

# Twente Workshops on Language Technology

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The TWLT workshops are organised by the PARLEVINK project of the University of Twente. The first workshop was held in Enschede, the Netherlands on March 22, 1991. The workshop was attended by about 40 participants. The contents of the proceedings are given below.

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## Proceedings Twente Workshop on Language Technology 1 (TWLT 1)

*Tomita's Algorithm: Extensions and Applications*  
Eds. R. Heemels, A. Nijholt & K. Sikkel, 103 pages.

Preface and Contents

- A. Nijholt** (*University of Twente, Enschede.*) (Generalised) LR Parsing: From Knuth to Tomita.  
**R. Leermakers** (*Philips Research Labs, Eindhoven.*) Recursive Ascent Parsing.  
**H. Harkema & M. Tomita** (*University of Twente, Enschede & Carnegie Mellon University, Pittsburgh*)  
A Parsing Algorithm for Non-Deterministic Context-Sensitive Languages.  
**G.J. van der Steen** (*Vleermuis Software Research, Utrecht*) Unrestricted On-Line Parsing and Transduction with Graph Structured Stacks.  
**J. Rekers & W. Koorn** (*CWI, Amsterdam & University of Amsterdam, Amsterdam*) Substring Parsing for Arbitrary Context-Free Grammars.  
**T. Vosse** (*NICI, Nijmegen.*) Detection and Correction of Morpho-Syntactic Errors in Shift-Reduce Parsing.  
**R. Heemels** (*Océ Nederland, Venlo*) Tomita's Algorithm in Practical Applications.  
**M. Lankhorst** (*University of Twente, Enschede*) An Empirical Comparison of Generalised LR Tables.  
**K. Sikkel** (*University of Twente, Enschede*) Bottom-Up Parallellization of Tomita's Algorithm.
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The second workshop in the series (TWLT 2) has been held on November 20, 1991. The workshop was attended by more than 70 researchers from industry and university. The contents of the proceedings are given below.

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## Proceedings Twente Workshop on Language Technology 2 (TWLT 2)

*Linguistic Engineering: Tools and Products.*  
Eds. H.J. op den Akker, A. Nijholt & W. ter Stal, 115 pages.

Preface and Contents

- A. Nijholt** (*University of Twente, Enschede*) Linguistic Engineering: A Survey.  
**B. van Bakel** (*University of Nijmegen, Nijmegen*) Semantic Analysis of Chemical Texts.  
**G.J. van der Steen & A.J. Dijenborgh** (*Vleermuis Software Research, Utrecht*) Lingware: The Translation Tools of the Future.  
**T. Vosse** (*NICI, Nijmegen*) Detecting and Correcting Morpho-syntactic Errors in Real Texts.  
**C. Barkey** (*TNO/ITI, Delft*) Indexing Large Quantities of Documents Using Computational Linguistics.  
**A. van Rijn** (*CIAD/Delft University of Technology, Delft*) A Natural Language Interface for a Flexible Assembly Cell.

- J. Honig** (*Delft University of Technology, Delft*) Using Deltra in Natural Language Front-ends.  
**J. Odijk** (*Philips Research Labs, Eindhoven*) The Automatic Translation System ROSETTA3.  
**D. van den Akker** (*IBM Research, Amsterdam*) Language Technology at IBM Nederland.  
**M.-J. Nederhof, C.H.A. Koster, C. Dekkers & A. van Zwol** (*University of Nijmegen, Nijmegen*) The Grammar Workbench: A First Step Toward Lingware Engineering.
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The third workshop in the series (TWLT 3) was held on May 12 and 13, 1992. Contrary to the previous workshops it had an international character with eighty participants from the U.S.A., India, Great Britain, Ireland, Italy, Germany, France, Belgium and the Netherlands. The proceedings were available at the workshop. The contents of the proceedings are given below.

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### **Proceedings Twente Workshop on Language Technology 3 (TWLT 3)**

*Connectionism and Natural Language Processing.*

Eds. M.F.J. Drossaers & A. Nijholt, 142 pages.

Preface and Contents

- L.P.J. Veelenturf** (*University of Twente, Enschede*) Representation of Spoken Words in a Self-Organising Neural Net.
- P. Wittenburg & U. H. Frauenfelder** (*Max-Planck Institute, Nijmegen*) Modelling the Human Mental Lexicon with Self-Organising Feature Maps.
- A.J.M.M. Weijters & J. Thole** (*University of Limburg, Maastricht*) Speech Synthesis with Artificial Neural Networks.
- W. Daelemans & A. van den Bosch** (*Tilburg University, Tilburg*) Generalisation Performance of Back Propagation Learning on a Syllabification Task.
- E.-J. van der Linden & W. Kraaij** (*Tilburg University, Tilburg*) Representation of Idioms in Connectionist Models.
- J.C. Scholtes** (*University of Amsterdam, Amsterdam*) Neural Data Oriented Parsing.
- E.F. Tjong Kim Sang** (*University of Groningen, Groningen*) A connectionist Representation for Phrase Structures.
- M.F.J. Drossaers** (*University of Twente, Enschede*) Hopfield Models as Neural-Network Acceptors.
- P. Wyard** (*British Telecom, Ipswich*) A Single Layer Higher Order Neural Net and its Application to Grammar Recognition.
- N.E. Sharkey & A.J.C. Sharkey** (*University of Exeter, Exeter*) A Modular Design for Connectionist Parsing.
- R. Reilly** (*University College, Dublin*) An Exploration of Clause Boundary Effects in SRN Representations.
- S.M. Lucas** (*University of Essex, Colchester*) Syntactic Neural Networks for Natural Language Processing.
- R. Miikkulainen** (*University of Texas, Austin*) DISCERN: A Distributed Neural Network Model of Script Processing and Memory.
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The fourth workshop in the series has been held on September 23, 1992. The theme of this workshop was "Pragmatics in Language Technology". Its aim was to bring together the several approaches to this subject: philosophical, linguistic and logic. The workshop was visited by more

than 50 researchers in these fields, together with several computer scientists. The contents of the proceedings are given below.

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### Proceedings Twente Workshop on Language Technology 4 (TWLT 4)

*Pragmatics in Language Technology*

Eds. D. Nauta, A. Nijholt & J. Schaake, 114 pages.

Preface and Contents

**D. Nauta, A. Nijholt & J. Schaake** (*University of Twente, Enschede*) Pragmatics in Language technology: Introduction.

#### Part 1: Pragmatics and Semiotics

**J. van der Lubbe & D. Nauta** (*Delft University of Technology & University of Twente, Enschede*) Semiotics, Pragmatism, and Expert Systems.

**F. Vandamme** (*Ghent*) Semiotics, Epistemology, and Human Action.

**H. de Jong & W. Werner** (*University of Twente, Enschede*) Separation of Powers and Semiotic Processes.

#### Part 2: Functional Approach in Linguistics

**C. de Groot** (*University of Amsterdam*) Pragmatics in Functional Grammar.

**E. Steiner** (*University of Saarland, Saarbrücken*) Systemic Functional Grammar.

**R. Bartsch** (*University of Amsterdam*) Concept Formation on the Basis of Utterances in Situations.

#### Part 3: Logic of Belief, Utterance, and Intention

**J. Ginzburg** (*University of Edinburgh*) Enriching Answerhood and Truth: Questions within Situation Semantics.

**J. Schaake** (*University of Twente, Enschede*) The Logic of Peirce's Existential Graphs.

**H. Bunt** (*Tilburg University*) Belief Contexts in Human-Computer Dialogue.

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The fifth workshop in the series took place on 3 and 4 June 1993. It was devoted to the topic "Natural Language Interfaces". The aim was to provide an international platform for commerce, technology and science to present the advances and current state of the art in this area of research.

