UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AMAZON.COM, INC.,
Petitioner,

v.

JAWBONE INNOVATIONS, LLC,
Patent Owner.

IPR2023-00253
U.S. Patent No. 8,019,091

DECLARATION OF CAROL S. PETERSON REGARDING *HUSSAIN*

LGE EXHIBIT NO. 1015
Amazon v. Jawbone
U.S. Patent 8,019,091
Amazon Ex. 1015

I, Carol S. Peterson, state and declare as follows:

I. Introduction

1. I am currently a Research Librarian with the law firm of Knobbe, Martens, Olson & Bear, LLP, located at 2040 Main Street, 14th Floor, Irvine, CA 92614.

2. I am over eighteen years of age. I am competent to make this Declaration, and I make this Declaration based on my own personal knowledge as well as my knowledge of library science practices.

3. I earned a Master of Library Science from the University of California Los Angeles in 1979 and a Bachelors in English from the University of California, Davis in 1977. I have worked as a research librarian at Knobbe, Martens, Olson & Bear for approximately 40 years.

4. I understand that a petition for *inter partes* review of U.S. Patent No. 8,019,091 will be filed concurrently with this Declaration.

5. Exhibit 1007 to the concurrently filed petition is a true and accurate copy of Amir Hussain, et al., *A New Metric for Selecting Sub-Band Processing in Adaptive Speech Enhancement Systems*, Proc. 5th Eur. Conf. on Speech Comm'n and Tech. (Eurospeech '97) 2611-14 ("*Hussain*") that was obtained from The Ohio State University Library.

II. Standard Library Practices for Making Materials Publicly Available

6. I have personal knowledge of standard library practices for making materials available to the public.

7. I have knowledge of and experience with the Machine-Readable Cataloging (MARC) system, an industry-wide standard that libraries use to catalog materials. Since at least 1980, MARC has been the international standard for cataloging bibliographic data in libraries' systems. Each MARC record contains fields that provide specific information about how cataloged items are held and made available to the public. MARC records can be accessed through many libraries' electronic cataloging systems.

III. MARC Records

8. The MARC record system uses a specific three-digit numeric code (from 001-999) to identify each field in a catalog record. For example:

a. field tag 008 provides bibliographic information and includes the six-digit date of when the item was cataloged in the "**YYMMDD**" format (*Date entered on file*), the four-digit year of the item's publication date;

b. field tag 022 provides the International Standard Serial Number (ISSN), which is a unique identification number assigned to serial publications;

c. field tag 245 identifies the full title statement for the work;

d. field tags 260 and 264 provide publication information that often includes the place of publication, name of publisher, publication date, and copyright date of the publication;

e. field tag 300 identifies the physical description, often including holdings information, for the work;

f. field tag 310 provides the current publication frequency of a serial;

g. field tag 362 indicates the numbering used for chronological cataloging of individual issues of a serial including information on when the serial began, which affects how issues of the serial are checked in, processed, and added to the library's main collection; and

h. field tags 9XX provide local holdings information for the resource

9. More information about the MARC record system can be found on the Library of Congress website at: https://www.loc.gov/marc/bibliographic/bd20x24x.html.

10. After an item is received by a library, the standard practice for the library is to process, catalog, date stamp, and then shelve the item. The public may

then access the item by searching the catalog and either requesting a print or electronic copy of the item. If a resource is available online or electronically, standard practice is to provide a link in the library's online catalog through which the resource can be downloaded. Standard practice is to make the item available to the public within a few days or weeks of cataloging it.

IV. OCLC Records

11. I also have knowledge of and experience with OCLC Control Numbers, which are unique accession numbers assigned by the OCL system when a bibliographic record is cataloged and made available to the public through WorldCat. WorldCat is an online database of hundreds of millions of bibliographic records from libraries worldwide. More information on WorldCat is available at https://www.oclc.org/en/worldcat/inside-worldcat.html. After a record is cataloged, the public can search for it within WorldCat using the OCLC Control Number as well as ordinary text searches.

V. Archived Web Pages

12. I understand that the Internet Archive is a non-profit organization that provides free access to archived web pages through the "Wayback Machine," which is accessible at https://archive.org/web/. I understand that the Wayback Machine archives web pages using an automated process known as a "web crawler" that captures publicly available web pages and saves them as individual "web captures."

I understand that these web captures are then archived with the date they were captured and made accessible to the public through the Wayback Machine. More information on the Wayback Machine is available at: https://help.archive.org/help/wayback-machine-general-information/.

VI. Records for *Hussain*

13. As detailed below, I have reviewed The Ohio State University Library and Rutgers University Library records for Eurospeech '97, which contains *Hussain*.

A. The Ohio State University Library Records for Eurospeech '97

14. Appendix A to this Declaration is a true and correct copy of The Ohio State University Library public catalog record for Eurospeech '97 that was downloaded from: https://library.ohio-state.edu/record=b5440967.

15. Appendix A provides the public with availability and holdings information for accessing Eurospeech '97, including the location, scope of holdings, and call number for locating it. Appendix A provides the following information for the public to access Eurospeech '97:

Conference: Eurospeech 97 (1997 : Rhodes, Greece);

Title: Eurospeech 97 : 5th European Conference on Speech Communication and Technology : Rhodes, Greece, 22-25 September, 1997;

Imprint: Grenoble, France : ESCA, [1997]; and

Description: 5 volumes.

Appendix A also indicates that The Ohio State University has copies of volumes 1-5 of Eurospeech 97 (corresponding to call numbers "P95 .E88 1997 v.1" through "P95 .E88 1997 v.5") available in the book depository.

16. Appendix B to this Declaration is a true and accurate copy of The Ohio State University Library MARC record for its copy of Eurospeech '97, which was downloaded from:

https://library.ohio-state.edu/search~S7?/.b5440967/.b5440967/1%2C1%2C1%2CB/marc~b5440967.

17. The Ohio State University Library MARC record (Appendix B) for Eurospeech '97, which contains *Hussain*, indicates that:

a. The data elements of field tag 008 (000630s1997 fr 100 0 eng d) provide the "date entered on file" for the record, which includes the six-digit date entry "000630," indicating that the MARC record for *Hussain* was created on June 30, 2000, with the character position "s" followed by "1997" indicating that the item has a single known date of publication in 1997. This denotes that Eurospeech '97 was first cataloged by The Ohio State University Library on June 30, 2000. Based on standard library practices, *Hussain* would have been processed, cataloged, shelved, and made available to the public at The Ohio State

University Library, on an ongoing, continuing basis, beginning a few days or weeks after June 30, 2000.

b. Field tag 245 provides the title statement of the work as Eurospeech 97 : 5th European Conference on Speech Communication and Technology : Rhodes, Greece, 22-25 September, 1997.

c. Field tag 264 indicates that Eurospeech ’97 was first published, distributed, or copyrighted in Grenoble, France by ESCA in 1997.

d. Field tag 300 indicates that Eurospeech ’97 includes 5 volumes.

B. Rutgers University Library for Eurospeech ’97

18. Appendix C to this Declaration is a true and correct copy of the Rutgers University Library public catalog record for Eurospeech ’97 that was downloaded from:

https://rutgers.primo.exlibrisgroup.com/discovery/fulldisplay?docid=alma991015673189704646&context=L&vid=01RUT_INST:01RUT&lang=en.

19. Appendix C provides the public with availability and holdings information for accessing Eurospeech ’97, including the location, scope of holdings, and call number for locating Eurospeech ’97. Appendix C provides the following information for the public to access Eurospeech ’97:

Title: Eurospeech ’97 : 5th European Conference on Speech Communication and Technology : Rhodes, Greece, 242-25 September 1997 : proceedings;

Creator: Eurospeech 97 (5th : 1997 : Rhodes, Greece) and European Speech Communication Association;

Publisher: Patras : European Speech Communication Association : University of Patras, Greece;

Format: 2 volumes;

ISSN: 1018-4074;

Appendix C also indicates that volumes 1-2 of Eurospeech ’97 (call number P95.E88 1997) are available in the Math & Physics Library.

20. Appendix D to this Declaration is a true and accurate copy of the Rutgers University Library MARC record for its copy of Eurospeech ’97, which was downloaded from:

https://rutgers.primo.exlibrisgroup.com/discovery/sourceRecord?vid=01RUT_INST:01RUT&docId=alma991015673189704646&recordOwner=01RUT_INST.

