

## Current and New Directions in Discourse and Dialogue

# Text, Speech and Language Technology

---

VOLUME 22

---

## *Series Editors*

Nancy Ide, *Vassar College, New York*

Jean Véronis, *Université de Provence and CNRS, France*

## *Editorial Board*

Harald Baayen, *Max Planck Institute for Psycholinguistics, The Netherlands*

Kenneth W. Church, *AT & T Bell Labs, New Jersey, USA*

Judith Klavans, *Columbia University, New York, USA*

David T. Barnard, *University of Regina, Canada*

Dan Tufis, *Romanian Academy of Sciences, Romania*

Joaquim Llisterri, *Universitat Autònoma de Barcelona, Spain*

Stig Johansson, *University of Oslo, Norway*

Joseph Mariani, *LIMSI-CNRS, France*

# Current and New Directions in Discourse and Dialogue

Edited by

Jan van Kuppevelt

*Stuttgart University, Germany*

and

Ronnie W. Smith

*East Carolina University, U.S.A.*

SPRINGER-SCIENCE+BUSINESS MEDIA, B.V.

A C.I.P. Catalogue record for this book is available from the Library of Congress.

ISBN 978-1-4020-1615-8    ISBN 978-94-010-0019-2 (eBook)  
DOI 10.1007/978-94-010-0019-2

---

*Printed on acid-free paper*

All Rights Reserved

© 2003 Springer Science+Business Media Dordrecht.

Originally published by Kluwer Academic Publishers in 2003

Softcover reprint of the hardcover 1st edition 2003

No part of this work may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, microfilming, recording or otherwise, without written permission from the Publisher, with the exception of any material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work.

# Contents

Preface	xi
Acknowledgements	xii
1	
Annotations and Tools for an Activity Based Spoken Language Corpus	1
<i>Jens Allwood, Leif Gronqvist, Elisabeth Ahlsen and Magnus Gunnarsson</i>	
1. Introduction	1
2. GSLC and Other Goteborg Corpora	4
3. Storage	5
4. Description of the Corpus Transcription Standard	6
5. Tools Which Have Been Developed	7
6. Types of Quantitative Analysis	9
7. Types of Qualitative Analysis	11
8. Conclusions and Future Directions	15
References	16
2	
Using Direct Variant Transduction for Rapid Development of Natural Spoken Interfaces	19
<i>Hiyan Alshawi and Shona Douglas</i>	
1. Introduction	20
2. Characteristics of Direct Variant Transduction	20
3. Constructing an Application with Example-Action Contexts	21
4. Context Expansion	23
5. Recognition, Classification and Matching	25
6. Dialog Control and Confirmation	27
7. Experiments	30
8. Concluding Remarks	33
References	33
3	
An Interface for Annotating Natural Interactivity	35
<i>Niels Ole Bernsen, Laila Dybkaer and Mykola Kolodnytsky</i>	
1. Introduction	35
2. Today's Natural Interactivity Coding Tools	37
3. The Nite Project	42

4.	Nite Target User Groups	43
5.	General Tool Requirements	44
6.	Annotation User Interface Requirements	47
7.	The Audio-Visual Annotation Interface	52
8.	Conclusion and Future Work	60
	Acknowledgements	61
	References	61
4		
	Managing Communicative Intentions with Collaborative Problem Solving	63
	<i>Nate Blaylock, James Allen and George Ferguson</i>	
1.	Previous Work	65
2.	A Collaborative Problem-Solving Model	68
3.	Examples	75
4.	Use in Dialogue Systems	79
5.	Conclusions and Future Work	81
	References	82
5		
	Building a Discourse-Tagged Corpus in the Framework of Rhetorical Structure Theory	85
	<i>Lynn Carlson, Daniel Marcu and Mary Ellen Okurowski</i>	
1.	Introduction	85
2.	Framework	86
3.	Discourse Annotation Task	90
4.	Quality Assurance	93
5.	Corpus Overview	96
6.	Mining the RST Corpus	97
7.	Conclusions and Future Work	108
	Acknowledgements	109
	References	110
6		
	An Empirical Study of Speech Recognition Errors in Human Computer Dialogue	113
	<i>Marc Cavazza</i>	
1.	Introduction	113
2.	The Speech Recognition Component	116
3.	Integrated Parsing of User Utterances	117
4.	The Dialogue Process	119
5.	From Speech Recognition Errors to Speech Act Recognition Errors	120
6.	Evaluating Robustness to Speech Recognition Errors	126
7.	Conclusion	129
	Acknowledgements	130