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### Proceedings Twente Workshop on Language Technology 5 (TWLT 5)

*Natural Language Interfaces*

Eds. F.M.G. de Jong & A. Nijholt, 124 pages.

Preface and Contents

**F.M.G. de Jong & A. Nijholt** (*University of Twente*) Natural Language Interfaces: Introduction.

**R. Scha** (*University of Amsterdam*) Understanding Media: Language vs. Graphics.

**L. Boves** (*University of Nijmegen*) Spoken Language Interfaces.

**J. Nerbonne** (*University of Groningen*) NL Interfaces and the Turing Test.

**K. Simons** (*Digimaster, Amstelveen*) "Natural Language": A Working System.

**P. Horsman** (*Dutch National Archives, The Hague*) Accessibility of Archival Documents.

**W. Sijtsma & O. Zweekhorst** (*ITK, Tilburg*) Comparison and Review of Commercial Natural Language Interfaces.

**J. Schaake** (*University of Twente*) The Reactive Dialogue Model: Integration of Syntax, Semantics, and Pragmatics in a Functional Design.

- D. Speelman** (*University of Leuven*) A Natural Language Interface that Uses Generalised Quantifiers.  
**R.-J. Beun** (*IPO, Eindhoven*) The DENK Program: Modeling Pragmatics in Natural Language Interfaces.  
**W. Menzel** (*University of Hamburg*) ASL: Architectures for Speech and Language Processing  
**C. Huls & E. Bos** (*NICI, Nijmegen*) EDWARD: A Multimodal Interface.  
**G. Neumann** (*University of Saarbrücken*) Design Principles of the DISCO system.  
**O. Stock & C. Strapparava** (*IRST, Trento*) NL-Based Interaction in a Multimodal Environment.
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The sixth workshop in the series took place on 16 and 17 December 1993. It was devoted to the topic "Natural Language Parsing". The aim was to provide an international platform for technology and science to present the advances and current state of the art in this area of research, in particular research that aims at analysing real-world text and real-world speech and keyboard input.

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### **Proceedings Twente Workshop on Language Technology 6 (TWLT 6)**

*Natural Language Parsing: Methods and Formalisms*

Eds. K. Sikkel & A. Nijholt, 190 pages.

Preface and Contents

- A. Nijholt** (*University of Twente*) Natural Language Parsing: An Introduction.  
**V. Manca** (*University of Pisa*) Typology and Logical Structure of Natural Languages.  
**R. Bod** (*University of Amsterdam*) Data Oriented Parsing as a General Framework for Stochastic Language Processing.  
**M. Stefanova & W. ter Stal** (*University of Sofia / University of Twente*) A Comparison of ALE and PATR: Practical Experiences.  
**J.P.M. de Vreught** (*University of Delft*) A Practical Comparison between Parallel Tabular Recognizers.  
**M. Verlinden** (*University of Twente*) Head-Corner Parsing of Unification Grammars: A Case Study.  
**M.-J. Nederhof** (*University of Nijmegen*) A Multi-Disciplinary Approach to a Parsing Algorithm.  
**Th. Stürmer** (*University of Saarbrücken*) Semantic-Oriented Chart Parsing with Defaults.  
**G. Satta** (*University of Venice*) The Parsing Problem for Tree-Adjoining Grammars.  
**F. Barthélemy** (*University of Lisbon*) A Single Formalism for a Wide Range of Parsers for DCGs.  
**E. Csuhaaj-Varjú & R. Abo-Alez** (*Hungarian Academy of Sciences, Budapest*) Multi-Agent Systems in Natural Language Processing.  
**C. Cremers** (*University of Leiden*) Coordination as a Parsing Problem.  
**M. Wirén** (*University of Saarbrücken*) Bounded Incremental Parsing.  
**V. Kubon & M. Platek** (*Charles University, Prague*) Robust Parsing and Grammar Checking of Free Word Order Languages.  
**V. Srinivasan** (*University of Mainz*) Punctuation and Parsing of Real-World Texts.  
**T.G. Vosse** (*University of Leiden*) Robust GLR Parsing for Grammar-Based Spelling Correction.
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The seventh workshop in the series took place on 15 and 16 June 1994. It was devoted to the topic "Computer-Assisted Language Learning" (CALL). The aim was to present both the state of the art in CALL and the new perspectives in the research and development of software that is meant to be used in a language curriculum. By the mix of themes addressed in the papers

and demonstrations, we hoped to bring about the exchange of ideas between people of various backgrounds.

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### Proceedings Twente Workshop on Language Technology 7 (TWLT 7)

*Computer-Assisted Language Learning*

Eds. L. Appelo, F.M.G. de Jong, 133 pages.

Preface and Contents

**L.Appelo, F.M.G. de Jong** (*IPO / University of Twente*) Computer-Assisted Language Learning: Prolegomena

**M. van Bodegom** (*Eurolinguist Language House, Nijmegen, The Netherlands*) Eurolinguist test: An adaptive testing system.

**B. Cartigny** (*Escape, Tilburg, The Netherlands*) Discatex CD-ROM XA.

**H.Altay Guvenir, K. Oflazer** (*Bilkent University, Ankara*) Using a Corpus for Teaching Turkish Morphology.

**H. Hamburger** (*GMU, Washington, USA*) Viewpoint Abstraction: a Key to Conversational Learning.

**J. Jaspers, G. Kanselaar, W. Kok** (*University of Utrecht, The Netherlands*) Learning English with It's English.

**G. Kempen, A. Dijkstra** (*University of Leiden, The Netherlands*) Towards an integrated system for spelling, grammar and writing instruction.

**F. Kronenberg, A. Krueger, P. Ludewig** (*University of Osnabruek, Germany*) Contextual vocabulary learning with CAVOL.

**S. Lobbe** (*Rotterdam Polytechnic Informatica Centrum, The Netherlands*) Teachers, Students and IT: how to get teachers to integrate IT into the (language) curriculum.

**J. Rous, L. Appelo** (*Institute for Perception Research, Eindhoven, The Netherlands*) APPEAL: Interactive language learning in a multimedia environment.

**B. Salverda** (*SLO, Enschede, The Netherlands*) Developing a Multimedia Course for Learning Dutch as a Second Language.

**C. Schwind** (*Universite de Marseille, France*) Error analysis and explanation in knowledge based language tutoring.

**J. Thompson** (*CTI, Hull, United Kingdom/EUROCALL*) TELL into the mainstream curriculum.

**M. Zock** (*Limsi, Paris, France*) Language in action, or learning a language by watching how it works.

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The eighth workshop in the series took place on 1 and 2 December 1994. It was devoted to speech, the integration of speech and natural language processing, and the application of this integration in natural language interfaces. The program emphasized research of interest for the themes in the framework of the Dutch NWO programme on Speech and Natural Language that started in 1994.

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### Proceedings Twente Workshop on Language Technology 8 (TWLT 8)

*Speech and Language Engineering*

Eds. L. Boves & A. Nijholt, 176 pages.