21. The Rutgers University Library MARC record (Appendix D) for *Hussain* indicates that:

a. The data elements of field tag 008 (990730s1997 gr a b 100 0 eng d) provide the “date entered on file” for the record, which

includes the six-digit date entry "990730," indicating that the MARC record for Eurospeech '97 was created on July 30, 1999, with the character position "s" followed by "1997" indicating that the item has a single known date of publication or distribution in 1997. This indicates that Eurospeech '97 published in 1997 and was first cataloged by the Rutgers University Library on July 30, 1999. Based on standard library practices, Eurospeech '97 would have been processed, cataloged, shelved, and made available to the public, on an ongoing, continuing basis, beginning a few days or weeks after July 30, 1999.

b. Field tag 245 indicates the title statement of the work as Eurospeech '97 : European Conference on Speech Communication and Technology : Rhodes, Greece, 242-25 September 1997 : proceedings.

c. Field tag 260 indicates that Eurospeech '97 was published in Patras, Greece by the European Speech Communication Association in 1997.

d. Field tag 300 indicates that Rutgers University Library holds two volumes of Eurospeech '97.

C. OCLC Records for Eurospeech '97

22. A public search of WorldCat lists nine individual OCLC catalog entries for Eurospeech '97 as of November 17, 2022. Appendix E to this Declaration is a true and accurate copy of the WorldCat search results for Eurospeech '97 obtained from:

https://www.worldcat.org/search?q=au%3Aeurospeech&dblist=638&fq=yr%3A1997&qt=facet_yr%3A&datePublished=1997-1997. Appendix E shows nine results, each of which can be clicked on to view libraries that have catalogued and made Eurospeech '97 publicly available.

23. Appendix F to this Declaration is a true and accurate copy of the first result in Appendix E corresponding to OCLC Control Number 44512506 that was obtained from https://www.worldcat.org/title/44512506. Appendix F provides the catalogued publicly available library holdings for OCLC Control Number 44512506 including the date of publication (1997), physical description (5 volumes), and title (Eurospeech 97 : 5th European Conference on Speech Communications and Technology : Rhodes, Greece, 22-25 September, 1997). Each of the other entries in Appendix E list similar information.

D. Archived Webpages for Eurospeech '97

24. In addition to the library and OCLC records discussed above, I have reviewed archived webpages, discussed below, for Eurospeech '97.

25. Appendix G to this Declaration is a true and correct copy of the Eurospeech '97 Index Page that was downloaded from: https://web.archive.org/web/19971211204358/http://www.cti.gr/~ee-www/Index.htm. Appendix G was archived from December 11, 1997 and indicates that hard copies of the proceedings of the conference consisting of five volumes and 3256 pages were available to interested participants and that they would be mailed to those who requested them. Appendix G also provides instructions for how other conference participants could order copies of the proceedings that would be mailed to them.

26. Appendix H to this Declaration is a true and correct copy of the Eurospeech '97 table of contents and abstracts of papers from "Session ThAA Noise Mitigation, Speech Enhancement II" that was downloaded from: https://web.archive.org/web/20000311093614/http://www.wcl2.ee.upatras.gr/eurtheu.html. Appendix H was archived from October 21, 1999. Page seven of Appendix H shows that *Hussain* was included in Volume 5 of Eurospeech '97 on pages 2611-2614.

27. Appendix I to this Declaration is a true and correct copy of the International Speech Communication Association's "Proceedings Order Form" that was downloaded from: https://web.archive.org/web/20000607171217/http://www.isca-

speech.org/proc_order.html. Appendix I was archived from June 7, 2000. Appendix I provides instructions for ordering proceedings of previous Eurospeech conferences and the mailing address of the ISCA Secretariat to whom order forms should be mailed.

28. Appendix J to this Declaration is a true and accurate copy of the Eurospeech '97 "Technical Programme" that was downloaded from: https://web.archive.org/web/19971211205519/http://www.cti.gr/~ee-www/Progr.htm. Appendix J was archived from December 11, 1997. Appendix J includes a message from the ESCA president Dr. Louis C. W. Pols stating that over 1,000 people from "all over the world" were registered to attend Eurospeech '97 and that the proceedings of Eurospeech '97 would be available on CD-ROMs. Appendix J also includes a message from the General Chairman George Kokkinakis stating that over 1,000 participants were expected to attend Eurospeech '97, that registration for Eurospeech '97 included access to "CD-ROM proceedings including the papers and audio files in addition to the usual hard copies which have increased to five volumes" and that hard copies of the proceedings would be mailed "well before the conference."

VII. *Hussain* was Likely Published and Publicly Available in 1997

29. Exhibit 1007 of the concurrently filed petition indicates that the paper titled "A New Metric for Selecting Sub-Band Processing In Adaptive Speech

Enhancement Systems" by Amir Hussain et al. was published on page 2611 (paper number ThAA.15) of volume 5 of the Proceedings on the 5th European Conference on Speech Communication and Technology. Appendix A also identifies the ISSN (1018-4074) and call number (P95 E88 1997 V. 5) of the work.

30. The library catalog and MARC records, OCLC records, and archived web pages for Eurospeech '97, discussed above, are consistent with and confirm the bibliographic and publication information provided in Exhibit 1007.

31. Based on the evidence discussed above and my understanding of standard library practices, it is my opinion that *Hussain* would have been published and publicly available in 1997, but in no event would it have been publicly available later than a few days or weeks after June 30, 2000.

VIII. Conclusion

I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Executed on November 21, 2022 in Los Alamitos, California.

Carol S. Peterson

Carol S. Peterson

APPENDIX A

The Ohio State University Libraries

Library Catalog

Conference	Eurospeech 97 (1997 : Rhodes, Greece)
Title	**Eurospeech 97 : 5th European Conference on Speech Communication and Technology : Rhodes, Greece, 22-25 September, 1997**
Imprint	Grenoble, France : ESCA, [1997]

LOCATION	CALL NO.	YEAR	STATUS	NOTE
Book Depository	P95 .E88 1997 v.5		Recently Returned	
Book Depository	P95 .E88 1997 v.4		AVAILABLE	
Book Depository	P95 .E88 1997 v.3		AVAILABLE	
Book Depository	P95 .E88 1997 v.2		AVAILABLE	
Book Depository	P95 .E88 1997 v.1		AVAILABLE	

Description	5 volumes ; 30 cm text unmediated volume
Note	Cover title
OCLC/Control #	44512506
Conference	Eurospeech 97 (1997 : Rhodes, Greece)
Subject	Speech -- Congresses. Phonetics -- Congresses.
Addt'l Author	European Speech Communication Association.
Other Title	ESCA : 5th European Conference on Speech Communication and Technology

Additional Info:

Book (Print)





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APPENDIX B

The Ohio State University Libraries

Library Catalog

Catalog home | Save for export | Regular display | Another search

```
LEADER 00000cam a2200325Ia 4500
001    44512506
003    OCoLC
005    20210623043656.0
008    000630s1997    fr            100 0 eng d
035    .b54409676
040    ATT|cATT|dOCL|dOSU|dWaOLN|dUtOrBLW
049    OSUU
090    P95|b.E88 1997
090    P95|b.E88 1997
092    302.2242|bE89e, 1997
111 2  Eurospeech 97|d(1997 :|cRhodes, Greece)
245 10 Eurospeech 97 :|b5th European Conference on Speech
       Communication and Technology : Rhodes, Greece, 22-25
       September, 1997
246 3  ESCA : 5th European Conference on Speech Communication and
       Technology
264  1 Grenoble, France :|bESCA,|c[1997]
300    5 volumes ;|c30 cm
336    text|btxt|2rdacontent
337    unmediated|bn|2rdamedia
338    volume|bnc|2rdacarrier
500    Cover title
650  0 Speech|vCongresses.|0http://id.loc.gov/authorities/
       subjects/sh2010114219
650  0 Phonetics|vCongresses.|0http://id.loc.gov/authorities/
       subjects/sh2008109254
710 2  European Speech Communication Association.|0http://
       id.loc.gov/authorities/names/n94005950
910    RDA ENRICHED|aMARS
910    MARS
910    xxs
```

LOCATION	CALL NO.	YEAR	STATUS	NOTE
Book Depository	P95 .E88 1997 v.5		Recently Returned	
Book Depository	P95 .E88 1997 v.4		AVAILABLE	
Book Depository	P95 .E88 1997 v.3		AVAILABLE	
Book Depository	P95 .E88 1997 v.2		AVAILABLE	
Book Depository	P95 .E88 1997 v.1		AVAILABLE	

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APPENDIX C

CONFERENCE PROCEEDING

Eurospeech '97 : 5th European Conference on Speech Communication and Technology : Rhodes, Greece, 242-25 September 1997 : proceedings.

Eurospeech 97 (5th : 1997 : Rhodes, Greece); European Speech Communication Association.
1997?

