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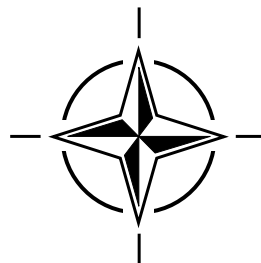
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RTO MEETING PROCEEDINGS 66

Multilingual Speech and Language Processing

(Le traitement multilingue de la parole et du langage)

Papers presented at the Information Systems Technology Panel (IST) Workshop held in Aalborg, Denmark, 8 September 2001.



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- AVT Applied Vehicle Technology Panel
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- IST Information Systems Technology Panel
- NMSG NATO Modelling and Simulation Group
- SAS Studies, Analysis and Simulation Panel
- SCI Systems Concepts and Integration Panel
- SET Sensors and Electronics Technology Panel

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Multilingual Speech and Language Processing

(RTO MP-066 / IST-025)

Executive Summary

Multilingual speech and language technology is becoming recognized as an important issue for international organizations, both civilian and military. For instance, one might want to use a speech coder optimized for French in Germany or Turkey. A native speaker of Spanish might want to use a speech recognizer trained for American English. Additionally with the explosion of multilingual text material on the web, a British user might want to access Dutch documents using English search terms. For reasons such as these, a special task group of the NATO Research and Technology Organization (RTO) started a project on the development and assessment of multilingual speech and language applications.

To stimulate interaction between civil and military researchers and developers, the NATO Research Study Group on Speech and Language Technology (IST-011/RTG-001) organized a workshop in cooperation with the International Speech Communication Association (ISCA) in Aalborg, Denmark on 8 September 2001. Forty-eight researchers from 16 countries attended the workshop.

The workshop's focus was on the scientific and engineering aspects of speech and language processing for and despite multiple languages, dialects, non-native speech, and/or regional accents. A significant feature of the workshop was the announcement and discussion of a new database of native and non-native speech collected by the NATO Research Study Group. This database is called the NATO Native and Non-Native (N4) Speech Corpus, and it will be made available to researchers for further study.

The workshop opened with a keynote speech by Prof. Alex Waibel of Carnegie Mellon University, USA on multilinguality in speech and language systems. The keynote speech was followed by four technical sessions containing a total of 12 presentations and the workshop closed with a directed discussion session on various topics of interest to the workshop attendees. These proceedings contain the 12 technical papers presented at the workshop.

Le traitement multilingue de la parole et du langage

(RTO MP-066 / IST-025)

Synthèse

L'importance des technologies du traitement multilingue de la parole et du langage est de plus en plus reconnue par les organisations internationales civiles et militaires. Il se pourrait, par exemple, qu'un codeur vocal optimisé pour le français soit demandé en Allemagne ou en Turquie. De la même façon, un hispanophone pourrait avoir besoin d'un système de reconnaissance de la parole conçu pour de l'anglais américain. En outre, avec le foisonnement de textes multilingues affichés sur l'Internet, un utilisateur britannique peut souhaiter consulter des documents en néerlandais en se servant de termes de recherche en anglais. Pour de telles raisons, un groupe de travail de l'Organisation pour la recherche et la technologie de l'OTAN (RTO) a lancé un projet sur le développement et l'évaluation d'applications multilingues de traitement de la parole et du langage.

Dans le but de promouvoir des interactions entre personnels civils et militaires chargés de la recherche et du développement, le groupe d'étude OTAN pour la recherche IST-011/RTG-001 sur les technologies de la parole et du langage a organisé, en coopération avec l'Association internationale de la communication verbale (ISCA), un atelier, à Aalborg, au Danemark, le 8 septembre 2001. Quarante huit chercheurs de 16 pays différents y ont participé.

L'atelier a eu pour objectif d'examiner les aspects scientifiques et techniques du traitement de la parole et du langage du point de vue du multilinguisme, des dialectes, de l'expression non autochtone et/ou des accents régionaux. La présentation d'une nouvelle base de données de la parole autochtone et non autochtone constituée par le groupe d'étude OTAN pour la recherche et la discussion qui en a suivi a été l'un des moments forts de la manifestation. Cette base de données, appelée Corpus OTAN de la parole autochtone et non autochtone (N4), sera mise à la disposition de chercheurs aux fins d'études ultérieures.

L'atelier a débuté par un discours d'ouverture du Prof. Alex Waibel de l'université Carnegie Mellon (USA), sur le multilinguisme dans les systèmes de traitement de la parole et du langage. Ce discours a été suivi de 4 sessions techniques comprenant 12 présentations et l'atelier a été clôturé par une session de discussions dirigées sur différents sujets d'intérêt pour les participants. Le présent compte rendu contient les 12 communications techniques présentées lors de l'atelier.

Table of Contents

	Page
Executive Summary	iii
Synthese	iv
Foreword	vii
Information Systems Technology Panel	viii
Acknowledgements/Remerciements	ix
	Reference
SESSION 1: N4 CORPUS AND SPEAKER IDENTIFICATION Chairman: Herman STEENEKEN (NE)	
The NATO Native and Non-Native (N4) Speech Corpus	1
by L. Benarousse, E. Geoffrois, J.J. Grieco, R. Series, H.J.M. Steeneken, H. Stumpf, C. Swail and D. Thiel	
Preliminary Speaker Recognition Experiments on the NATO N4 Corpus	2
by M.A. Zissman, R.A. van Buuren, J.J. Grieco, D.A. Reynolds, H.J.M. Steeneken and M.C. Huggins	
Phonetic Refraction for Speaker Recognition	3
by M.A. Kohler, W.D. Andrews, J.P. Campbell and J. Hernández-Cordero	
SESSION 2: NON-NATIVE SPEECH Chairman: Ray SLYH (US)	
Methods and Models for Quantitative Assessment of Speech Intelligibility in Cross-Language Communication	4
by S.J. van Wijngaarden, H.J.M. Steeneken and T. Houtgast	
Evaluation of Speaker's Degree of Nateness Using Text-Independent Prosodic Features	5
by C. Teixeira, H. Franco, E. Shriberg, K. Precoda and K. Sönmez	
Adaptation Methods for Non-Native Speech	6
by L. Mayfield Tomokiyo and A. Waibel	
SESSION 3: SPEECH RECOGNITION Chairman: Tim ANDERSON (US)	
HMM-Based English Speech Recognizer for American, Australian, and British Accents	7
by R. Chengalvarayan	