Preface and Contents

- Chr. Dugast** (*Philips, Aachen, Germany*) The North American Business News Task: Speaker Independent, Unlimited Vocabulary Article Dictation
- P. van Alphen, C. in't Veld & W. Schelvis** (*PTT Research, Leidschendam, The Netherlands*) Analysis of the Dutch Polyphone Corpus.
- H.J.M. Steenken & D.A. van Leeuwen** (*TNO Human factors Research, Soesterberg, The Netherlands*) Assessment of Speech Recognition Systems.
- J.M. McQueen** (*Max Planck Institute, Nijmegen, The Netherlands*) The Role of Prosody in Human Speech Recognition.
- L. ten Bosch** (*IPO, Eindhoven, the Netherlands*) The Potential Role of Prosody in Automatic Speech Recognition.
- P. Baggia, E. Gerbino, E. Giachin & C. Rullent** (*CSELT, Torino, Italy*) Spontaneous Speech Phenomena in Naive-User Interactions.
- M.F.J. Drossaers & D. Dokter** (*University of Twente, Enschede, the Netherlands*) Simple Speech Recognition with Little Linguistic Creatures.
- H. Helbig & A. Mertens** (*FernUniversität Hagen, Germany*) Word Agent Based Natural Language Processing.
- Geunbae Lee et al.** (*Pohang University, Hyoja-Dong, Pohang, Korea*) Phoneme-Level Speech and natural Language Integration for Agglutinative Languages.
- K. van Deemter, J. Landsbergen, R. Leermakers & J. Odijk** (*IPO, Eindhoven, The Netherlands*) Generation of Spoken Monologues by Means of Templates
- D. Carter & M. Rayner** (*SRI International, Cambridge, UK*) The Speech-Language Interface in the Spoken Language Translator
- H. Weber** (*University of Erlangen, Germany*) Time-synchronous Chart Parsing of Speech Integrating Unification Grammars with Statistics.
- G. Veldhuijzen van Zanten & R. op den Akker** (*University of Twente, Enschede, the Netherlands*) More Efficient Head and Left Corner Parsing of Unification-based Formalisms.
- G.F. van der Hoeven et al.** (*University of Twente, Enschede, the Netherlands*) SCHISMA: A natural Language Accessible Theatre Information and Booking System.
- G. van Noord** (*University of Groningen, the Netherlands*) On the Intersection of Finite State Automata and Definite Clause Grammars.
- R. Bod & R. Scha** (*University of Amsterdam, the Netherlands*) Prediction and Disambiguation by Means of Data-Oriented Parsing.

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The ninth workshop in the series took place on 9 June 1995. It was devoted to empirical methods in the analysis of dialogues, and the use of corpora of dialogues in building dialogue systems. The aim was to discuss the methods of corpus analysis, as well as results of corpus analysis and the application of such results.

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### **Proceedings Twente Workshop on Language Technology 9 (TWLT 9)**

*Corpus-based Approaches to Dialogue Modelling*

Eds. J.A. Andernach, S.P. van de Burgt & G.F. van der Hoeven, 124 pages.

Preface and Contents

**N. Dahlbäck** (*NLP Laboratory, Linköping, Sweden*) Kinds of agents and types of dialogues.

- J.H. Connolly, A.A. Clarke, S.W. Garner & H.K. Palmén** (*Loughborough University of Technology, UK*) Clause-internal structure in spoken dialogue.
- J. Carletta, A. Isard, S. Isard, J. Kowtko, G. Doherty-Sneddon & A. Anderson** (*HCRC, Edinburgh, UK*) The coding of dialogue structure in a corpus.
- J. Alexandersson & N. Reithinger** (*DFKI, Saarbrücken, Germany*) Designing the dialogue component in a speech translation system - a corpus-based approach.
- H. Aust & M. Oerder** (*Philips, Aachen, Germany*) Dialogue control in automatic inquiry systems.
- M. Rats** (*ITK, Tilburg, the Netherlands*) Referring to topics - a corpus-based study.
- H. Dybkjær, L. Dybkjær & N.O. Bernsen** (*Centre for Cognitive Science, Roskilde, Denmark*) Design, formalization and evaluation of spoken language dialogue.
- D.G. Novick & B. Hansen** (*Oregon Graduate Institute of Science and Technology, Portland, USA*) Mutuality strategies for reference in task-oriented dialogue.
- N. Fraser** (*Vocalis Ltd, Cambridge, UK*) Messy data, what can we learn from it?
- J.A. Andernach** (*University of Twente, Enschede, the Netherlands*) Predicting and interpreting speech acts in a theatre information and booking system.

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The tenth workshop in the series took place on 6-8 December 1995. This workshop was organized in the framework provided by the Algebraic Methodology and Software Technology movement (AMAST). It focussed on algebraic methods in formal languages, programming languages and natural languages. Its aim was to bring together those researchers on formal language theory, programming language theory and natural language description theory, that have a common interest in the use of algebraic methods to describe syntactic, semantic and pragmatic properties of language.

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### **Proceedings Twente Workshop on Language Technology 10 (TWLT 10)**

*Algebraic Methods in Language Processing*

Eds. A. Nijholt, G. Scollo & R. Steetskamp, 263 pages.

Preface and Contents

**Teodor Rus** (*Iowa City, USA*) Algebraic Processing of Programming Languages.

**Eelco Visser** (*Amsterdam, NL*) Polymorphic Syntax Definition.

**J.C. Ramalho, J.J. Almeida & P.R. Henriques** (*Braga, P*) Algebraic Specification of Documents.

**Teodor Rus & James, S. Jones** (*Iowa City, USA*) Multi-layered Pipeline Parsing from Multi-axiom Grammars.

**Klaas Sikkel** (*Sankt Augustin, D*) Parsing Schemata and Correctness of Parsing Algorithms.

**François Barthélemy** (*Paris, F*) A Generic Tabular Scheme for Parsing.

**Frederic Tendeau** (*INRIA, F*) Parsing Algebraic Power Series Using Dynamic Programming.

**Michael Moortgat** (*Utrecht, NL*) Multimodal Linguistic Inference.

**R.C. Berwick** (*MIT, USA*) Computational Minimalism: The Convergence of the Minimalistic Syntactic Program and Categorical Grammar.

**Annius V. Groenink** (*Amsterdam, NL*) A Simple Uniform Semantics for Concatenation-Based Grammar.

**Grzegorz Rozenberg** (*Leiden, NL*) Theory of Texts (abstract only).

**Jan Rekers** (*Leiden, NL*) & *A Schürr* (*Aachen, D*) A Graph Grammar Approach to Graphical Parsing.

**Sándor Horvath** (*Debrecen, H*) Strong Interchangeability and Nonlinearity of Primitive Words.

**Wojciech Buszkowski** (*Poznan, P*) Algebraic Methods in Categorical Grammar.

- Vladimir A. Fomichov** (*Moscow, R*) A Variant of a Universal Metagrammar of Conceptual Structures. Algebraic Systems of Conceptual Syntax.
- Theo M.V. Jansen** (*Amsterdam, NL*) The Method of ROSETTA, Natural Language Translation Using Algebras.
- C.M. Martín-Vide, J. Miquel-Verges & Gh. Paun** (*Tarragona, E*) Contextual Grammars with Depth-First Derivation.
- Pál Dömösi & Jürgen Duske** (*Kussuth University H, University of Hannover, G*) Subword Membership Problem for Linear Indexed Languages.
- C. Rico Perez & J.S. Granda** (*Madrid, E*) Algebraic Methods for Anaphora Resolution.
- Vincenzo Manca** (*Pisa, I*) A Logical Formalism for Intergrammatical Representation.
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The eleventh workshop in the series took place on 19-21 June 1996. It focussed on the task of dialogue management in natural-language processing systems. The aim was to discuss advances in dialogue management strategies and design methods. During the workshop, there was a separate session concerned with evaluation methods.