Available at Math & Physics Library Stacks (P95.E88 1997) >

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LINKS

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Math & Physics Library
Available , Stacks ; P95.E88 1997

Item in place (0 requests) v.2
Loanable

Item in place (0 requests) v.1
Loanable

Details

Title	Eurospeech '97 : 5th European Conference on Speech Communication and Technology : Rhodes, Greece, 242-25 September 1997 : proceedings.
Creator	Eurospeech 97 (5th : 1997 : Rhodes, Greece) >
	European Speech Communication Association. >
Subject	Speech >
	Phonetics >
Genre	Congresses.

Other title	Eurospeech ninety seven Proceedings, Eurospeech '97
Publisher	Patras : European Speech Communication Association : University of Patras, Greece
Year	1997?
Format	2 v. (lvii + lvii, 1074 p.) : ill. ; 29 cm.
Language	English
General note	"ISSN 1018-4074"--T.p. verso, v. 1-2.
Bibliography	Includes bibliographical references and index.
Identifier	OCLC : (OCoLC)ocm55169276
MMS ID	991015673189704646
Source	Library Catalog

Virtual Browse



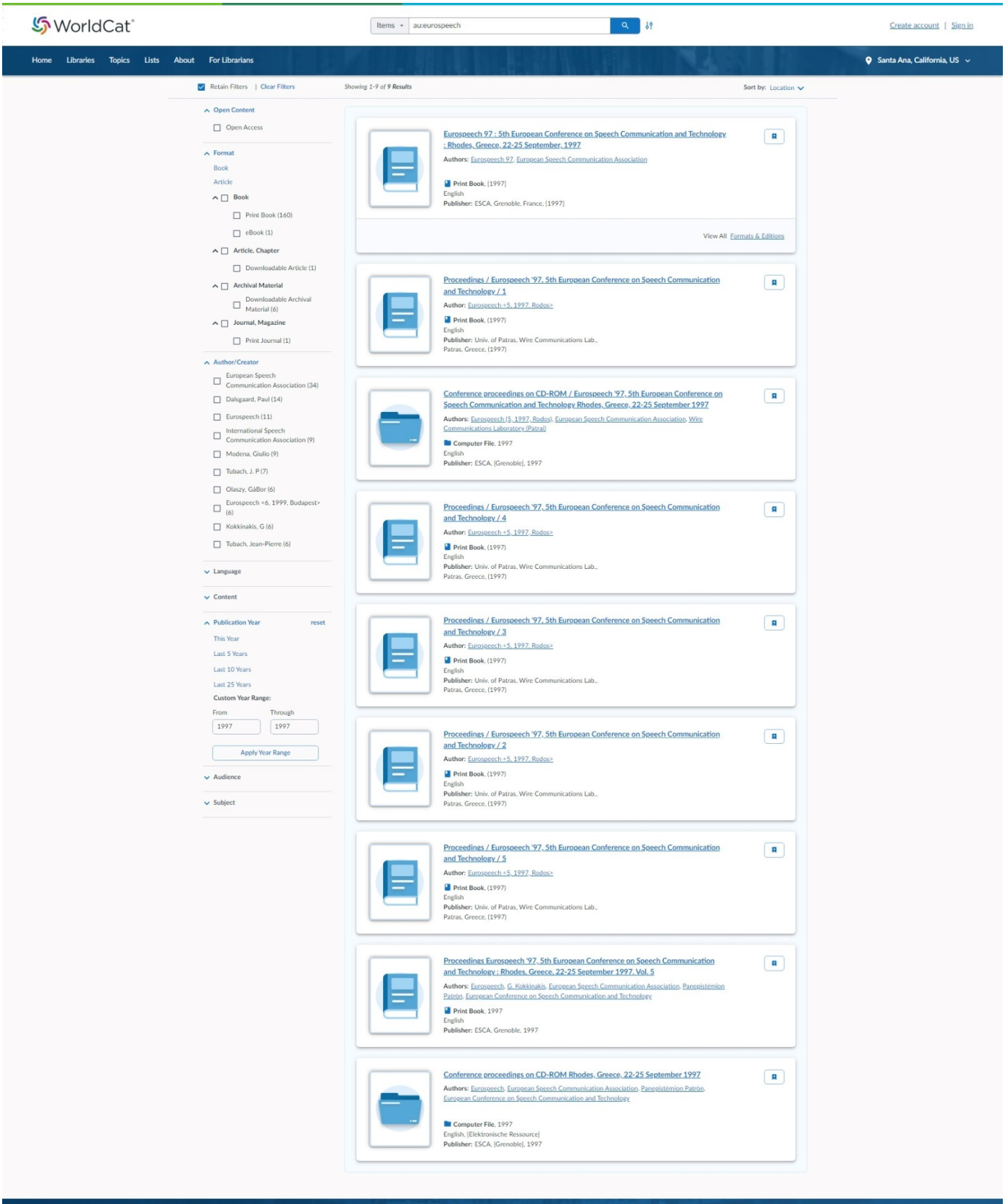
Links

Display Source Record

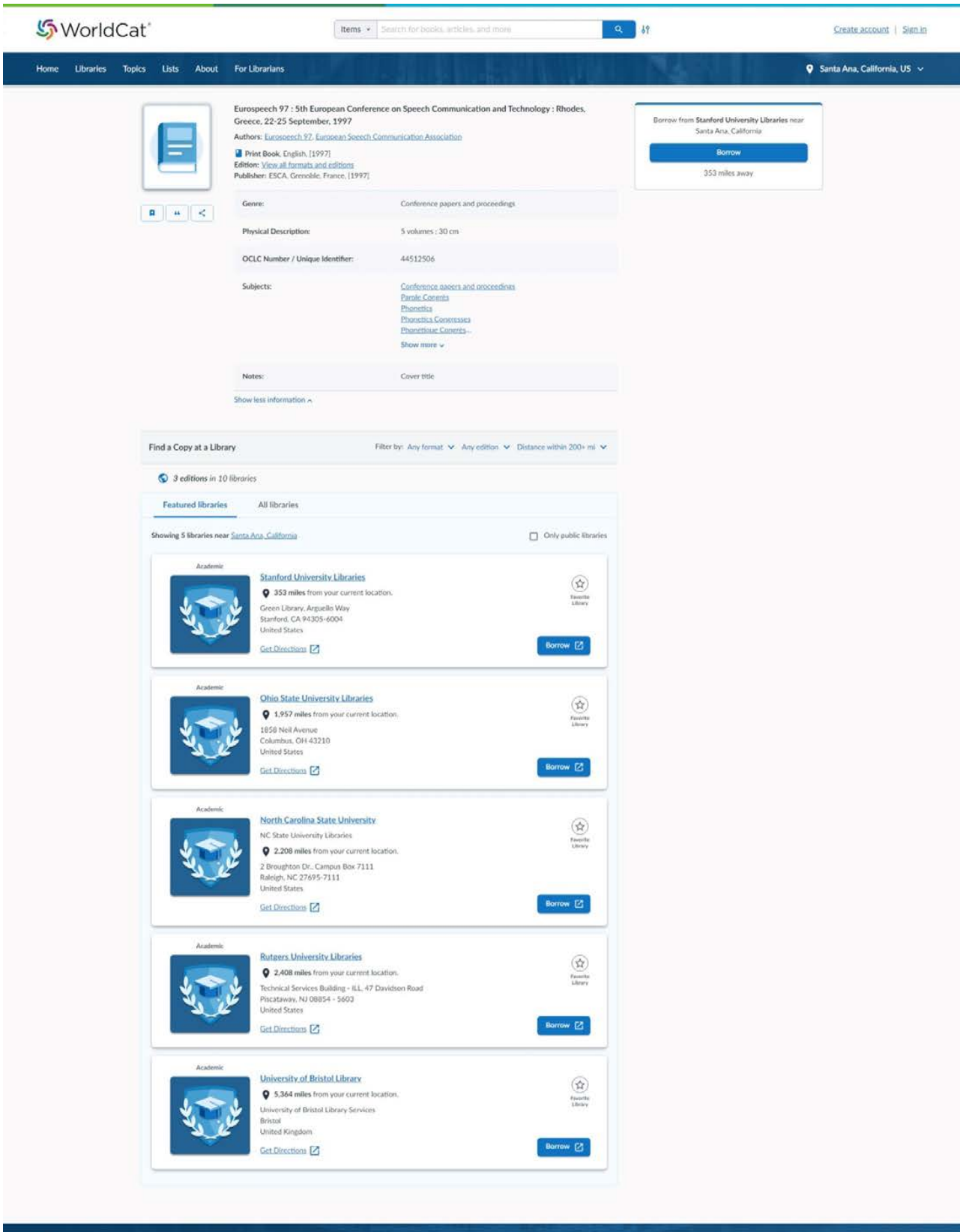
APPENDIX D

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035     ##$a(SIRSI)1408128 $9ExL
035     ##$a(OCoLC)ocm55169276
040     ##$aNjR $cNjR
050     #4$aP95 $b.E88 1997
111     2#$aEurospeech 97 $n(5th : $d1997 : $cRhodes, Greece)
245     10$aEurospeech '97 : $b5th European Conference on Speech Communication and Technology : Rhodes, Greece, 242-25 September 1997 : proceedings.
246     3#$aEurospeech ninety seven
246     30$aProceedings, Eurospeech '97
260     ##$aPatras : $bEuropean Speech Communication Association : $bUniversity of Patras, Greece, $c[1997?]
300     ##$a2 v. (lvii + lvii, 1074 p.) : $bill. ; $c29 cm.
500     ##$a"ISSN 1018-4074"--T.p. verso, v. 1-2.
504     ##$aIncludes bibliographical references and index.
596     ##$a19
650     #0$aSpeech $vCongresses.
650     #0$aPhonetics $vCongresses.
710     2#$aEuropean Speech Communication Association.
999     ##$aP95.E88 1997 $vv.1 $wLC $c1 $i39030026065096 $d7/20/2010 $e5/9/2007 $f4/29/2004 $g3 $lMASTACKC $mMATH $n6 $rY $sY $tBOOK-Y $u7/22/1999 $y
999     ##$aP95.E88 1997 $vv.2 $wLC $c1 $i39030026065179 $d7/20/2010 $e5/9/2007 $f4/29/2004 $g3 $lMASTACKC $mMATH $n7 $rY $sY $tBOOK-Y $u7/30/1999 $y
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APPENDIX E


WorldCat
Items
au:eurospeech
Create account | Sign in
Home Libraries Topics Lists About For Librarians
Santa Ana, California, US
Retain Filters | Clear Filters
Showing 1-9 of 9 Results
Sort by: Location
Open Content
Open Access
Format
Book
Article
Book
Print Book (160)
eBook (1)
Article, Chapter
Downloadable Article (1)
Archival Material
Downloadable Archival Material (6)
Journal, Magazine
Print Journal (1)
Author/Creator
European Speech Communication Association (34)
Dalsgaard, Paul (14)
Eurospeech (11)
International Speech Communication Association (9)
Modena, Giulio (9)
Tubach, J. P (7)
Olaszy, GáBor (6)
Eurospeech <6, 1999, Budapest> (6)
Kokkinakis, G (6)
Tubach, Jean-Pierre (6)
Language
Content
Publication Year
reset
This Year
Last 5 Years
Last 10 Years
Last 25 Years
Custom Year Range:
From
Through
1997
1997
Apply Year Range
Audience
Subject
Eurospeech 97 : 5th European Conference on Speech Communication and Technology : Rhodes, Greece, 22-25 September, 1997
Authors: Eurospeech 97, European Speech Communication Association
Print Book, [1997]
English
Publisher: ESCA, Grenoble, France, [1997]
View All Formats & Editions
Proceedings / Eurospeech '97, 5th European Conference on Speech Communication and Technology / 1
Author: Eurospeech <5, 1997, Rodos>
Print Book, (1997)
English
Publisher: Univ. of Patras, Wire Communications Lab., Patras, Greece, (1997)
Conference proceedings on CD-ROM / Eurospeech '97, 5th European Conference on Speech Communication and Technology Rhodes, Greece, 22-25 September 1997
Authors: Eurospeech (5, 1997, Rodos), European Speech Communication Association, Wire Communications Laboratory (Patrai)
Computer File, 1997
English
Publisher: ESCA, [Grenoble], 1997
Proceedings / Eurospeech '97, 5th European Conference on Speech Communication and Technology / 4
Author: Eurospeech <5, 1997, Rodos>
Print Book, (1997)
English
Publisher: Univ. of Patras, Wire Communications Lab., Patras, Greece, (1997)
Proceedings / Eurospeech '97, 5th European Conference on Speech Communication and Technology / 3
Author: Eurospeech <5, 1997, Rodos>
Print Book, (1997)
English
Publisher: Univ. of Patras, Wire Communications Lab., Patras, Greece, (1997)
Proceedings / Eurospeech '97, 5th European Conference on Speech Communication and Technology / 2
Author: Eurospeech <5, 1997, Rodos>
Print Book, (1997)
English
Publisher: Univ. of Patras, Wire Communications Lab., Patras, Greece, (1997)
