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Speech Communication 42 (2004) 1–3
SPEECH COMMUNICATION
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Editorial

For many years, speech recognition was considered a very interesting research domain but performance improvements were still very slow. However, if we look back, important advances led us to where we are today. After the introduction of Hidden Markov Models (HMMs), the pace of development accelerated significantly. The size of recognition vocabularies increased, as a result of new training and decoding methods allowing researchers to deal with larger and larger databases. Through the Linguistic Data Consortium (LDC) and the European Language Resources Association (ELRA), many databases were made available. Availability of these databases, along with algorithm improvements, gave birth to speaker-independent recognition systems providing reasonably good performance for many languages and tasks. Another very important step was the emergence of speech companies focused on transferring research results into commercial products.

The transfer of speech technology from the laboratory into commercial applications emphasized the importance of research areas such as robustness to noise and to the communication channel, continuous learning, speaker and environment adaptation, pronunciation modeling, domain adaptation and user interface design. To make recognition systems usable in real-world applications, it is critical to develop new technologies in these areas. One common denominator of many proposed solutions is to use a "small" amount of data from the user/environment to adapt a speaker-independent recognition system to the current user/conditions. To permit interchanges and fruitful discussions between researchers working in these areas of adaptive methods for speech recognition, we organized an ISCA ITR-Workshop entitled "Adaptation Methods For Speech Recognition". This workshop, sponsored by Swisscom, the Conseil Général des Alpes Maritimes and Texas Instruments, was held in Sophia-Antipolis, France, on August 29–30, 2001. It was successful in attracting about 75 participants from all over the world, including key experts in this specialized area of speech communication research.

The focus of the workshop was on recent advances in adaptive methods for speech recognition including feature and model adaptation and also language and pronunciation adaptation. Excellent keynote presentations by Phil Woodland (Cambridge University, UK), Shigeki Sagayama (Tokyo University, Japan), Lou Boves (University of Nijmegen, NL/replacing Helmer Strik) and Jerome Bellegarda (Apple Computer, USA) introduced the topics of the sessions and paved the way for constructive debates which were animated by panelists H. Bourlard (IDIAP, CH), W. Byrne (CLSP, the Johns Hopkins University, USA), R. de Mori (LIA, F) and M. Rahim (AT&T Research, USA).

This special issue of *Speech Communication* derives from extended versions of the contributions presented at the workshop and additional submissions which were compatible with the workshop theme. The papers went through a review process before being accepted. The papers contained in this special issue provide a representative cross-section of the issues discussed at the workshop. They cover areas such as noise and channel adaptation (Yao, Cerisara et al., Zhang and Furui), speaker adaptation (Kim and Mc Donough et al.), language adaptation (Bellegarda),

0167-6393/$ - see front matter
doi:10.1016/j.specom.2003.10.001

pronunciation adaptation (Goronzy et al.) and task adaptation (Sankar).

The workshop could not have been organized without a great deal of help. We would like to thank ISCA, Swisscom, the Conseil Général des Alpes Maritimes and Texas Instruments for their sponsorship and support; Panasonic Speech Technology Laboratory (Santa Barbara) and Institut Eurécom (Sophia Antipolis) for their support; the keynote speakers, panelists and discussants for their time, effort, and expertise; the International Scientific Committee for reviewing the papers submitted to the workshop; and Stephanie Villa, secretary at the Multimedia Communications Department during the workshop, for the amount of time, enthusiasm and kindness she dedicated to the organization of this event. Finally, we would like to thank the authors who submitted the papers for this special issue and the reviewers who did an excellent job at improving the papers.

Acknowledgements

Hereafter, we give a list of colleagues who kindly agreed to review manuscripts for this Special Issue of Speech Communication. As Guest Editors we would like to thank them for their assistance.

J. Bellegarda, H. Botterweck, G. Bouliane, W. Byrne, R. de Mori, J. de Veth, J. Droppo, M. Federico, J. Glass, S. Goronzy, T. Hazen, T. Holter, D. Jouvet, S. King, B. Kingsbury, R. Kuhn, P. Laface, J.-P. Martens, C. Nadeu, H. Ney, P. Nguyen, M. Omologo, M. Ostendorf, J.M. Pardo, F. Perronnin, M. Picheny, R. Rose, A. Sankar, H. Strik, T. Svendsen, C.Wellekens, Y. Zhao.