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### **Proceedings Twente Workshop on Language Technology 11 (TWLT 11)**

*Dialogue Management in Natural Language Systems*

Eds. S. LuperFoy, A. Nijholt and G. Veldhuijzen van Zanten, 228 pages.

Preface and Contents

- David R. Traum** (*Université de Genève, CH*) Conversational Agency: The TRAINS-93 Dialogue Manager.
- Scott McGlashan** (*SICS, SW*) Towards Multimodal Dialogue Management.
- Pierre Nugues, Christophe Godéreaux, Pierre-Olivier and Frédéric Revolva** (*GREYC, F*) A Conversational Agent to Navigate in Virtual Worlds.
- Anne Vilnat** (*LIMSI-CNRS, F*) Which Processes to Manage Human-Machine Dialogue?
- Susann LuperFoy** (*MITRE, USA*) Tutoring versus Training: A Mediating Dialogue Manager for Spoken Language Systems.
- David G. Novick & Stephen Sutton** (*Portland, USA*) Building on Experience: Managing Spoken Interaction through Library Subdialogues.
- Latifa Taleb** (*INRIA, F*) Communicational Deviation in Finalized Informative Dialogue Management.
- Robbert-Jan Beun** (*IPO, NL*) Speech Act Generation in Cooperative Dialogue.
- Gert Veldhuijzen van Zanten** (*IPO, NL*) Pragmatic Interpretation and Dialogue Management in Spoken-Language Systems.
- Joris Hulstijn, Renè Steetskamp, Hugo ter Doest, Anton Nijholt & Stan van de Burgt** (*University of Twente, NL & KPN Research, NL*) Topics in SCHISMA Dialogues.
- Gavin Churcher, Clive Souter & Eric S. Atwell** (*Leeds University, UK*) Dialogues in Air Traffic Control
- Elisabeth Maier** (*DFKI, D*) Context Construction as Subtask of Dialogue Processing – the VERBMOBIL Case.
- Anders Baekgaard** (*CPK, DK*) Dialogue Management in a Generic Dialogue System.
- Wayne Ward** (*Carnegie Mellon University, USA*) Dialog Management in the CMU Spoken Language Systems Toolkit.



- Wieland Eckert** (*University of Erlangen, D*) Understanding of Spontaneous Utterances in Human-Machine-Dialog.
- Jan Alexandersson** (*DFKI, D*) Some Ideas for the Automatic Acquisition of Dialogue Structure.
- Kristiina Jokinen** (*Nara Institute of Science and Technology, JP*) Cooperative Response Planning in CDM: Reasoning about Communicative Strategies.
- Elizabeth Hinkelman** (*Kurzweil Applied Science, USA*) Dialogue Grounding for Speech Recognition Systems.
- Jennifer Chu-Carroll** (*University of Delaware, USA*) Response Generation in Collaborative Dialogue Interactions.
- Harry Bunt** (*Tilburg University, NL*) Interaction Management Functions and Context Representation Requirements.
- Peter Wyard & Sandra Williams** (*BT, GB*) Dialogue Management in a Mixed-Initiative, Cooperative, Spoken Language System.
- Rolf Carlson** (*KTH, SW*) The Dialog Component in the Waxholm System.
- Laila Dybkjær, Niels Ole Bernsen & Hans Dybkjaer** (*Roskilde University, DK*) Evaluation of Spoken Dialogue Systems.
- Vincenzo Manca** (*Pisa, I*) A Logical Formalism for Intergrammatical Representation.

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TWLT 12 took place on 11-14 September 1996. It focussed on 'computational humor' and in particular on verbal humor. TWLT12 consisted of a symposium (Marvin Minsky, Douglas Hofstadter, John Allen Paulos, Hugo Brandt Corstius, Oliviero Stock and Gerrit Krol as main speakers), an essay contest for computer science students, two panels, a seminar organized by Salvatore Attardo and Wladyslaw Chlopicki and a two-day workshop (Automatic interpretation and Generation of Verbal Humor) with a mix of invited papers and papers obtained from a Call for Papers.

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### **Proceedings Twente Workshop on Language Technology 12 (TWLT 12)**

*Computational Humor: Automatic Interpretation and Generation of Verbal Humor*

Eds. J. Hulstijn and A. Nijholt, 208 pages.

Preface and Contents

**Oliviero Stock** 'Password Swordfish': Verbal Humor in the Interface.

**Victor Raskin** Computer Implementation of the General Theory of Verbal Humor.

**Akira Ito & Osamu Takizawa** Why do People use Irony? - The Pragmatics of Irony Usage.

**Akira Utsumi.** Implicit Display Theory of Verbal Irony: Towards a Computational Model of Irony.

**Osamu Takizawa, Masuzo Yanagida, Akira Ito & Hitoshi Isahara** On Computational Processing of Rhetorical Expressions - Puns, Ironies and Tautologies.

**Carmen Curc3** Relevance Theory and Humorous Interpretations.

**Ephraim Nissan** From ALIBI to COLOMBUS. The Long March to Self-aware Computational Models of Humor.

**Salvatore Attardo** Humor Theory beyond Jokes: The Treatment of Humorous Texts at Large.

**Bruce Katz** A Neural Invariant of Humour.

**E. Judith Weiner** Why is a Riddle not Like a Metaphor?

**Tone Veale** No Laughing Matter: The Cognitive Structure of Humour, Metaphor and Creativity.

**Tony Veale & Mark Keane** *Bad Vibes* Catastrophes of Goal Activation in the Appreciation of Disparagement Humour and General Poor Taste.

**Kim Binsted & Graeme Ritchie** Speculations on Story Pun.

**Dan Loehr** An Integration of a Pun Generator with a Natural Language Robot.

**Cameron Shelley, Toby Donaldson & Kim Parsons** Humorous Analogy: Modeling 'The Devils Dictionary'.

**Michal Ephratt** More on Humor Act: What Sort of Speech Act is the Joke?

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TWLT 13 took place on 13-15 May 1998. It was the follow-up of the Mundial workshop, that took place in München in 1997. Both the Mundial workshop as TWLT13 focussed on the formal semantics and pragmatics of dialogues. In addition to the three-day workshop in Twente, with invited and accepted papers, on 18 May a workshop titled 'Communication and Attitudes' was organized at ILLC/University of Amsterdam.

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### **Proceedings Twente Workshop on Language Technology 13 (TWLT 13)**

*Formal Semantics and Pragmatics of Dialogue (Twendial'98)*

Eds. J. Hulstijn and A. Nijholt, 274 pages.

