NORTH-HOLLAND
LINGUISTIC SERIES

47

COLING 82

Proceedings of the Ninth International Conference on
Computational Linguistics, Prague, July 5-10, 1982

edited by

JÁN HORECKÝ
Institute of Slovak Language
Slovak Academy of Sciences

1982

NORTH-HOLLAND PUBLISHING COMPANY
AMSTERDAM · NEW YORK · OXFORD

© ACADEMIA, Prague 1982

All rights reserved. No part of this publication may be reproduced stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publishers and the distributors.

ISBN: 0 444 86393 1

Published by:

ACADEMIA
Publishing House of the Czechoslovak Academy of Sciences
Prague

Distributed by:

NORTH-HOLLAND PUBLISHING COMPANY
AMSTERDAM · NEW YORK · OXFORD

Sole distributors for the U.S.A. and Canada.

ELSEVIER SCIENCE PUBLISHING COMPANY, INC.
52 Vanderbilt Avenue
New York, N.Y. 10017

Printed in Czechoslovakia

PREFACE

In the course of the almost twenty years of their existence, COLING conferences have become a well-established opportunity to exchange ideas and experience in the rather young, interdisciplinary domain of research of computational linguistics, which attracts attention thanks to the stimuli it offers for deep theoretical studies as well as to the possibilities it provides for applications in various directions.

The enormous interest in meetings of this kind is reflected also in the great number of papers submitted for admission for COLING 82 in Prague - the international body of reviewers faced the difficult task to choose only one third of submitted abstracts for presentation as full papers. The contents of this volume is the result of their responsible and uncomprosing work: it presents the collection of full texts of the papers accepted for presentation. The papers reflect the main directions followed by researchers engaged in this field and they give evidence that the field of computational linguistics, even though so difficult to be specified as for the proper domain of its concern, continuously attracts new students.

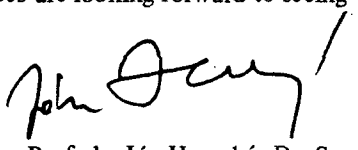
The topics are fairly heterogeneous, but nevertheless the following main domains of interest can be delimited: machine translation efforts, both theoretical and practical, linguistic aspects of artificial intelligence and man-machine communication, questions of knowledge representation, computational linguistics in its relation to theoretical linguistics, to mathematics and computer science, and to information storage and retrieval.

The interest in these domains is so large that - in addition to the full papers - about seventy abstracts were accepted as short communications, which will be presented (without any time for discussion, unfortunately) at a session parallel to those of the main papers and to the two workshops, one of which is devoted to the theoretical and practical aspects of automized translation, the other to the tradition of the Prague School of functional-structural linguistics and to some of its present day continuations. Two panel discussions will be organized, one on linguistic processes in man and machine (concerned with new approaches in computational linguistics, artificial intelligence and cognitive science) and the other on the question whether there can be general computational linguistic results within artificial intelligence.

The abstracts of the short communications are included in a separate volume, published by Charles University, Prague.

COLING 82 takes place in the heart of Europe, in a city of great linguistic tradition, where an international conference on formal linguistic was held already in 1964. Computer facilities may be more easily accessible in many other places, but the spirit of scientific discussions in Prague, we hope, will outweigh this as well as other possible difficulties.

I hope that COLING 82 will provide a stimulating and friendly working atmosphere for all the participants and I and my collegues are looking forward to seeing you in Prague.



Prof. dr. Ján Horecký, Dr. Sc.
Chairman of the Organizing Committee

LIST OF CONTENTS

Preface v

Message from the ICCL Chairman xv

N. ABE and S. TSUJI
A learning of object structures by verbalism 1

G. ADORNI, A. BOCCALATTE and M. DI MANZO
Cognitive models for computer vision 7

B. BEGIER
Knowledge representation method based on predicate calculus in an intelligent CAI system 13

Ch. BOITET, P. GUILLAUME and M. QUEZEL-AMBRUNAZ
Implementation and conversational environment of ARIANE 78.4. An integrated system for automated translation and human revision 19