Proceedings / Eurospeech '97, 5th European Conference on Speech Communication and Technology / 5
Author: Eurospeech <5, 1997, Rodos>
Print Book, (1997)
English
Publisher: Univ. of Patras, Wire Communications Lab., Patras, Greece, (1997)
Proceedings Eurospeech '97, 5th European Conference on Speech Communication and Technology : Rhodes, Greece, 22-25 September 1997. Vol. 5
Authors: Eurospeech, G. Kokkinakis, European Speech Communication Association, Panepistémion Patrón, European Conference on Speech Communication and Technology
Print Book, 1997
English
Publisher: ESCA, Grenoble, 1997
Conference proceedings on CD-ROM Rhodes, Greece, 22-25 September 1997
Authors: Eurospeech, European Speech Communication Association, Panepistémion Patrón, European Conference on Speech Communication and Technology
Computer File, 1997
English, [Elektronische Ressource]
Publisher: ESCA, [Grenoble], 1997
WorldCat
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Topics
Lists
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For Librarians
Santa Ana, California, US
Eurospeech 97 : 5th European Conference on Speech Communication and Technology : Rhodes, Greece, 22-25 September, 1997
Authors: Eurospeech 97, European Speech Communication Association
Print Book, English, [1997]
Edition: View all formats and editions
Publisher: ESCA, Grenoble, France, [1997]
Genre: Conference papers and proceedings
Physical Description: 5 volumes ; 30 cm
OCLC Number / Unique Identifier: 44512506
Subjects: Conference papers and proceedings
Parole Congrès
Phonetics
Phonetics Congresses
Phonétique Congrès...
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Raleigh, NC 27695-7111
United States
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2,408 miles from your current location.
Technical Services Building - ILL, 47 Davidson Road
Piscataway, NJ 08854 - 5603
United States
Get Directions
Borrow
Academic
University of Bristol Library
5,364 miles from your current location.
University of Bristol Library Services
Bristol
United Kingdom
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Borrow
WorldCat
WorldCat is the world's largest library catalog, helping you find library materials online.
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Topics
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About
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APPENDIX G

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EUROSPEECH'97

5th EUROPEAN CONFERENCE ON SPEECH COMMUNICATION AND TECHNOLOGY

RHODES - GREECE, 22-25 SEPTEMBER 1997

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Furthermore we would like to draw your attention on the Pan-European Internet Training for Language and Speech Processing Seminar organised by the Copernicus project ELSNET goes East and the ESPRIT network ELSNET in conjunction with EUROSPEECH'97.

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| INSTRUCTIONS FOR AUTHORS |
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| IMPORTANT DATES |

APPENDIX H

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Session ThAA Noise Mitigation, Speech Enhancement II

Chairperson Bayya Yegnanarayana IIT MADRAS, India

Home

NOISY SPEECH ENHANCEMENT BY FUSION OF AUDITORY AND VISUAL INFORMATION: A STUDY OF VOWEL TRANSITIONS

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Volume 5 pages 2555 - 2558

ABSTRACT

This paper deals with a noisy speech enhancement technique based on the fusion of auditory and visual information. We first present the global structure of the system, and then we focus on the tool we used to melt both sources of information. The whole noise reduction system is implemented in the context of vowel transitions corrupted with white noise. A complete evaluation of the system in this context is presented, including distance measures, gaussian classification scores, and a perceptive test. The results are very promising.

SPECTRAL SUBTRACTION USING A NON-CRITICALLY DECIMATED DISCRETE WAVELET TRANSFORM

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Volume 5 pages 2559 - 2562

ABSTRACT

The method of spectral subtraction has become very popular in speech enhancement. It is performed by modifying the spectral amplitudes of the disturbed signal. The spectral analysis of the signal is usually done by a Discrete Fourier Transformation (DFT). We propose a spectral transformation with nonuniform bandwidth to take into account the characteristics of the human ear. The spectral analysis and synthesis is performed by a non-

critically decimated discrete wavelet transform. Critical subsampling is not performed to avoid errors due to aliasing. A significant drawback of spectral-subtraction methods are tonal residual noises in speech pauses with unnatural sound. The application of the proposed wavelet transform results in reduced residual noise with subjectively more comfortable sound.