Preface and Contents

**Nicholas Asher** Varieties of Discourse Structure in Dialogue

**Jonathan Ginzburg** Clarifying Utterances

**Steve Pulman** The TRINDI Project: Some Preliminary Themes

**Henk Zeevat** Contracts in the Common Ground

**John Barnden** Uncertain Reasoning About Agents' Beliefs and Reasoning, with special attention to Metaphorical Mental State Reports

**Thomas Clermont, Marc Pomplun, Elke Prestin and Hannes Rieser** Eye-movement Research and the Investigation of Dialogue Structure

**Robin Cooper** Mixing Situation Theory and Type Theory to Formalize Information States in Dialogue

**Jean-louis Dessalles** The Interplay of Desire and Necessity in Dialogue

**Wieland Eckert** Automatic Evaluation of Dialogue Systems

**Jelle Gerbrandy** Some Remarks on Distributed Knowledge

**Jeroen Groenendijk** Questions in Update Semantics

**Wolfgang Heydrich** Theory of Mutuality (Syntactic Skeleton)

**Wolfgang Heydrich, Peter Kühnlein and Hannes Rieser** A DRT-style Modelling of Agents' Mental States in Discourse

**Staffan Larsson** Questions Under Discussion and Dialogue Moves

**Ian Lewin** Formal Design, Verification and Simulation of Multi-Modal Dialogues

**Nicolas Maudet & Fabrice Evrard** A Generic framework for Dialogue Game Implementation

**Soo-Jun Park, Keon-Hoe Cha, Won-Kyung Sung, Do Gyu Song, Hyun-A Lee, Jay Duke Park,**

**Dong-In Park & Jörg Höhle** MALBOT: An Intelligent Dialogue Model using User Modeling

**Massimo Poesio & David Traum** Towards an Axiomatization of Dialogue Acts

**Mieke Rats** Making DRT Suitable for the Description of Information Exchange in a Dialogue

**Robert van Rooy** Modal subordination in Questions

**Adam Zachary Wyner** A Discourse Theory of Manner and Factive Adverbial Modification

**Marc Blasband** A Simple Semantic Model

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TWLT14 was held on 7-8 December 1998. It focussed on the role of human language technology in the indexing and accessing of written and spoken documents, video material and/or images, and on the role of language technology for cross-language retrieval and information extraction. The workshop consisted of a series of accepted papers.

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**Proceedings Twente Workshop on Language Technology 14 (TWLT 14)**

*Language Technology in Multimedia Information Retrieval*

Eds. D. Hiemstra, F.M.G. de Jong and K. Netter, 194 pages.

Preface and Contents

**Hans Uszkoreit** (*DFKI, Saarbrücken*) Cross-language information retrieval: from naive concepts to realistic applications

**Paul Buitelaar, Klaus Netter & Feiyu Xu** (*DFKI, Saarbrücken*) Integrating Different Strategies for Cross-Language Retrieval in the MIETTA Project

**Djoerd Hiemstra & Franciska de Jong** (*University of Twente*) Cross-language Retrieval in Twenty-One: using one, some or all possible translations?

**David A. Hull** (*Xerox Research Center Europe*) Information Extraction from Bilingual Corpora and its application to Machine-aided Translation

**Arjen P. de Vries** (*University of Twente*) Mirror: Multimedia Query Processing in Extensible Databases

**Douglas E. Appelt** (*SRI International*) An Overview of Information Extraction Technology and its Application to Information Retrieval

**Paul E. van der Vet & Bas van Bakel** (*University of Twente*) Combining Linguistic and Knowledge-based Engineering for Information Retrieval and Information Extraction

**Karen Sparck Jones** (*Cambridge University*) Information retrieval: how far will really simple methods take you?

**Raymond Flournoy, Hiroshi Masuichi & Stanley Peters** (*Stanford University and Fuji Xerox Co. Ltd.*) Cross-Language Information Retrieval: Some Methods and Tools

**Andrew Salway & Khurshid Ahmad** (*University of Surrey*) Talking Pictures: Indexing and Representing Video with Collateral Texts

**Wim van Bruxvoort** (*VDA informatiebeheersing*) Pop-Eye: Using Language Technology in Video Retrieval

**Istar Buscher** (*Südwestrundfunk, Baden Baden*) Going digital at SWR TV-archives: New dimensions of information management professional and public demands

**Arnold W.M. Smeulders, Theo Gevers & Martin L. Kersten** (*University of Amsterdam*) Computer vision and image search engines

**Kees van Deemter** (*University of Brighton*) Retrieving Pictures for Document Generation

**Steve Renals & Dave Abberly** (*University of Sheffield*) The THISL Spoken Document Retrieval System

**Wessel Kraaij, Joop van Gent, Rudie Ekkelenkamp & David van Leeuwen** (*TNO-TPD Delft and TNO-HFRI Soesterberg*) Phoneme Based Spoken Document Retrieval

**Jade Goldstein & Jaime Carbonell** (*Carnegie Mellon University*) The use of MMR, diversity-based reranking in document reranking and summarization

**Michael P. Oakes, Chris D. Paice** (*Lancaster University*) Evaluation of an automatic abstractic system

**Danny H. Lie** (*Carp Technologies, The Netherlands*) Sumatra: A system for Automatic Summary Generation

**Marten den Uyl, Ed S. Tan, Heimo Müller & Peter Uray** (*SMR Amsterdam, Vrije Universiteit Amsterdam, Joanneum Research*) Towards Automatic Indexing and Retrieval of Video Content: the VICAR system

**Anton Nijholt** (*University of Twente*) Access, Exploration and Visualization of Interest Communities: The VMC Case Study (in Progress)

**Joanne Capstick, Abdel Kader Diagne, Gregor Erbach & Hans Uszkoreit** (*DFKI, Saarbrücken*) MULINEX: Multilingual Web Search and Navigation

**Klaus Netter & Franciska de Jong** (*DFKI, Saarbrücken and University of Twente*) OLIVE: speech based video retrieval

**Franciska de Jong** (*University of Twente*) Twenty-One: a baseline for multilingual multimedia

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TWLT15 was held on 19-21 May 1999. It focussed on the interactions in Virtual World. Contributions were invited on theoretical, empirical, computational, experimental, anthropological or philosophical approaches to VR environments. Invited talks were given by Russell Eames (*Microsoft*), Lewis Johnson (*USC*), James Lester (*North Carolina State University*), Pierre Nugues (*ISMRA-Caen*) and Stephan Matsuba (*VRML Dream Company*)

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### **Proceedings Twente Workshop on Language Technology 15 (TWLT 15)**

*Interactions in Virtual Worlds*

Eds. Anton Nijholt, Olaf Donk and Betsy van Dijk, 240 pages.

Preface and Contents

**Riccardo Antonini** (*University of Rome*) Let's-Improvise-Together

**Philip Brey** (*Twente University*) Design and the Social Ontology of Virtual Worlds

**Dimitrios Charitos, Alan H. Bridges and Drakoulis Martakos** (*University of Athens & University of Strathclyde*) Investigating Navigation and Orientation within Virtual Worlds

**M. Cibelli, G. Costagliola, G. Polese & G. Tortora** (*University of Salerno*) VR-Spider for (non) Immersive WWW navigation

**Bruce Damer, Stuart Gold, Jan A.W. de Bruin & Dirk-Jan G. de Bruin** (*The Contact Consortium & Tilburg University*) Steps toward Learning in Virtual World Cyberspace: TheU Virtual University and BOWorld

**Russell Eames** (*Microsoft Research, Seattle*) Virtual Worlds Applications

**Hauke Ernst, Kai Schafer & Willi Bruns** (*University of Bremen*) Creating Virtual Worlds with a Graspable User Interface

**Denis Gracanin & Kecia E. Wright** (*University of Southwestern Louisiana*) Virtual Reality Interface for the World Wide Web

**Geert de Haan** (*IPO, Eindhoven University of Technology*) The Usability of Interacting with the Virtual and the Real in COMRIS