L. BOLC and T. STRZALKOWSKI
Transformation of natural language into logical formulas 29

L. BORGHESI and C. FAVARETO
Flexible parsing of discretely uttered sentences 37

J. BRADFORD
A metric space defined on English and its relation to error correction 43

A. BRIETZMANN and G. GOERZ
Pragmatics in speech understanding—revisited 49

A.S. CHEKHOV
Synactic and anaphoric relations: A tentative semantic generalization *

E. CHOURAQUI
Recherches sur la représentation des connaissances, le système ARCHES 55

M. CLEMENTE
E-graphs: An interesting data structure *

H. COELHO
A formalism for the structural analysis of dialogues 61

J.T. CRITZ
Frame based recognition of theme continuity 71

W. DILGER
Tree directed grammars 77

Z.W. FENG
Mémoire pour une tentative de traduction multilingue du Chinois en Français, Anglais, Japonais, Russe et Allemand *

D. FUM, G. GUIDA and C. TASSO
Forward and backward reasoning in automatic abstracting 83

R. GRISHMAN, L. HIRSCHMAN and C. FRIEDMAN
Natural language interfaces using limited semantic information 89

B. GROSZ, N. HAAS, G. HENDRIX, J. HOBBS, P. MARTIN, R. MOORE, J. ROBINSON and S. ROSENSCHEIN
DIALOGIC: A core natural-language processing system 95

Ch.U. HABEL
Referential nets with attributes 101

E. HAJIČOVÁ and J. VRBOVÁ
On the role of the hierarchy of activation in the process of natural language understanding 107

P.-K. HALVORSEN
Lexical-functional grammar and order-free semantic composition 115

A.S. HEIN
An experimental parser 121

J.R. HOBBS, D.E. WALKER and R.A. AMSLER
Natural language access to structured text 127

W. HOEPPNER
A multilayered approach to the handling of word formation 133

A. ISHIMOTO
A. Lesniewskian version of Montague grammar 139

A.K. JOSHI
Processing of sentences with intra-sentential code-switching 145

G. KEMPEN and E. HOENKAMP
Incremental sentence generation: Implications for the structure of a syntactic processor 151

Z. KIRSCHNER
On a device in dictionary operations in machine translation 157

R. KITTREDGE
Tidy French and English grammars and their uses *

G. KNORZ
Recognition of abstract objects - A decision theory approach within natural language processing 161

H. KUČERA
Markedness and frequency: A computational analysis 167

J. LANDSBERGEN
Machine translation based on logically isomorphic Montague grammars 175

J. LÉON, D. MEMMI, M. ORNATO, J. POMIAN and G.P. ZARRI
Conversion of a French surface expression into its semantic representation according to the RESEDA metalanguage 183

M.G. MALKOVSKY
TULIPS-2 - Natural language learning system 191

W.C. MANN
The anatomy of a systemic choice 195

E. MARSCH and N. SAGER
Analysis and processing of compact text 201

L.J. MAZLACK and R.A. FEINAUER
Surface analysis of queries directed toward a database 207

D.D. McDONALD
Using a compentence grammar in a performing system: An example from language generation *

A.K. MELBY
Mmulti-level translation aids in a distributed system 215

D. MEMMI and J. MARIANI
ARBUS, a tool for developing application grammars 221

A. MICHIELS and J. NOËL
Approaches to thesaurus production 227

F. MIZOGUCHI and S. KONDO
A software environment for developing natural language understanding system 233

K. MURAKI
On a semantic model for multi-lingual paraphrasing 239

M. NAGAO, J. TSUJII, K. YADA and T. KAKIMOTO
An English Japanese machine translation system of the titles of scientific and engineering papers 245

M. NAGAO and J. NAKAMURA
A parser which learns the application order of rewriting rules 253

A.S. NARINJANI
A simplified anaphora model within the framework of the NL text understanding system *

G. NEUBERT
Zum Wiederauffinden von Informationen in automatischen Wörterbüchern 259

T.M. NIKOLAYEVA
Sentences with 'imbedded semantics' and the formal methods of

B. NIKOLOVA and I. NENOVA
Termservice - An automated system for terminology services 265

F. NISHIDA and S. TAKAMATSU
Japanese-English translation through internal expressions 271

T. NISHIDA and S. DOSHITA
An English-Japanese machine translation system based on formal semantics of natural language 277