BAYESIAN AFFINE TRANSFORMATION OF HMM PARAMETERS FOR INSTANTANEOUS AND SUPERVISED ADAPTATION IN TELEPHONE SPEECH RECOGNITION

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Volume 5 pages 2563 - 2566

ABSTRACT

This paper proposes a Bayesian affine transformation of hidden Markov model (HMM) parameters for reducing the acoustic mismatch problem in telephone speech recognition. Our purpose is to transform the existing HMM parameters into its new version of specific telephone environment using affine function so as to improve the recognition rate. The maximum a posteriori (MAP) estimation which merges the prior statistics into transformation is applied for estimating the transformation parameters. Experiments demonstrate that the proposed Bayesian affine transformation is effective for instantaneous adaptation and supervised adaptation in telephone speech recognition. Model transformation using MAP estimation performs better than that using maximum-likelihood (ML) estimation.

INTEGRATED BIAS REMOVAL TECHNIQUES FOR ROBUST SPEECH RECOGNITION \Lambda

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Volume 5 pages 2567 - 2570

ABSTRACT

In this paper, we present a family of maximum likelihood (ML) techniques that aim at reducing an acoustic mismatch between the training and testing conditions of hid- den Markov model (HMM)-based automatic speech recognition (ASR) systems. We propose a codebook-based stochastic matching (CBSM) approach for bias removal both at the feature level and at the model level. CBSM associates each bias with an ensemble of HMM mixture components that share similar acoustic characteristics. It is integrated with hierarchical signal bias removal (HSBR) and further extended to accommodate for N-best candidates. Experimental results on connected digits, recorded over a cellular network, shows that the proposed system reduces both the word and string error rates by about 36% and 31%, respectively, over a baseline system not incorporating bias removal.

ACOUSTIC FRONT ENDS FOR SPEAKER-INDEPENDENT DIGIT RECOGNITION IN CAR ENVIRONMENTS

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Volume 5 pages 2571 - 2574

ABSTRACT

This paper describes speaker-independent speech recognition experiments concerning acoustic front end processing on a speech database that was recorded in 3 different cars. We investigate different feature analysis approaches (mel-filter bank, mel-cepstrum, perceptually linear predictive coding) and present results with noise compensation techniques based on spectral subtraction. Although the methods employed lead to considerable error rate reduction the error analysis shows that low signal-to-noise ratios are still a problem.

SIGNAL BIAS REMOVAL USING THE MULTI-PATH STOCHASTIC EQUALIZATION TECHNIQUE

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Volume 5 pages 2575 - 2578

ABSTRACT

We propose using Hidden Markov Models (HMMs) associated with the cepstrum coefficients as a speech signal model in order to perform equalization or noise removal. The MUlti-path Stochastic Equalization (MUSE) framework allows one to process data at the frame level: it is an on-line adaptation of the model. More precisely, we apply this technique to perform bias removal in the cepstral domain in order to increase the robustness of automatic speech recognizers. Recognition experiments on two databases recorded on both PSN and GSM networks show the efficiency of the proposed method.

SUBBAND ECHO CANCELLATION IN AUTOMATIC SPEECH DIALOG SYSTEMS

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Volume 5 pages 2579 - 2582

ABSTRACT

Echo cancellation has been most widely studied for hands-free telephony and for cancelling line echos in telephone central offices. The problem of echo cancelling in speech dialog systems is similar, however it has some specific requirements. In this contribution, a subband echo cancellation structure is proposed which can be integrated in the feature extraction part of a recognizer. A NLMS gradient-based adaptation is performed in frequency subbands that can either be derived directly from FFT analysis of input speech signal, or by using a proposed reduced-subband approach where the number of subbands is reduced in order to lessen the aliasing effect of the FFT. A double-talk detector is proposed based on the estimated error function for decision on stopping the adaptation. Finally, a new approach of combining echo cancellation and noise reduction is proposed.

Speech Enhancement via Energy Separation

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Volume 5 pages 2583 - 2586

ABSTRACT

This work presents a novel technique to enhance speech signals in the presence of interfering noise. In this paper, the amplitude and frequency (AM- FM) modulation model [7] and a multi-band analysis scheme [5] are applied to extract the speech signal parameters. The enhancement process is performed using a time-warping function B(n) that is used to warp the speech signal. B(n) is extracted from the speech signal using the Smoothed Energy Operator Separation Algorithm (SEOSA) [4]. This warping is capable of increasing the SNR of the high frequency harmonics of a voiced signal by forcing the the quasiperiodic nature of the voiced component to be more periodic, and consequently is useful for extracting more robust parameters of the signal in the presence of noise.

A Method of Signal Extraction from Noisy Signal

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Volume 5 pages 2587 - 2590

ABSTRACT

This paper presents a method of extracting the desired signal from a noise-added signal as a model of acoustic source segregation. Using physical constraints related to the four regularities proposed by Bregman, the proposed method can solve the problem of segregating two acoustic sources. Two simulations were carried out using the following signals: (a) a noise-added AM complex tone and (b) a noisy synthetic vowel. It was shown

that the proposed method can extract the desired AM complex tone from noise- added AM complex tone in which signal and noise exist in the same frequency region. The SD was reduced an average of about 20 dB. It was also shown that the proposed method can extract a speech signal from noisy speech.

MULTI-CHANNEL NOISE REDUCTION USING WAVELET FILTER BANK

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Volume 5 pages 2591 - 2594

ABSTRACT

This paper deals with the problem of estimation of a speech signal corrupted by an additive noise when observations from two microphones are available. The basic method for noise reduction using the coherence function is modified by using wavelets. The both observations are splitted by filter bank in five narrow bands through the whole used bandwidth (0...4kHz). The coherence functions are then computed for each band and the output speech estimation is reconstructed.

SPEECH SIGNAL DETECTION IN NOISY ENVIRONEMENT USING A LOCAL ENTROPIC CRITERION

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Volume 5 pages 2595 - 2598

ABSTRACT

This paper describes an original method for speech/non-speech detection in adverse conditions. Firstly, we define a time-dependent function called Local Entropic Criterion [1] based on Shannon's entropy [2]. Then we present the detection algorithm and show that at Signal to Noise Ratio (SNR) above 5 dB, it offers a segmentation comparable to the one obtained in clean conditions. We finally, describe how at very low SNR (< 0 dB) , it permits to detect speech units masked by noise.

A New Algorithm for Robust Speech Recognition: The Delta Vector Taylor Series Approach

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Volume 5 pages 2599 - 2602

ABSTRACT

In this paper we present a new model-based compensation technique called Delta Vector Taylor Series (DVTS). This new technique is an extension and improvement over the Vector Taylor Series (VTS) approach [7] that addresses several of its limitations. In particular, we present a new statistical representation for the distribution of clean speech feature vectors based on a weighted vector codebook. This change to the underlying probability density function (PDF) allows us to produce more accurate and stable solutions for our algorithm. The algorithm is also presented in a EM-MAP framework where some the environmental parameters are treated as random variables with known PDF's. Finally, we explore a new compensation approach based on the use of convex hulls. We evaluate our algorithm in a phonetic classification task on the TIMIT [5] database and also in a small vocabulary size speech recognition database. In both databases artificial and natural noise is injected at several signal to noise ratios (SNR). The algorithm achieves matched performance at all SNR's above 10 dB.

ROBUST ENHANCEMENT OF REVERBERANT SPEECH USING ITERATIVE NOISE REMOVAL

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Volume 5 pages 2603 - 2606

ABSTRACT

We suggest a new technique for the enhancement ofsingle channel reverberant speech. Previous methods have used either waveform deconvolution or modulation envelope deconvolution. Waveform deconvolution requires calculation of an inverse room response, and is impractical due to variation with source or receiver movement. Modulation envelope deconvolution has been claimed to be position independent, but our research indicates that envelope restoration in fact degrades intelligibility of the speech. Our method uses the observation that the smoothed segmental spectral magnitude of the room response is less variable with position. This is used to estimate the reverberant component of the signal, which is removed iteratively using conventional noise reduction algorithms. The enhanced output is not perceptibly affected by positional changes.

A NETWORK SPEECH ECHO CANCELLER WITH COMFORT NOISE

Authors: D.J.Jones*, S.D.Watson* ,K.G.Evans*, B.M.G.Cheetham* and R.A.Reeves#.