**G. M. P. O'Hare, A. J. Murphy, T. Delahunty & K. Sewell** (*University College Dublin*) ECHOES: A Collaborative Virtual Training Environment

**Mikael Jakobsson** (*Ume University*) Why Bill was killed – understanding social interaction in virtual worlds

**W. Lewis Johnson** (*Marina del Rey*) Natural Interaction with Pedagogical Agents in Virtual Worlds

**Kulwinder Kaur Deol, Alistair Sutcliffe & Neil Maiden** (*City University London*) Modelling Interaction to Inform Information Requirements in Virtual Environments

- Rainer Kuhn & Sigrun Gujonsdottir** (*University of Karlsruhe*) Virtual Campus Project – A Framework for a 3D Multimedia Educational Environment
- James C. Lester** (*North Carolina State University*) Natural Language Generation in Multimodal Learning Environments
- Stephen N. Matsuba** (*The VRML Dream Company, Vancouver*) Lifelike Agents and 3D Animated Explanation Generation Speaking Spaces: Virtual Reality, Artificial Intelligence and the Construction of Meaning
- Pierre Nugues** (*ISMRA-Caen*) Verbal and Written Interaction in Virtual Worlds – Some application examples
- Anton Nijholt** (*University of Twente*) The Twente Virtual Theatre Environment: Agents and Interactions
- Sandy Ressler, Brian Antonishek, Qiming Wang, Afzal Godil & Keith Stouffer** (*National Institute of Standards and Technology*) When Worlds Collide –Interactions between the Virtual and the Real
- Lakshmi Sastry & D. R. S. Boyd** (*Rutherford Appleton Laboratory*) EISCAT Virtual Reality Training Simulation: A Study on Usability and Effectiveness
- Frank Schaap** (*University of Amsterdam*) "Males say 'blue,' females say 'aqua,' 'sapphire,' and 'dark navy'" The Importance of Gender in Computer-Mediated Communication
- Boris van Schooten, Olaf Donk & Job Zwiers** (*University of Twente*) Modelling Interaction in Virtual Environments using Process Algebra
- Martijn J. Schuemie & Charles A. P. G. van der Mast** (*Delft University of Technology*) Presence: Interacting in Virtual Reality?
- Jarke J. van Wijk, Bauke de Vries & Cornelius W. A. M. van Overveld** (*Eindhoven University of Technology*) Towards an Understanding 3D Virtual Reality Architectural Design System
- Peter J. Wyard & Gavin E. Churcher** (*BT Laboratories, Ipswich, Suffolk*) Spoken Language Interaction with a Virtual World in the MUESLI Multimodal 3D Retail System
- J. M. Zheng, K. W. Chan & I. Gibson** (*University of Hong Kong*) Real Time Gesture Based 3D Graphics User Interface for CAD Modelling System

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TWLT16/AMiLP 2000 is the second AMAST workshop on Algebraic Methods in Language Processing. Like its predecessor, organized in 1995 at the University of Twente in the TWLT series, papers were presented on formal language theory, programming language theory and natural language theory. A common theme in these papers was the use of mathematics, in particular the use of an algebraic approach. AMiLP 2000 was held in Iowa City, Iowa, USA, from May 20–22 2000, just before the AMAST 2000 conference.

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**Proceedings Twente Workshop on Language Technology 16 (TWLT 16)**  
*Algebraic Methods in Language Processing (AMiLP2000)*  
 Eds. D. Heylen, A. Nijholt, and G. Scollo, 263 pages.

Preface and Contents

- Peter R.J. Asveld** (*University of Twente*) Algebraic Aspects of Families of Fuzzy Languages
- P. Boullier** (*INRIA-Rocquencourt*) 'Counting' with Range Concatenation Grammars
- D. Cantone, A. Formisano, E.G. Omodreo & C.G. Zarbu** (*University of Catania, University L'Aquila & University of Perugia*) Compiling Dyadic First-Order Specifications into Map Algebra

- Denys Duchier** (*Universität des Saarlandes*) A Model Eliminative Treatment of Quantifier-Free Tree Descriptions
- Theo M.V. Janssen** (*University of Amsterdam*) An Algebraic Approach to Grammatical Theories for Natural Languages
- Aravind K. Joshi** (*University of Pennsylvania*) Strong Generative Power of Formal Systems
- Jozef Kelemen, Alica Kelemenov & Carlos Martin-Vide** (*Silesian University & Rovira I Virgili University*) On the Emergence of Infinite Languages from Finite Ones
- Stephan Kepser** (*University of Tübingen*) A Coalgebraic Modelling of Head-Driven Phrase Structure Grammar
- Hubert Dubois & Hélène Kirchner** (*LORIA-UHP & CNRS*) Objects, Rules and Strategies in ELAN
- Jens Michaelis & Uwe Mönnich & Frank Morawietz** (*Universität Tübingen*) Algebraic Description of Derivational Minimalism
- Rani Nelken & Nissim Francez** (*Dept. of Computer Science, Technion, Israel*) A Calculus for Interrogatives Based on Their Algebraic Semantics
- Gheorghe Păun** (*Institute of Mathematics of the Romanian Academy*) Molecular Computing and Formal Languages: A Mutually Beneficial Cooperation
- G. Reggio, M. Cerioli & E. Astesiano** (*University of Genova*) An Algebraic Semantics of UML Supporting its Multiview Approach
- James Rogers** (*University of Central Florida*) wMSO Theories as Grammar Formalisms.
- Teodor Rus** (*University of Iowa*) Algebraic Definition of Programming Languages.
- Karl-Michael Schneider** (*University of Passau*) Tabular Parsing and Algebraic Transformations
- Edward Stabler & Ed Keenan** (*University of California*) Structural Similarity
- Thomas L. Cornell** (*Cymfony Net, Inc.*) Parsing and Grammar Engineering with Tree Automata.

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TWLT 17, *Interacting Agents*, was co-organised with the Centre for Evolutionary Language Engineering (CELE) and as such is also the first workshop in the CELE Workshops on Evolutionary Language Engineering (CEvoLE) series. Together with TWLT18/CEvoLE2 these workshops are jointly titled “Learning to Behave”. The workshops investigate human-agent interaction and knowledge both on the level of agents communicating with the external environment and on the level of the internal agent processes that guide the modelling and understanding of the external sensory input in the brain.

TWLT 17 focussed on the interaction of an agent with the environment. This covers many topics such as the use of conversational strategies, natural language and non-verbal communication, turn-taking, protocols, cross-media references, the effect of context, affect and emotion in agents. A special session is devoted to theatre applications. TWLT 17 was held in Enschede from October 18–20 2000.

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### **Proceedings Twente Workshop on Language Technology 17 (TWLT 17)**

*Learning to Behave, Workshop I: Interacting Agents*

Eds. A. Nijholt, D. Heylen and K. Jokinen, 205 pages.