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Jean-Claude Junqua received his Engineer degree (1980) from ENSEM (France) in Electronics and Automation, his Master and Doctorate degrees (in 1981 and 1989, respectively) and the "Habilitation à diriger des recherches" (1993) from the University of Nancy I (France) in the field of Computer Science. From 1981 to 1986 he was responsible for the computer resources of CRIN (Research Center in Computer Science of Nancy, France). From 1987 to 1988 he was visiting researcher at Panasonic's Speech Technology Laboratory in Santa Barbara, California.

In 1989, he joined Speech Technology Laboratory. From April 1992 to August 1993 he was visiting researcher at Matsushita, Osaka, Japan. His current interests cover all aspects of automatic speech recognition, speech synthesis, speaker recognition/verification, dialogue and multimodal systems. He is currently Director at Panasonic's Speech Technology Laboratory, Santa Barbara, California. He is the author/co-author of more than 100 articles which appeared in conference proceedings, journals or books and more than 80 patents granted or filed in the above areas along with two recent books entitled "Robustness in Automatic Speech Recognition" and "Robust Speech Recognition in Embedded Systems and PC Applications". At the beginning of 2001, he also co-edited a book on "Robustness in Languages and Speech Technology". He served as a chairman at several international conferences, co-organized several ISCA/IEEE workshops and participated in various international scientific committees.

He was a tutorial speaker for several ESCA/IEEE workshops, ICASSP'99 and ICSLP'02. His two recent tutorials were entitled "Robust Speech Recognition for Unknown Environment Compensation" and "Adaptive Methods for Automatic Speech and Speaker Recognition". He was an Associate Editor of the IEEE Transactions on Speech and Audio Processing and he is currently on the Editorial Board of the Speech Communication Journal and the ACM magazine: Computers in Entertainment.

Christian J. Wellekens (IEEE SM) received the degree of Ingenieur Electricien Mecanicien from the University of Louvain, Belgium in 1965 and the degree of Docteur es Sciences Techniques (PhD) from the Ecole Polytechnique Fédérale de Lausanne, Switzerland in 1974.

As a member of technical staff of Development Laboratory of MBLE, Brussels, Belgium, he contributed to the study of microwave power amplifiers.

In 1968, he joined the Philips Research Laboratory Brussels where his main interests were circuit theory, signal processing,

speech recognition, connectionist networks and applied mathematics.

From September 1989 to July 1990, he was on leave of absence from Philips at Bellcore (Bell Communications Research), Morristown, New Jersey (USA) where he was associated with a team using connectionist techniques for speech recognition (Dr Tom K. Landauer).

From 1969 to 1992, he was also Lecturer at Ecole Centrale des Arts et Métiers (ECAM) Brussels, where he taught successively electronics (linear and nonlinear amplification and oscillation) and circuit theory.

In March 1991, he moved to Lernout & Hauspie Speech Products (Belgium) as a Scientific Advisor for speech recognition where his interests were the development of a wide range of industrial speech recognizers based on neural networks as well as on traditional Hidden Markov Models and innovation of new related technologies.

In September 1992, he moved to Institute EURECOM (Sophia Antipolis—France) where he was appointed full Professor. He created and headed the Multimedia Communications Department from 1992 until 1998.

In Summer 1997, he was invited to participate to a 6 week workshop at the Center for Speech and Language Processing at the Johns Hopkins University, Baltimore, USA.

He is the author/co-author of more than 70 papers in different fields such as numerical analysis, classical network theory, digital filters, switched capacitor filters, piezoelectric transducer modeling, speech recognition and connectionist machines.

He has been a member of several thesis juries (in France, Belgium, Spain, Switzerland, Denmark, Norway and Canada) and supervised 9 PhD theses on speech and audio processing.

He was an invited speaker at several conferences and a member of many program committees. In particular, he was the technical chairman of the EURASIP workshop on Neural Networks held in Sesimbra (Portugal) in February 1990.

In August 2001, he organized an ISCA Workshop on Adaptation Methods in Speech Recognition at Sophia Antipolis. He has been appointed by the Commission of the European Communities as an expert and reviewer for several ESPRIT and more recently IST-HLT projects in speech processing and multimedia applications and also made reviewings for the Swiss National Science Foundation and the Belgian Government.

He participated to COST 249 and currently to COST 278.

He will start a EU 6FP Strep project in January 2004. He is a member of the editorial board of Speech Communication and from March 2000, a member of the Board of ISCA (International Speech Communication Association) and of IEEE Speech Technical Committee.