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Volume 5 pages 2607 - 2610

ABSTRACT

This paper describes a proposed comfort noise system for a network echo canceller. In this system, any residual echo is suppressed using a single threshold centre-clipper, but instead of transmitting silence to the far-end of the network, a synthetic version of the background sounds is sent. This masks any 'noise modulation' or 'noise pumping' that may otherwise occur. The background sounds are characterised using linear prediction. Periods when only background sounds are present are identified by a modified GSM Voice Activity Detector (VAD). Informal listening tests have shown that this 'synthetic background' is preferable to the transmission of silence or pseudo-random noise that is not spectrally shaped to match the original background.

A NEW METRIC FOR SELECTING SUB-BAND PROCESSING IN ADAPTIVE SPEECH ENHANCEMENT SYSTEMS

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Volume 5 pages 2611 - 2614

ABSTRACT

A multi-microphone adaptive speech enhancement system employing diverse sub-band processing is presented. A new robust metric is developed, which is capable of real-time implementation, in order to automatically select the best form of processing within each sub-band. It is based on an adaptively estimated inter-channel Magnitude Squared Coherence (MSC) relationship, which is used to detect the level of correlation between in-band signals from multiple sensors during noise-alone periods in intermittent speech. This paper reports recent results of comparative experiments with simulated anechoic data extended to include simulated reverberant data. The results demonstrate that the method is capable of significantly outperforming conventional noise cancellation schemes.

ESTIMATION OF LPC CEPSTRUM VECTOR OF SPEECH CONTAMINATED BY ADDITIVE NOISE AND ITS APPLICATION TO SPEECH ENHANCEMENT

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Volume 5 pages 2615 - 2618

ABSTRACT

This paper presents a new method for speech enhancement. It is well known that Wiener filtering is effective in reducing additive noises and the proposed method is based on it. This paper focuses on the design of Wiener filter, where we place emphasis on the recovery of original formant characteristics and the smooth transition of speech spectrum. Transformation method of LPC cepstrum vector extracted from noisy speech to reduce noise effects is given, which gives an estimated LPC cepstrum vector of original speech. Sharpening of formant peaks and eliminating false spectral peaks are necessary for high quality speech restoration and they are realized by the proposed method. Experiments of noise reduction have been performed, whose results show the effectiveness of the proposed method.

MULTI-BAND AND ADAPTATION APPROACHES TO ROBUST SPEECH RECOGNITION

Authors: Sangita Tibrewala (1) and Hynek Hermansky (1),(2)

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Volume 5 pages 2619 - 2622

ABSTRACT

In this paper we present two approaches to deal with degradation of automatic speech recognizers due to acoustic mismatch in training and testing environments. The first approach is based on the multi-band approach to automatic speech recognition (ASR). This approach is shown to be inherently robust to frequency selective degradation. In the second approach, we present a conceptually simple unsupervised feature adaptation technique, based on recursive estimation of means and variances of the cepstral parameters to compensate for the noise effects. Both techniques yield significant reduction in error rates.

NON-QUADRATIC CRITERION ALGORITHMS FOR SPEECH ENHANCF NT

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Volume 5 pages 2623 - 2626

ABSTRACT

A new algorithm for speech enhancement based on the iterative Wiener filtering method due to Lim-Oppenheim [1] is presented. We propose the use of a generalized non-quadratic cost function in addition to the classical MSE term (quadratic term). The proposed cost function includes two signal-error cross- correlation terms and a L2 norm term of the filter weights. The signal-error cross- correlation terms reduce both the residual noise and the signal distortion in the enhanced speech. The L2 norm term of the filter weights reduces the overall gain of the filter, decreasing the weight noise variance and removing the side lobe of the filter response. Two solutions to the new cost function are presented: the classical non-causal type (ideal Wiener), working in the frequency

domain; and a causal finite length in the time domain. In both cases, as Lim's algorithm, the filter output of each iteration is used as "noiseless" speech signal for the following one. Simulation results demonstrate the effectiveness of these algorithms.

APPENDIX I

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APPENDIX J

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EUROSPEECH'97
TECHNICAL PROGRAMME

SCIENTIFIC COMMITTEE	PROGRAM AT A GLANCE	TRAVEL INFORMATION
REGISTRATION INFORMATION	CONFERENCE INFORMATION	OLYMPICS	EXHIBITION
USEFUL INFORMATION	ABOUT RHODES	SATELLITE EVENTS

ESCA PRESIDENT'S MESSAGE

It is with great relief and pride that I welcome at this 5th European Conference on Speech Communication and Technology, for short EUROSPEECH '97, so many new and old colleagues and friends from all over the world. Once the late registration is closed, it may well be that we will go beyond the number of 1,000 participants. This growth from some 840 participants in Berlin for Eurospeech '93 and in Madrid for Eurospeech '95 to the present figure is impressive. The growth is even more impressive if we take into account the number of abstracts being submitted. This grew from 666 in Berlin, to 807 in Madrid and some 1070 this time. Also in terms of number of papers accepted, this will be by far the biggest Eurospeech conference, and for that matter also bigger than any International Conference on Spoken Language Processing (ICSLP) or International Congress of Phonetic Sciences so far.

The Eurospeech International Scientific Committee, that gathered in Athens on March 21 and 22, ultimately accepted 726 papers. With only very few withdrawals and some minor changes, the number of papers that actually will be presented at the conference, and that will be included in the proceedings, is 717. This implies a reject rate of about 30% which, as always, is a compromise between keeping up high standards and the desire to accommodate as many participants as possible, given the fact that many administrations only permit conference participation with an accepted paper. It is also a compromise between what the conference site can practically accommodate, which is quite a lot at the Convention Centre of Rodos Palace Hotel, and what participants can actually absorb. People also become more and more reluctant to carry around with them several kilos of proceedings books. Also for that reason I am very pleased that now also this Eurospeech Proceedings will be available on CD-ROM. We just have to wait for the time that hand-held and intelligent CD-ROM-readers will become available. Another compromise is that between plenary keynote presentations and parallel oral and poster sessions. Upon studying the advance program in the call for participation or the more detailed information on the web-site, you will have seen that there will be 4 oral and 2 poster sessions in parallel each day. This makes the program still rather surveyable. The break on Wednesday afternoon with a fine excursion and the banquet later that evening, will hopefully also recharge your batteries for the final meeting day of the conference.

I hope and expect that everybody will find enough of his/her flavor in the scientific program. The diversity may also appeal to you to consume some of the less well known. I also strongly advice you to join the plenary keynote lectures, this will be excellent presentation on carefully selected themes.

Such a major event takes a long time for preparation. More than three years ago ESCA already started collecting bids for this year's event, and in the future we may even have to start this process earlier. The ESCA Board finally chose for Greece for the Eurospeech conference in 1997. Originally the meeting place was announced to be Patras, but for various reasons Professor George Kokkinakis and his organizing committee changed that to Rhodes. The beauty and glamour of this holiday island will certainly have brought some extra participants to this event. This necessary change in meeting place is just one example of the many circumstances that Eurospeech organizers have to face and that sometimes makes the ESCA Board and its president nervous. However, George Kokkinakis as the general chairman, George Carayannis as the vice-chairman, Nikos Fakotakis as the secretary

and the whole local organizing committee have done a marvelous job with great efficiency and they deserve our great gratitude.

ESCA is a European-based international membership organization that welcomes everybody active in the broad field of Speech Communication. Similarly the biennial Eurospeech conference and its satellite events intend to be international events with a European flavour. World-wide participation to Eurospeech is evident although certain countries, like from Central and Eastern Europe, are definitely underrepresented. Whenever this is related to the unavoidable high costs of registration and/or living, the conference organizers and ESCA try to find a solution for that. This year's registration form gave the opportunity to apply for a grant. Over 65 people made use of that possibility, and our resources allowed us to (partially) approve some 35 of these requests.

Next to the biennial Eurospeech conference every odd year, ESCA by now is also quite well-known for its workshops (ESCA Tutorial and Research Workshops, ETRWs) on specialized topics, of which some 2 to 4 take place every year. This year two of them are satellite events of Eurospeech '97. One on "Intonation: Theory, Models and Applications", that will take place in Athens (Sept. 18-20), the other on "Audio-visual speech processing", that will take place in Rhodes (Sept. 27-28). It also became a tradition that the EU Speech Projects Day precedes the main conference on Monday morning (Sept. 22), whereas Cocosda will meet after the main event, most probably in conjunction with a COST workshop. Earlier this year two more, highly successful, ETRWs took place, one on "Robust speech recognition for unknown communication channels" in Pont-a-Mousson (April 17-18), the other in Marseille on "Larynx" (June 18-20). Each time Proceedings are available at the start of the workshop and additional copies can be ordered from the ESCA secretariat as long as the stock lasts. Also for 1998 several workshops are being planned. For more information see our NESCA newsletter, the esca-list, the ESCA web-site, or the announcements in the international journal Speech Communication.

