COLING 80
Proceedings of
The 8th International Conference on
Computational Linguistics

Sept. 30-Oct. 4, 1980, Tokyo
The proceedings was printed with the partial assistance of a "Grant from the Commemorative Association for the Japan World Exposition."
MESSAGE FROM HONORARY PRESIDENT OF COLING 80

Representing the Organizing Committee of the COLING 80, I would like to express our heartiest welcome to all of you. As Japan is an island country in the Orient, and is located far from western countries, we have many exotic cultural aspects for everyone of you to enjoy. Our language is one of them, and I would like to explain a little bit about our language.

In ancient Japan people had their language (they called it Yamato-kotoba), but had no characters. When they learned Chinese characters around the sixth century, they began to write by utilizing Chinese characters in two ways:

1) For ideograms they borrowed Chinese characters of equivalent meaning but read the characters in their own ways.

2) For about fifty phonetic signs they invented two kinds of Kana-characters.
   (a) Kata-kana: each kana is derived from an element of a corresponding Chinese character, (the pronunciation of it is needed for Japanese language).
   (b) Hira-kana: each kana is a result of simplification of a corresponding Chinese character written in a very cursive hand.

Today, Kata-kana is ordinarily used for names and words of Western origin, and Hira-kana for everything else that is written phonetically. Nowadays we use about two thousand ideographic characters and about one hundred Kana characters in our daily life. Consequently if we want to process our texts by digital computers, our first problem is the choice of input/output devices for manipulating such many characters. In this preprint you will find many papers from Japanese colleagues that relate to this problem. And you will have opportunities to see such devices during your stay in Japan.

I earnestly hope that you will find the conference both intellectually profitable and personally pleasurable. I encourage you to stay in Japan as long as possible to enjoy the autumn season which is the best in the entire year.

Hiroshi Wada
Honorary President
of COLING 80
MESSAGE FROM ICCL CHAIRMAN

Ladies and Gentlemen, dear colleagues
in Computational Linguistics

The International Committee for Computational Linguistics is delighted to present the 8th Conference in Tokyo.

Since 1965, year of the foundation of ICCL and the first COLING conference in New York, the interest for the field has been increasing. After seven meetings, held in North-America and in Europe, COLING-80 takes place for the first time in Asia. It is a happy event to meet in Tokyo!

For those who are regular participants of COLING conferences, it will be a good opportunity to have a more detailed knowledge of what is going on in Japan and Far East countries. It will also be an occasion for the numerous Japanese scientists, of whom only a few could attend the previous meetings, to have fruitful exchanges with their Western colleagues.

After a few years of reflection and discussion about the proper content and the relevant features of what is computational linguistics, a general agreement came out for a broad area dealing with "natural languages and computers". The topic is both wide and yet specialized enough to find its own originality.
It is not a juxtaposition on linguists on one hand nor computer scientists or mathematicians on the other hand. Obviously, the computer is a tool. However, it is a tool with which we have to communicate by means of languages; it is also a tool by means of which we can simulate some intelligent behaviour. So, the use of natural languages to communicate with computers, and, beyond this scope, the ways of processing natural languages by computers were the attractive poles of computational linguistics.

Many papers included in these COLING-80 proceedings show practical experiments both with written and spoken languages. Nevertheless, the different aspects of computational linguistics could not progress in an efficient way, without deep insight and theoretical researches in linguistics, in computability, in logics and different models of representation as well as in software or hardware systems. These topics are also present in these proceedings.

There were so many submitted papers of high quality that the task of the Program Committee was very difficult. It was impossible to accept all of them. The unfortunate authors will be welcome and their cooperation will be appreciated during discussions.

It is also a very long, patient and difficult task to organize such a conference. On behalf on the ICCL, I would like to convey the gratitude of all participants to our hosts for this very successful COLING.

Bernard Vanquois
Chairman of ICCL
NAME LIST

Chairman of ICCL
Prof. Bernard Vauquois
Groupe d'Etudes pour la Traduction Automatique
Cedex No. 53, 38041 Grenoble, France

Honorary President of COLING 80
Prof. Hiroshi Wada
Dept. of Engineering Seikei University
3-3-1 Kichijoji Kitamachi
Musashino-shi, Tokyo 180, Japan

Program Chairman
Prof. David G. Hays
Twin Willows, 5048 Lakeshore Road
Hamburg, New York 14075, USA

Local Arrangements Chairmen
Prof. Makoto Nagao
Dept. of Electrical Engineering
Kyoto University, Sakyo-ku, Kyoto 606, Japan