<i>Contents</i>	vii
References	130
7	
Comparing Several Aspects of Human-Computer and Human-Human Dialogues	133
<i>Christine Doran, John Aberdeen, Laurie Damianos and Lynette Hirschman</i>	
1. Introduction	133
2. Our Data	134
3. Analysis	138
4. Analysis of Misunderstandings	151
5. Discussion	155
6. Conclusions	156
Appendix: Dialogue Act Tag Set and Examples	156
References	157
8	
Full Paraphrase Generation for Fragments in Dialogue	161
<i>Christian Ebert, Shalom Lappin, Howard Gregory and Nicolas Nicolov</i>	
1. Introduction	161
2. SHARDS	164
3. Generation of Fragment Paraphrases	168
4. An Implemented System for Fragment Resolution and Paraphrase Generation	171
5. Conclusion and Future Research	179
Acknowledgements	179
References	180
9	
Disentangling Public from non-Public Meaning	183
<i>Jonathan Ginzburg</i>	
1. Introduction	184
2. Utterer's Content v. Utterer's Plan	188
3. Clarifying Utterer's Content	190
4. <i>Why<sub>meta</sub></i> : an analysis	198
5. Concluding Remarks	205
References	209
10	
Adaptivity and Response Generation in a Spoken Dialogue System	213
<i>Kristiina Jokinen and Graham Wilcock</i>	
1. Introduction	213
2. Interaction Management	215
3. Dialogue Response Generation	221
4. Confidence-based Adaptivity	227
5. Conclusion	232

References	232
11	
On the Means for Clarification in Dialogue	235
<i>Matthew Purver, Jonathan Ginzburg and Patrick Healey</i>	
1. Introduction	235
2. Clarification Forms	238
3. Clarification Readings	241
4. Corpus Analysis	243
5. Conclusions	248
Acknowledgements	250
Appendix: Corpus Markup Decision Trees	251
References	254
12	
Plug and Play Spoken Dialogue Processing	257
<i>Manny Rayner, Johan Boye, Ian Lewin, and Genevieve Gorrell</i>	
1. Introduction	258
2. The CANTONA Plug and Play Demonstrator	261
3. Device Descriptions: Rules and Hierarchies	264
4. Plug and Play Response Generation	267
5. Plug and Play Speech Recognition and Parsing	271
6. Discussion	278
Acknowledgements	279
References	280
13	
Conversational Implicatures and Communication Theory	283
<i>Robert van Rooy</i>	
1. Introduction	283
2. Particularized Conversational Implicatures	284
3. Generalized Conversational Implicatures	293
References	301
14	
Reconciling Control and Discourse Structure	305
<i>Susan E. Strayer, Peter A. Heeman and Fan Yang</i>	
1. Introduction	305
2. Discourse Structure and Control Analysis	307
3. Relationship between Control and Discourse Structure	313
4. Reconciling Control inside Discourse Segments	315
5. Conclusion	320
6. Future Work	320
Acknowledgements	321



<i>Contents</i>	ix
References	322
15	
The Information State Approach to Dialogue Management	325
<i>David R. Traum and Staffan Larsson</i>	
1. Introduction	325
2. The Information State Approach	328
3. A Multi-level Architecture for Reusable Dialogue Management	334
4. TrindiKit: A Dialogue Move Engine Toolkit	336
5. Implementations using TrindiKit	339
6. Reusing Dialogue Management Components	346
References	350
16	
Visualizing Spoken Discourse	355
<i>Li-Chiung Yang</i>	
1. Introduction: Interruptions and Dialogue	355
2. Research Goals and Procedures	356
3. Prosodic Characteristics of Interruptions	357
4. Implications for Dialogue Systems	375
5. Conclusion	377
Acknowledgements	377
References	377
Appendix	378

## Preface

The origins of this book arise from the highly successful second SIGdial Workshop on Discourse and Dialogue that was held in September 2001 in conjunction with Eurospeech 2001. The original workshop proceedings consisted of 29 papers selected from 57 submissions, an exceptionally high number of submissions for a two day workshop.

This book includes extended versions of 12 papers originally presented at the workshop. In addition, 4 other invited papers on major themes in discourse and dialogue research are included. There are three main themes addressed by the papers in this collection: (1) corpus annotation and analysis; (2) methodologies for construction of dialogue systems; and (3) perspectives on various key theoretical issues including communicative intention, context-based generation, and modeling of discourse structure. However, because of the very nature of discourse and dialogue research that often requires researchers to tackle several issues in one piece of work, we have chosen to order the papers alphabetically by author rather than try to create artificial thematic sections.

We believe this collection provides a concise yet reasonably comprehensive snapshot of major research themes in discourse and dialogue. We hope that readers will benefit greatly from this collection.

Jan van Kuppevelt  
Ronnie W. Smith

## **Acknowledgements**

Individuals whose support, advice, and encouragement have been invaluable during this project include Laila Dybkjaer and David Traum, President and Vice-President, respectively, of SIGdial, and Jacqueline Bergsma of Kluwer Publishing. Thanks also go to Jolanda Voogd of Kluwer Publishing who inherited this project during its final stages.

Our efforts to be accomodating to our authors by allowing submissions in either LaTeX or Word unfortunately created some unforeseen difficulties in producing consistent camera-ready copy. We express a special thanks to Treena Larrew, a graduate student at East Carolina University, for her diligent efforts at producing consistent versions of the Word formatted papers. A special thanks must also go to Deborah Doherty of Kluwer for her technical assistance in resolving the formatting issues.

Lastly and most importantly, we express our appreciation to the authors of the papers for sharing their work and to the many reviewers whose feedback has contributed to the overall quality of this book.