Crosslingual Adaptation of Multilingual Triphone Acoustic Models 8
by A. Žgank, B. Imperl, F.T. Johansen, Z. Kačič and B. Horvat

Multilingual Text-To-Phoneme Mapping for Speaker Independent Name Dialing in Mobile Terminals 9
by K.J. Jensen, S.K. Riis and M.W. Pedersen

SESSION 4: LANGUAGE IDENTIFICATION AND MULTILINGUAL APPLICATIONS
Chairman: Marc ZISSMAN (US)

Multilingual Speech Interpretation for Cellular Phones 10
by Y. Obuchi, Y. Kitahara and A. Koizumi

Fusion of Output Scores on Language Identification System 11
by E. Wong and S. Sridharan

Multilingual Processing for Operational Users 12
by K.J. Miller, F. Reeder, L. Hirschman and D.D. Palmer

Foreword

The NATO Workshop on Multilingual Speech and Language Processing was held 8 September 2001 in Aalborg, Denmark at the Aalborg Kongres & Kultur Center, the site of EuroSpeech 2001. The workshop was sponsored by the NATO Research Study Group on Speech and Language Technology (IST-011/RTG-001) and supported by the International Speech Communication Association (ISCA). Although NATO sponsored the workshop, attendance was open to researchers from non-NATO countries. Of the 48 researchers from 16 countries attending the workshop, one quarter were affiliated with institutions from countries that are not members of NATO.

The workshop's focus was on the scientific and engineering aspects of speech and language processing for and despite multiple languages, dialects, non-native speech, and/or regional accents. A significant feature of the workshop was the announcement and discussion of a new database of native and non-native speech collected by the NATO Research Study Group. This database is called the NATO Native and Non-Native (N4) Speech Corpus, and it will be made available to researchers for further study.

The workshop opened with a keynote speech by Prof. Alex Waibel of Carnegie Mellon University, USA on multilinguality in speech and language systems. The keynote speech was followed by four technical sessions, and the workshop closed with a directed discussion session on various topics of interest to the workshop attendees.

The first session covered the topics of the N4 Speech Corpus and speaker recognition. In this session, Edouard Geoffrois (DGA/CTA/GIP, France) described the N4 Speech Corpus, and Marc Zissman (MIT Lincoln Laboratory, USA) presented results of speaker recognition experiments conducted on the N4 corpus. Joseph Campbell (MIT Lincoln Laboratory, USA) discussed the use of phonetic recognizers for multiple languages for speaker recognition.

The second session was on the topic of non-native speech. Sander van Wijngaarden (TNO Human Factors, The Netherlands) presented methods for the quantitative assessment of speech intelligibility in cross-language communication, and Carlos Teixeira (IST/INESC-ID, Portugal and SRI International, USA) discussed the evaluation of speakers' degree of nativeness using text-independent prosodic features. Laura Mayfield Tomokiyo (CMU, USA) discussed methods for adapting speech recognition systems to handle non-native speech.

The third session covered speech recognition. Rathi Chengalvarayan (Lucent Technologies Inc., USA) presented an HMM-based speech recognizer for American, Australian, and British English. Andrej Žgank (University of Maribor, Slovenia) discussed crosslingual adaptation of multilingual triphone acoustic models, and Kåre Jensen (Nokia Mobile Phones, Denmark) discussed multilingual text-to-phoneme mapping for speaker independent name dialing in mobile terminals.

The fourth session was on language identification and multilingual applications. John Dines (Queensland University of Technology, Australia) discussed the fusion of output scores for language identification. Yasunari Obuchi (Hitachi, Ltd., Japan) discussed multilingual speech interpretation for cellular phones, and David Palmer (The MITRE Corporation, USA) discussed multilingual technology projects currently being undertaken in conjunction with the NATO BICES (Battlefield Information Collection and Exploitation) organization.

We would like to thank the NATO-RTO and ISCA for their support in the organization of the workshop, the speakers for their time, effort and expertise; the technical committee for their help in reviewing the proposals and their advice. Finally we would like to thank Prof. Børge Lindberg of the Center for PersonKommunikation at Aalborg University and Ms. Hanne Kristiansen of the Aalborg Tourist and Convention Bureau for the fine handling of the local arrangements.

Timothy R. Anderson and Raymond E. Slyh

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Le Panel tient à remercier les membres du RTB du Danemark auprès de la RTA de leur invitation à tenir cette réunion à Aalborg, ainsi que pour les installations et le personnel mis à sa disposition.

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14. Abstract	<p>This volume contains the 12 papers, presented in 4 sessions at the Information Systems Technology Panel Workshop held in Aalborg, Denmark on 8th September 2001.</p> <p>The papers presented covered the following headings:</p> <ul style="list-style-type: none">• N4 Corpus and Speaker Identification• Non-Native Speech• Speech Recognition• Language Identification and Multilingual Applications		

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