Dr. Kazuhiro Fuchi
Electrotechnical Laboratory
1-1-4 Umezono, Sakura-mura
Niihari-gun, Ibaraki-ken 305, Japan

European Secretary, ICCL
Sra. Nicholetta Calzolari
C.N.U.C.E. 36, Via Santa Maria, 56100, Pisa, Italy

American Secretary, ICCL
Dr. A. Hood Roberts
Roberts Information Services
8305-G Merrifield Avenue
Fairfax, Virginia 22030, USA

ICCL Honorary Member
D.G. Hays (USA)

ICCL Chairman
B. Vauquois (France)

ICCL Member
E. Hajičová (Czechoslovakia)
B. Harris (Canada)
K. Heggstad (Norway)
H. Karlgren (Sweden)
M. Kay (USA)
O. Kulagina (USSR)
M. Nagao (Japan)
G. Rondeau (Canada)
H. Schnelle (West Germany)
P. Sgali (Czechoslovakia)
P. Verburg (The Netherlands)
H. Wada (Japan)
Y. Wilks (United Kingdom)
A. Zampolli (Italy)

Local Arrangement Committee
K. Fuchi
T. Ishiwata
F. Mizoguchi
S. Mizutani
M. Nagao
H. Nakai
A. Nozaki
T. Okamoto
Y. Sakamoto
H. Tanaka
# CONTENTS

(LINGUISTICS)

## [SYNTAX]

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>K. SHUDO, T. NARAHARA, S. YOSHIDA</td>
<td>Morphological aspect of Japanese language processing</td>
<td>1</td>
</tr>
<tr>
<td>J.L. BINOT, M. GRAITSON, Ph. LEMAIRE, D. RIBBENS</td>
<td>Automatic processing of written French language</td>
<td>9</td>
</tr>
<tr>
<td>T. HITAKA, S. YOSHIDA</td>
<td>A syntax parser based on the case dependency grammar and its efficiency</td>
<td>15</td>
</tr>
<tr>
<td>T. SATO</td>
<td>SGS: A system for mechanical generation of Japanese sentences</td>
<td>21</td>
</tr>
<tr>
<td>J. SVARTVIK</td>
<td>Computer-aided grammatical tagging of spoken English</td>
<td>29</td>
</tr>
<tr>
<td>H. KUČERA</td>
<td>Computational analysis of predicational structures in English</td>
<td>32</td>
</tr>
<tr>
<td>M. SALKOFF</td>
<td>A context-free grammar of French</td>
<td>38</td>
</tr>
<tr>
<td>N.K. SONDHEIMER, R.M. WEISCHEDEL</td>
<td>A rule-based approach to ill-formed input</td>
<td>46</td>
</tr>
<tr>
<td>S.G. PULMAN</td>
<td>Parsing and syntactic theory</td>
<td>54</td>
</tr>
<tr>
<td>G.D. PRIDEAUX</td>
<td>The role of perceptual strategies in the processing of</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>English relative clause structures</td>
<td></td>
</tr>
</tbody>
</table>

## [SEMANTICS]

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. HAJIČOVÁ, P. SGALL</td>
<td>Linguistic meaning and knowledge representation in automatic understanding of natural language</td>
<td>67</td>
</tr>
<tr>
<td>B.B. RIEGER</td>
<td>Fuzzy word meaning analysis and representation in linguistic semantics. AN empirical approach to the reconstruction of lexical meanings in East- and West-German newspaper texts</td>
<td>76</td>
</tr>
<tr>
<td>T. NISHIDA, S. DOSHTA</td>
<td>Hierarchical meaning representation and analysis of natural language documents</td>
<td>85</td>
</tr>
<tr>
<td>S. UCHINAMI, Y. TEZUKA</td>
<td>Linguistic model based on the generative topological information space</td>
<td>93</td>
</tr>
<tr>
<td>Y. KUSANAGI</td>
<td>A model of natural language processing of time-related expressions</td>
<td>101</td>
</tr>
<tr>
<td>Y. MOMOUCHI</td>
<td>Control structures for actions in procedural texts and PT-chart</td>
<td>108</td>
</tr>
</tbody>
</table>