After the regular all-day Eurospeech sessions on Tuesday Sept. 23, the ESCA General Assembly will take place. On that occasion the newly elected Board members will be installed and we will say farewell to some long-standing Board members that served our association for the maximum period of 8 years. First and foremost this will be our past president Joseph Mariani, who served ESCA and the speech community so eminently, as well as Jens Blauert, who always acted as our financial conscience, and Bjorn Granstöm, who made the ESCA workshops to such a great success. I will also myself resign from the Board and gladfully hand over the presidency to one of the new team. Elections took place this spring on the basis of a list of candidates proposed by the present Board. Regular ESCA members had a chance to propose additional candidates, although nobody made use of that possibility. This implies that (in alphabetic order) Gerrit Bloothooft, Rolf Carlsson, Wolfgang Hess, and George Kokkinakis will complete the Board, next to the sitting members Christian Benoit, Roberto Billi, Paul Dalsgaard, Roger Moore, and Isabel Trancoso. Maria Gosy, furthermore, will act as a non-European-Union observer in the Board.

Although the news has been announced already in NESCA 18 at the end of 1996, many of you may not yet know where Eurospeech in the year 1999 will take place. It is with great pleasure that I can express here again that Hungary has accepted our invitation and that Eurospeech '99 will most probably take place from Sept. 6 to 9, 1999 in the Congress Centre Liget in Budapest. The General Chairman of the Organizing Committee will be Professor Geza Gordos, with Professor Maria Gosy as the vice-chairman and Dr. Geza Nemeth as the secretary.

Traditionally I have one last pleasant announcement to make and this concerns the ESCA medal. Since 1989 this has been offered to Gunnar Fant, Jim Flanagan, Adrian Fourcin, and Ken Stevens, respectively. This time the distinguished Professor Mario Rossi from the Institute of Phonetics in Aix-en-Provence will receive this medal.

I wish you all a successful conference and a wonderful stay in a sunny Rhodes.

Professor Dr. Louis C. W. Pols
ESCA President

GENERAL CHAIRMAN'S MESSAGE

On behalf of the Organizing Committee of Eurospeech '97, I am glad to welcome you to this biennial event of the European Speech Communication Association (ESCA) and to the beautiful Greek island of Rhodes.

Ancient Greeks used to challenge everybody who boasted to be able to perform an exceptional achievement by saying "Éäïý ç Ñüäïò, éäïý êáé ôï ðÞäçìá", which means literally "Here is Rhodes, here you jump", or metaphorically "Prove right now what you pretend to be". This utterance which apparently originated when a boaster claimed that if he were in Rhodes he could make an enormous jump, acquires a special meaning for our conference. As scientists and engineers working in one of the most challenging areas of research and technology, that of man-machine communication by voice, we have to prove that we are able to carry out this endeavour successfully. Eurospeech on the other hand has to prove that it makes substantial progress from event to event so that it is able to efficiently promote the work of its audience in a steadily improving way.

Well, established in 1989 in Paris, Eurospeech enjoyed a spectacular increase in submitted papers and attendees at the events that followed in Genoa (1991), Berlin (1993) and Madrid (1995). This year the number of proposed papers surpassed every expectation jumping from 807 in Madrid to 1,076 and that of papers accommodated in the program from 535 to 717. The number of participants is expected to approach 1,100 from 840, an impressive "jump" indeed. I would like to thank all the researchers around the world who submitted their contribution to Eurospeech '97 and the members of the international scientific committee who performed the enormous task of reviewing them in a very short time.

The technical program includes a large spectrum of novel contributions by authors from 49 countries, arranged in 44 oral and 22 poster sessions. Four oral and two poster sessions will run in parallel. Included in the above are two special sessions: One on "Education for Language and Speech Communication" organized by Gerrit Bloothooft and another on "Robust Speech Recognition: Review and Perspectives" organized by Jean-Claude Junqua. In addition, there will be five plenary sessions in which seven distinguished scientists will give keynote speeches: On Monday afternoon, just after the opening ceremony, Mario Rossi will speak on "Is Syntactic Structure Prosodically Recoverable?". On Tuesday and Wednesday morning, Victor Zue and Jan van Santen will speak on "Conversational Interfaces: Advances and Challenges" and "Prosodic Modelling in Text-to-Speech Synthesis", correspondingly. On Thursday morning in a plenary session on: "Robust Speech Recognition: Review and Perspectives", Jean-Claude Junqua will speak on "Impact of the Unknown Communication Channel on Automatic Speech Recognition: A Review", Jerome Bellegarda on "Statistical Techniques for Robust ASR: Review and Perspectives" and Richard Lippmann on "Using Missing Feature Theory to Actively Select Features for Robust Speech Recognition with Interruptions, Filtering and Noise". Finally, at the closing ceremony on Thursday afternoon, Wolfgang Hess will give a review speech entitled: "Perspectives of Speech Technology Research Highlighted in Eurospeech '97".

As in previous Eurospeech conferences an accompanying industrial and scientific exhibition of products, books, services and scientific results shown by known firms and institutes, will run from Monday afternoon to Thursday afternoon. A novelty this year is the group presentation of EU-supported projects organized by the EU-project LINGLINK: Promotion and Support for the Application of Language Engineering in Europe. Last but not least, six workshops just before and after the conference including the traditional EU speech projects day, will provide valuable information on recent developments in specific areas.

We are proud that Eurospeech '97 features a series of innovations and additional offerings to the delegates included in the registration fees which have been kept to similar levels to those in the recent past:

- CD-ROM proceedings including the papers and audio files in addition to the usual hard copies which have increased to five volumes.
- Mailing of the hard-copy proceedings well before the conference.
- A hard-copy program including the paper abstracts in addition to the pocket program.
- A bus service from Rhodes Airport to the venue and back to the airport on the day before and after the conference.
- A half-day excursion to the famous archeological site and the village of Lindos.
- Three lunches at Rodos Palace Hotel.
- An ESCA membership of one year for non-ESCA members.

- Twenty grants to students and young scientists in addition to those offered by ESCA.
- A contest for the best student papers and a competition between man-machine dialogue systems over the telephone network named "Olympics" and organized by ELSNET/ELRA.

Apart from the already mentioned excursion to Lindos, other outstanding events of the conference are the opening ceremony, the welcome reception, the banquet and the closing ceremony. In the opening ceremony the Minister of Development Mrs Vasso Papandreou and the Minister of the Aegean, Mrs Elizabeth Papazoi, who have taken Eurospeech '97 under the auspices of their ministries, and the Mayor of Rhodes Mr George Giannopoulos have been invited to give addresses. Furthermore, a multivision show: "The Dodecanese: A journey in space and time" will be presented by the author Mr Nikos Kasseris and the ESCA medal will be awarded to Mario Rossi by the ESCA president Louis Pols.

The welcome reception will be held by the Mayor of Rhodes at the magnificent Palace of the Grand Masters, the residence of the supreme commanders of the Knights of Saint John's order, who ruled in Rhodes from 1309 to 1522 AD.

The banquet will take place in the Gardens of the Rodos Palace Hotel by the swimming pool organized as a Greek night and will include Greek specialities and wine, barbecue and an orchestra that will play modern and folk music. The highlight of the night will be the ballet performance by the "Nafsika Dance Theatre" consisting of dance pieces from the well known films "Zorba the Greek" and "Never on a Sunday" choreographed by Sofia Smailou.

In the closing ceremony, apart from Wolfgang Hess's review speech and the usual farewell addresses, the awards will be handed to the winners of the ELSNET/ELRA Olympics.

I would like to thank all the members of the organizing committee, especially the secretary Nikos Fakotakis and Evangelos Dermatas, the personnel and the graduate students of WCL, especially Kyriakos Sgarbas, Dimitris Galanis, Despina Krana, Panagiota Bobolas, Sofia Antonakopoulou and Jeanette Smith, the commercial organizer CPR and its director Loukia Simonoviki, the ESCA board and especially its president Louis Pols, who has assisted us in every step, for their tireless efforts to bring this conference to a successful end. Without them, Eurospeech '97 would not have materialized. Furthermore, I would like to extend my best thanks to the many sponsors and supporters of Eurospeech '97:

- The University of Patras and WCL in particular.
- The European Commission.
- ESCA.
- The Ministries of Development, Culture, Education and the Aegean.
- The City of Rodos.
- The Hellenic Telecommunications Organization (OTE).
- The firms ERICSSON SA, INTRAKOM SA, SIEMENS SA, STAT SA, ANKO SA

We feel that Eurospeech '97 in Rhodes will be a memorable event and we look forward to sharing it with you.

