bernadette M. Watson,
and Cindy Gallois
(Victoria University of Wellington and
University of Queensland)
Palgrave Macmillan (Palgrave advances in
linguistics, edited by Christopher N.
Candlin), 2007, xvii+309 pp; hardbound,
ISBN 978-1-4039-9594-0, $90.00; paperbound,
ISBN 978-1-4039-9595-7, $34.95

**Contrastive Linguistics: History,
philosophy, and methodology**
Pan Wenguo and Tham Wai Mun
(East China Normal University and
Nanyang Technological University)
Continuum, 2007, xii+287 pp; hardbound,
ISBN 978-0-8264-8634-9, £85.00, $150.00

**On the Syntactic Composition of Manner
and Motion**
Maria Luisa Zubizarreta and Eunjeong Oh
(University of Southern California and
Korea University)
The MIT Press, 2007, xi+228 pp; paperbound,
ISBN 978-0-262-74029-6, $32.00, £19.95