## [SEMANTIC TOPICS]

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. RALPH</td>
<td>Relative semantic complexity in lexical units</td>
<td>115</td>
</tr>
<tr>
<td>C. ROHRER</td>
<td>L'analyse logique des temps du passé en français. Comment on peut appliquer la distinction entre nom de matière et nom comptable aux temps du verbe</td>
<td>122</td>
</tr>
<tr>
<td>N. OKADA</td>
<td>Conceptual taxonomy of Japanese verbs for understanding natural language and picture patterns</td>
<td>127</td>
</tr>
</tbody>
</table>
H. YAMAUCHI
Processing of syntax and semantics of natural language by predicate logic .......................... 389

W. DILGER
Automatic translation with attribute grammars ................................................................. 397

J.-T. WANG
On computational sentence generation from logical form .................................................. 405

F.J. PELLETIER
Formal properties of rule orderings in linguistics ......................................................... 412

[MACHINE TRANSLATION]
M. NAGAO, J. TSUJI, K. MITAMURA, H. HIRAKAWA, M. KUME
A machine translation system from Japanese into English
another perspective of MT system — .............................................................................. 414

A.K. MELBY, M.R. SMITH, J. PETERSON
ITS: Interactive translation system .................................................................................. 424

Ch. BOITET, P. CHATELIN, P. DAUN FRAGA
Present and future paradigms in the automatized translation of natural languages ............ 430

Ch. BOITET, N. NEDOBEKINE
Russian-French at GETA: Outline of the method and detailed example ........................... 437

F. NISHIDA, S. TAKAMATSU, H. KUROKI
English-Japanese translation through case-structure conversion ...................................... 447

H. UCHIDA, K. SUGIYAMA
A machine translation system from Japanese into English
based on conceptual structure ......................................................................................... 455

K.-H. BRINKMANN
Terminology data banks as a basis for high-quality translation ........................................ 463

[SPEECH RECOGNITION]
K. SHIRAI, Y. FUKAZAWA, T. MATZUI, H. MATZUURA
A trial of Japanese text input system using speech recognition ........................................ 464

M. SHIGENAGA, Y. SEKIGUCHI, C.-H. LAI
Speech recognition system for spoken Japanese sentences ............................................. 472

[DIALOGUE]
B. PHILLIPS, J. HENDLER
The impatient tutor: An integrated language understanding system ................................ 480

D. METZING
ATNS used as a procedural dialog model ......................................................................... 487

T. ENDO, T. TAMATI
Decomposition of Japanese sentences into normal forms based on human linguistic process ............................................................................................................. 492

[INFORMATION SYSTEM]
R. GRISHMAN
Conjunctions and modularity in language analysis procedures ........................................ 500

K. HANAKATA
An intelligent digester for interactive text processings .................................................... 504

E. GRANDJEAN, G. VEILLON
Une expérience pratique d'utilisation de l'analyse linguistique en recherche d'information: bilan et perspectives .................................................. 512

H. KINUKAWA, H. MATSUOKA, M. KIMURA
Japanese sentence analysis for automatic indexing ......................................................... 514
[PROGRAM LANGUAGE]
P.A.C. BAILES, L.H. REEKER
An experimental applicative programming language for linguistics and string processing .............. 520
I.H. WITTEN
Translating interactive computer dialogues from ideographic to alphabetic languages ............... 526

[DATA BASE]
M. NAGAO, J. TSUJII, Y. UEDA, M. TAKIYAMA
An attempt to computerized dictionary data bases ............................................................... 534
T. AIZAWA, N. HATADA
Using a natural-artificial hybrid language for database access ........................................ 543
G. GUIDA
Goal oriented parsing: improving the efficiency of natural language access to relational data bases ................................................................. 550
H.H. ZIMMERMANN
Natürlichsprachige Problembeschreibung als ein Verfahren für den bürgernahen Zugang zu Dokumentationssystemen ......................................................... 558

[MISCELLANY]
P. KÜMMEL
Content guided answer search system for natural languages .................................................. 559
A.S. NARIN'YANI
Interaction with a limited object domain — ZAPSIB project .................................................. 567
G. FISCHER
Integrated information manipulation systems (IMS). A cognitive view .................................. 570
CHANG M.S.
The morphological analysis of bahasa Malaysia ........................................................................ 578
M.F. BRUANDET
A conceptual framework for automatic and dynamic thesaurus updating in information retrieval systems ................................................................. 586
M. POZZI, J. BECERRA, J. RANGEL, L. FERNANDO LARA
A method to reduce large number of concordances .................................................................. 590
J. TULDAVA
A mathematical model of the vocabulary-text relation .............................................................. 600
T. OGINO
Computational dialectology using GLAPS — Automated processing of field survey data — .... 605