Y. NITTA, A. OKAJIMA, F. YAMANO and K. ISHIHARA
A heuristic approach to English-into-Japanese machine translation 283

I.I. OUBINE and B.D. TIKHOMIROV
Machine translation systems and computer dictionaries in the information service. Ways of their development and operation 289

E.V. PADUCEVA
Voproso-otvetnoe sootvetstvie i semantika voprosa *

J. PANEVOVÁ
Random generation of Czech sentences 295

F. PAPP
Empirical data and automatic analysis 301

B. PHILLIPS and J.A. HENDLER
A message-passing control structure for text understanding 307

M. PLÁTEK
Composition of translation schemes with D-trees 313

B.B. RIEGER
Procedural meaning representation by connotative dependency structures. An empirical approach to word semantics for analogical inferencing 319

D.F. ROESNER and J.H. LAUBSCH
Formalization of argumentation structures in newspaper texts 325

Ch. ROHRER
Towards a mechanical analysis of French tense forms in texts 331

K.M. ROSS
An improved left-corner parsing algorithm 333

Y. SAKAMOTO and T. OKAMOTO
Lexical parallelism in text structure determination and content analysis 339

S.C. SALVETER and D. MAIER
Natural language updates 345

E.N. SAVVINA
A model for elliptical and conjunction reduction in symmetric constructions *

S. SAWAI, H. FUKUSHIMA, M. SUGIMOTO and N. UKAI
Knowledge representation and machine translation 351

L.K. SCHUBERT
From English to logic: context-free computation of 'conventional' logical translations *

P. SGALL
Natural language understanding and the perspectives of question answering 357

J. SLOCUM
The LRC machine translation system: An application of state-of-the-art text and natural language processing techniques *

I. STEINACKER and H. TROST
Parsing German 365

C.Y. SUEN
Computational analysis of Mandarin sounds with reference to the English language 371

M. TĚŠITELOVÁ
Quantification of meaning and the computer 377

H. THOMPSON
Handling meta rules in a parser for GPSG *

J. TSUJII
The transfer phase in an English-Japanese translation system 383

L. UHLIŘOVÁ, I. NEBESKÁ and J. KRALÍK
Computational data analysis for syntax 391

T. USKOVA
Frame approach to document storage and retrieval *

J.N. VERASTEGUI-CARVAJAL
Utilisation du parallélisme en traduction automatisée par ordinateur 397

D.E. WALKER
Natural-language-access systems and the organization and use of information 407

B. WEBBER and A. JOSHI
Taking the initiative in natural language data base interactions: Justifying why 413

S. YOSHIDA, H. TSURUMARU and T. HITAKA
Man-assisted machine construction of a semantic dictionary for natural language processing 419

L.A. ZADEH
Test-score semantics for natural languages 425

Author Index 431

** These papers were accepted for presentation but arrived too late to be included in the volume.*

MESSAGE FROM THE ICCL CHAIRMAN

Ladies and Gentlemen, Dear Colleagues
in Computational Linguistics

Prague has been selected as the site for the 9th International Conference: COLING-82.

The regular participants of COLING conferences may notice that the International Committee tries to arrange it in such a way that many different places in the world become, for a few days, the focus of International Computational Linguistics.

Last time, in Tokyo, many participants came from Japan; this time, it will be easier for European scientists, especially for those coming from Eastern Europe, to join. Obviously, I wish that as many colleagues as possible will come, from the most eastern parts of Asia as well as from the most western and southern parts of America.

It will be a pleasure to be welcomed by our friends from Czechoslovakia, who have organized COLING-82 very nicely. The work to be performed by our hosts during the Conference is appreciated, as this can be seen; however, the hidden, time-consuming and difficult tasks during the months before the opening session are always underestimated. For such a successful result, I would like to convey to our hosts, on behalf of the ICCL, the gratitude of all those participating.

Vive COLING.

B. VAUQUOIS