Preface and Contents

**Nadia Magnenat-Thalmann, Sumedha Kshirsagar** (*MIRALab, CUI, University of Geneva*) Communication with Autonomous Virtual Humans

- Sabine S. Geldof** (*AI-Lab, Vrije Universiteit Brussel*) Co-habited Mixed Reality and Context
- Zsófia Ruttkay, Jeroen Hendrix, Paul ten Hagen, Alban Lelièvre, Han Noot & Behr de Ruiter** (*Centre for Mathematics and Computer Science, Amsterdam*) A Facial Repertoire for Avatars
- Kristina Höök** (*SICS, Kista, Sweden*) Evaluating Interactive Characters – going beyond body language
- Frédéric Kaplan** (*Sony Computer Science Laboratory, Paris*) Talking AIBO : First Experimentation of Verbal Interactions with an Autonomous Four-legged Robot
- Jan-Thorsten Milde** (*Universität Bielefeld*) The Instructable Agent Lokutor
- Patrizia Paggio & Bart Jongejan** (*Center for Sprogteknologi, Copenhagen*) Unification-Based Multimodal Analysis in a 3D Virtual World: the Staging Project
- Boris van Schooten** (*Parlevink Group, University of Twente, Enschede*) A Specification Technique for Building Interface Agents in a Web Environment
- Bernard Spanlang, Tzvetomir I Vassilev** (*Department of Computer Science, University College, London*) Efficient Cloth Model for Dressing Animated Virtual People
- Luc van Tichelen and Alex Schoenmakers** (*Lernout & Hauspie Speech Products, Ieper*) A Conversational Agent for a Multi-Modal Information Kiosk
- Job Zwiers, Betsy van Dijk, Anton Nijholt & Rieks op den Akker** (*Parlevink/CTIT, University of Twente, Enschede*) Design Issues for Intelligent Navigation and Assistance Agents in Virtual Environment
- Marc Cavazza** (*University of Teesside*) Mapping Dialogue Acts to Narrative Functions for Interactive Storytelling
- Ricardo Imbert & Angélica de Antonio** (*Universidad Politécnica de Madrid*) The Bunny Dilemma: Stepping Between Agents and Avatars
- Patrizia Palamidese** (*CNR-CNUCE, Pisa*) Composing and Editing Structured 3D Stories
- Rachel Price, Chraig Douthier, Mervyn A. Jack** (*Center for CIR, University of Edinburgh*) Using Choreographed Electronic Motion to Create Mood in Virtual Environments
- Nikitas M. Sgouros** (*University of Piraeus*) Empowering the Audience in Virtual Performances
- Elisabeth André** (*DFKI, Germany*) Adding Lifelike Synthetic Characters to the Web
- Roel Vertegaal** (*Queens University, Kingston*) Agents as Attention-based Interfaces

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TWLT 18, *Internalising Knowledge*, was co-organised with the Centre for Evolutionary Language Engineering (CELE) and as such is also the second workshop in the CELE Workshops on Evolutionary Language Engineering (CEvoLE) series. Together with TWLT17/CEvoLE1 these workshops are jointly titled “Learning to Behave”. The workshops investigate human-agent interaction and knowledge both on the level of agents communicating with the external environment and on the level of the internal agent processes that guide the modelling and understanding of the external sensory input in the brain.

TWLT 18 focussed on internal aspects of learning and interaction: computation in brain-like systems. The goal is to investigate cognitive models for information processing and coordination, especially how symbolic processing, conceptualising and language learning take place in neural models.

TWLT 18 was held in Ieper (Belgium) from November 22-24 2000.

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Eds. K. Jokinen, D. Heylen and A. Nijholt, 221 pages.

Preface and Contents

- Joseph Bruce and Risto Miikulainen** (*University of Texas at Austin, Austin*) Evolving Populations of Expert Neural Networks
- Charlotte K. Hemelrijk** (*University of Zürich*) Social Phenomena Emerging by Self-organisation in a Competitive, Virtual World (“Domworld”)
- Marc Leman** (*IPEM – Dept. Of Musicology, Ghent University*) Spatio-temporal Processing of Musical Texture, Pitch/Tonality and Rhythm
- Erik Robert** (*AZ MM Gent, Belgium; KaHoG, Gent/Foundation “Brain and Behaviour” Erasmus University, Rotterdam*) Psycholinguistic Assessments of Language Processing in Aphasia
- Luc Berthouze and Nadia Bianchi-Berthouze** (*Electrotechnical Laboratory, Tsukuba & Aizu University, Aizu-Wakamatsu*) Dynamics of Sensorimotor Categorization and Language Formation: A Co-evolution?
- L. Andrew Coward** (*Murdoch University, Perth*) Modeling Cognitive Processes with the Recommendation Architecture
- A. Dhunay, C.J.Hinde & J.H.Connolly** (*Loughborough University, UK*) Induction of a Second Language by Transformation and Augmentation
- Thomas Liebscher** (*University of Potsdam*) Modelling Reaction Times with Neural Networks using Leaky Integrator Units
- Jaime J. Dávila** (*School of Cognitive Science, Amherst*) Genetic Algorithms and the Evolution of Neural Networks for Language Processing
- Yvan Saeys & Herwig Van Marck** (*Sail Port Western Europe, Centre for Evolutionary Language Engineering (CELE), Ieper*) A Study and Improvement of the Genetic Algorithm in the CAM-Brain Machine
- Peter beim Graben, Thomas Liebscher & Douglas Saddy** (*University of Potsdam*) Parsing Ambiguous Context-Free Languages by Dynamical Systems: Disambiguation and Phase Transitions in Neural Networks with Evidence from Event-Related Brain Potentials
- Aard-Jan van Kesteren, Riëks op den Akker, Mannes Poel & Anton Nijholt** (*University of Twente*) Simulation of Emotions of Agents in Virtual Environments using Neural Networks
- Régine Kolinsky, Vincent Goetry, Monique Radeau and José Morais** (*Unité de Université Libre de Bruxelles, Fonds National de la Recherche Scientifique*) Human Cognitive Processes in Speech Perception and World Recognition
- Mehdi Dastani, Bipin Indurkha and Remko Scha** (*Vrije Universiteit Amsterdam and Tokyo University of Agriculture and Technology*) Modelling Analogical Projection based on Pattern Perception
- Marc Leman & Bart Verbeke** (*Ghent University*) The Concept of Minimal ‘Energy’ Change (MEC) in Relation to Fourier Transform, Auto-Correlation, Wavelets, AMDF and Brain-like Timing Networks – Application to the Recognition of Reptitive Rhythmical Patterns in Acoustical Musical Signals
- Jakub Zavrel, Sven Degroeve, Anne Kool, Walter Daelemans & Kristiina Jokinen** (*University of Antwerp & CELE, Ieper*) Diverse Classifiers for NLP Disambiguation Tasks. Comparison, Optimization, Combination and Evolution

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TWLT 19, *Information Extraction in Molecular Biology*, was organised in the context of the Scientific Programme on Integrated Approaches for Functional Genomics funded by the European



Science Foundation (ESF). In TWLT19, *Information Extraction for Molecular Biology*, the focus is on the published literature. Authors of journal articles identify relations between genes, regulators and proteins, and each such relation is a piece of the puzzle. We do not know most pathways, but we do know that more systematic perusal of the available literature will no doubt uncover many more pieces of the puzzle. It is therefore in order to bring together workers in relevant disciplines to exchange ideas, views and approaches. The main goal of TWLT19 is to further informal and formal collaborations between different disciplines in order to promote better use of existing literature.

TWLT 19 was held in Enschede from November 11-14 2001.

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### **Proceedings Twente Workshop on Language Technology 19 (TWLT 19)**

*Information Extraction in Molecular Biology*

Eds. P. van der Vet, G. van Ommen, A. Nijholt and A. Valencia, 78 pages.

Preface and Contents

**Pieter Adriaans** (*University of Amsterdam*) Sematic Induction with Emile, Opportunities in Bioinformatics

**Sophia Ananiadou, Goran Nenadić & Hideki Mima** (*University of Salford, UK & University of Tokyo, Japan*) A Terminology Management Workbench for Molecular Biology

**Christian Blaschke, Juan Carlos Oliveros, Alfonso Valencia & Luis Cornide** (*Universidad Autónoma, Madrid, Spain & ALMA Bioinformatica, Tres Cantos, Spain*) Biological Function and DNA Expression Arrays

**Udo Hahn, Stefan Schulz & Martin Romacker** (*Freiburg University, Freiburg, Germany & Freiburg University Hospital, Freiburg, Germany*) 'Deep' Information Extraction From Biomedical Documents in the MEDSYNDIKATE System

**Jerry R. Hobbs** (*Artificial Intelligence Center, SRI International, California*) Information Extraction from Biomedical Text

**U. Reyle & J. Šarić** (*University of Stuttgart, Germany & European Media Laboratory, Heidelberg, Germany*) Ontology Driven Information Extraction

**B.J. Stapley, L.A. Kelley & M.J.E. Sternberg** (*Imperial Cancer Research Fund, London, UK*) Protein Functional Classification by Text Data-Mining

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TWLT 20, *The April Fools' Day Workshop on Computational Humour*, was an initiative of HAHAcronym (European Project IST-2000-30039). The aims of TWLT20, *the April Fools' Day Workshop on Computational Humour* were bringing together research results in the area of computational humour, with an emphasis on the computational interpretation and generation of verbal humour.

TWLT 20 was held in Trento from April 15-16 2002.

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### **Proceedings Twente Workshop on Language Technology 20 (TWLT 20)**

*The April Fools' Day Workshop on Computational Humour*

Eds. O. Stock, C. Strapparava, A. Nijholt, 169 pages.

Preface and Contents

**Salvatore Attardo** (*Youngstown University, USA*) Formalizing Humor Theory

- Rachel Giora** (*Tel Aviv University, Israel*) Optimal Innovation and Pleasure
- Douglas Hofstadter** (*Indiana University, USA*) Frame Blends, Analogies, and Humor
- Victor Raskin** (*Purdue University, USA*) Computational Humor and Ontological Semantics
- Graeme Ritchie** (*Edinburgh, Scotland*) The Structure of Forced Reinterpretation Jokes
- Willibald Ruch** (*Queens University, Belfast, UK*) Computers with a personality? Lessons to be learned from studies of the psychology of humor
- Aaron Ben-Ze'ev** (*University of Haifa, Israel*) Humour in Online Romantic Relationship
- Justin McKay** (*Binsted-McKay, Tokio, Japan*) Generation of Idiom-based Witticisms to Aid Second Language Learning
- Francesco Mele** (*Istituto di Cibernetica, CNR, Napoli, Italy*) Real and Fictional Ridicule. A Cognitive Approach for Models of Humour
- Anton Nijholt** (*University of Twente, The Netherlands*) Embodied Agents: A New Impetus to Humor Research
- Ephraim Nissan** (*University of Greenwich, UK*) A Formalism for Misapprehended Identities: Taking a Leaf Out of Pirandello
- Oliviero Stock, Carlo Strapparava** (*ITC-irst, Trento, Italy*) Humorous Agent for Humorous Acronyms: The HAHAcronym Project
- Chris Vernour, Michael Levinson, Greg Lessard** (*Queen's University, Canada*) The Verbal/Non-verbal Distinction: Still an O-pun Question

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AMiLP 2003 is the third AMAST workshop on Algebraic Methods in Language Processing. Like with its predecessors, organized in 2000 at Iowa City and in 1995 at the University of Twente and published in the TWLT series, papers will be presented on formal language theory, programming language theory and natural language theory. A common theme in these papers is the use of mathematics, in particular the use of an algebraic approach. Due to this approach, traditional boundaries between the areas may disappear, allowing researchers to learn from areas that were uncommon to them before.

AMiLP 2003 was held in Verona, Italy, from August 25–27 2003.

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### **Proceedings Twente Workshop on Language Technology 21 (TWLT 21)**

*Algebraic Methods in Language Processing (AMiLP2003)*

Eds. F. Spoto, G.Scollo and A. Nijholt, 274 pages.

Preface and Contents

- Joseph Goguen** (*University of California at San Diego, USA*) Semiotic Morphisms, Representations and Blending for Interface Design
- Giancarlo Mauri** (*Università di Milano-Bicocca, Italy*) Word Design for Molecular Computing
- Mark-Jan Nederhof and Giorgio Satta** (*University of Groningen, the Netherlands and University of Padua, Italy*) Probabilistic Parsing Strategies
- Christian Retoré** (*LaBRI-C.N.R.S. & INRIA-Futurs & Universités Bordeaux, France*) Semantic Aspects of Minimalist Grammars
- Antonino Salibra** (*Università Ca'Foscari di Venezia, Italy*) Lambda Calculus: Models and Theories
- Peter R.J. Asveld** (*University of Twente, the Netherlands*) Generating All Permutations by Context-Free Grammars in Chomsky Normal Form

- Domenico Cantone, Simone Faro** (*University of Catania, Italy*) On the Frequency of Characters in Natural Language Texts
- Stephen Chong, Riccardo Pucella** (*Cornell University, USA*) A Framework for Creating Natural Language User Interfaces for Action-Based Applications
- Radu Gramatovici and Carlos Martín-Vide** (*University of Bucharest, Romania and Rovira i Virgili University, Spain*) 1-Contextual Grammars with Sorted Dependencies
- Helmar Gust, Kai-Uwe Kühnberger, Ute Schmid** (*University of Osnabrück, Germany*) Metaphors and Anti-Unification
- Dana Harrington** (*University of Calgary, Canada*) Uniqueness Logic
- Stephan Kepser, Uwe Mönnich** (*University of Tübingen, Germany*) (Un-)Decidability Results for Head-Driven Phrase Structure Grammar
- Stephan Kepser, Uwe Mönnich** (*University of Tübingen, Germany*) A Note on the Complexity of Optimality Theory
- Markus Kracht** (*UCLA, Los Angeles, USA*) Partial Algebras, Meaning Categories and Algebraization
- Hans-Ulrich Krieger** (*DFKI, Germany*) SDL – A Description Language for Building NLP Systems
- Rohit N. Kundaji, R. K. Shyamasundar** (*School of Technology and Computer Science, Tata Institute of Fundamental Research, Mumbai, India*) Refinement Calculus: A Basis for Translation Validation, Debugging and Certification
- M. D. Jiménez López** (*University of Pisa, Italy*) Dialogue Modeling with Formal Languages
- Gerald Penn** (*University of Toronto, Canada*) Efficient Transitive Closure of Sparse Matrices over Closed Semirings
- Markus Roggenbach** (*University of Wales Swansea, United Kingdom*) CSP-CASL – A new Integration of Process Algebra and Algebraic Specification
- Markus Schulze** (*University of Erlangen-Nürnberg, Germany*) A Linear LAG for  $a^i$
- A.N. Trahtman** (*Bar-Ilan University, Israel*) Verification Tools for Checking some kinds of Testability

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The proceedings of the workshops can be ordered from Leerstoel TKI, Department of Computer Science, University of Twente, P.O. Box 217, NL-7500 AE Enschede, The Netherlands. E-mail orders are possible: [bijron@cs.utwente.nl](mailto:bijron@cs.utwente.nl). Each of the proceedings costs €25,=.