Professor George Kokkinakis
General Chairman

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SPONSORSHIP

EUROSPEECH '97 has been sponsored and supported by the following companies and authorities:

Sponsors

The University of Patras, Greece
The European Commission
The Hellenic Telecommunications Organization (OTE), Greece
The Ministry of Education, Greece
The Ministry of the Aegean, Greece
The City of Rodos, Greece
ERICSSON SA, Greece
INTRAKOM SA, Greece

Supporters

The Ministry of Culture, Greece
The Ministry of Development, Greece (The General Secretariat of Science & Technology)
ESCA
SIEMENS SA, Greece
STAT SA, Greece
ANKO SA, Greece

Outstanding Events

Opening Ceremony

Monday 22, 14:30
Plenary event at Rodos Palace Jupiter Hall with welcome addresses, ESCA medal Award, Invited speech, Mutlivision Show.

Welcome Reception

Monday 22, 19:30
Drinks and hors d'oeuvres, offered by the Mayor of Rodos at the Grand Masters Palace

Banquet

Wednesday 24, 21:00
Greek Night at Rodos Palace Gardens with Greek specialities, wine barbecue, orchestra, ballet performance

Lunches

Tues. 22, Wed. 23, Thurs. 24, 13:30-15:00
Regular participant and student menus offered at the "AMBROSIA" and "CASTELLANIA" Restaurants of Rodos Palace, correspondingly

Excursion to Lindos

Wednesday 24, 15:00
Guided tour to the archeological site and the village of Lindos

Closing ceremony

Thursday 25, 18:45
Plenary event at Rodos Palace Jupiter Hall with Farewell addresses, "Olympics Contests" Awards, Eurospeech '97 Review Speech

Sessions

Plenary keynote sessions: 5
Oral sessions: (including 2 Special Sessions): 44
Poster sessions: 22 Total: 71

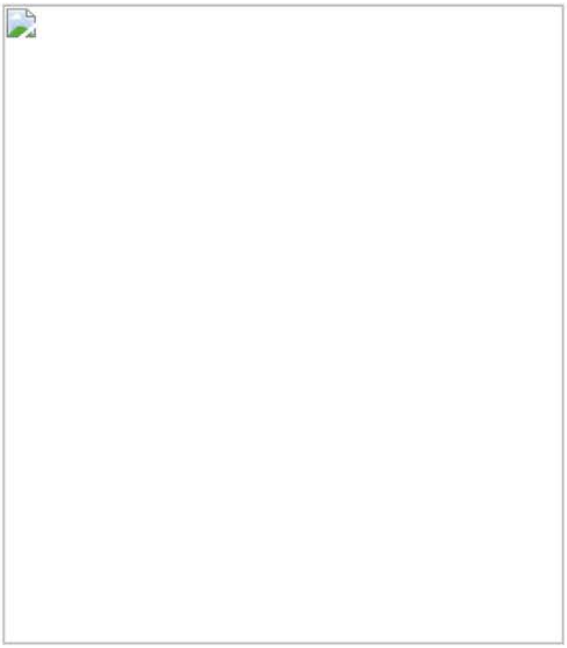
Papers

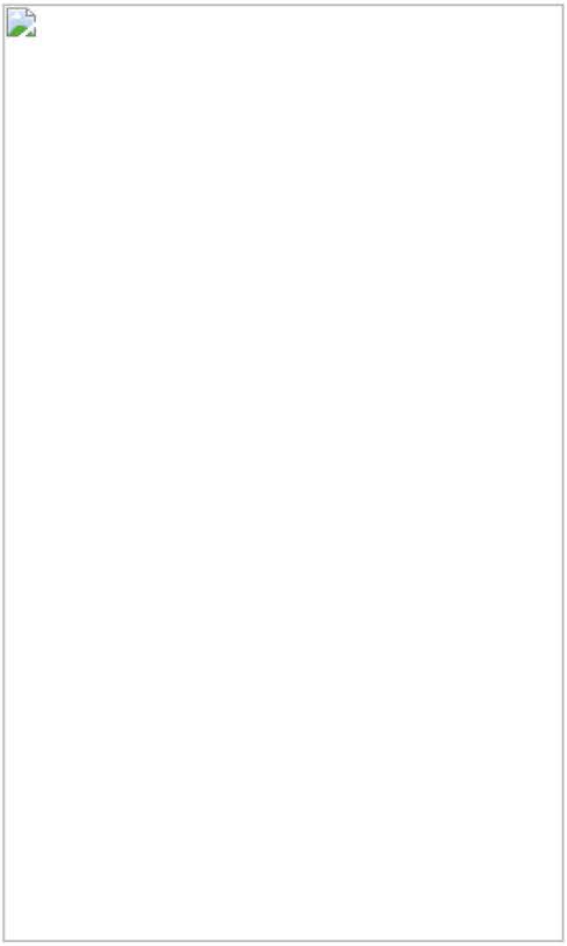
Keynote papers: 7
Oral session papers: 264
Poster session papers: 453
Total: 724

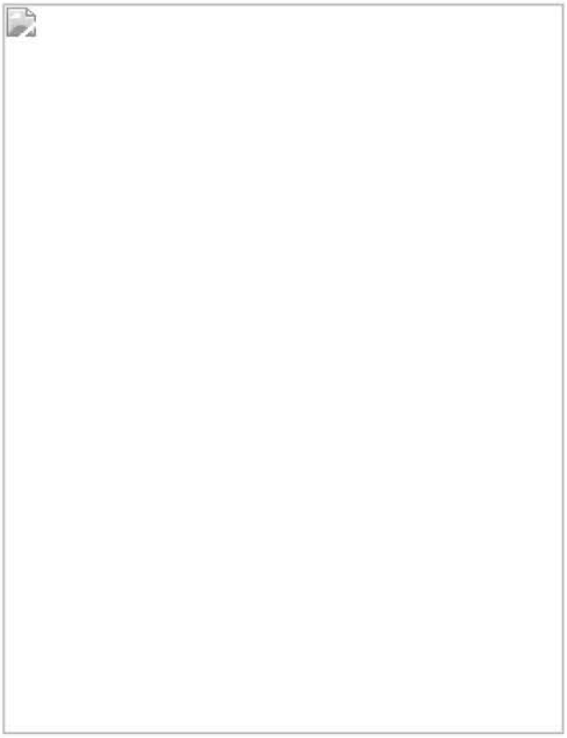
Programs - Proceedings

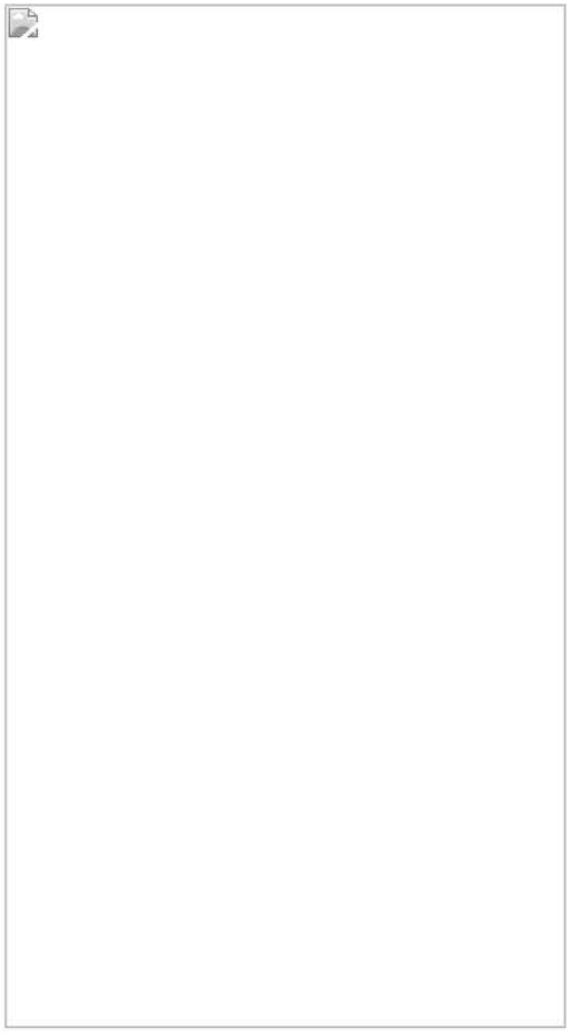
Pocket program: One booklet, 175 pages
Abstracts program: One volume, approx. 180 pages (in preparation)
Hard-copy proceedings: Five volumes, 3,256 pages
CD-ROM proceedings: One CD

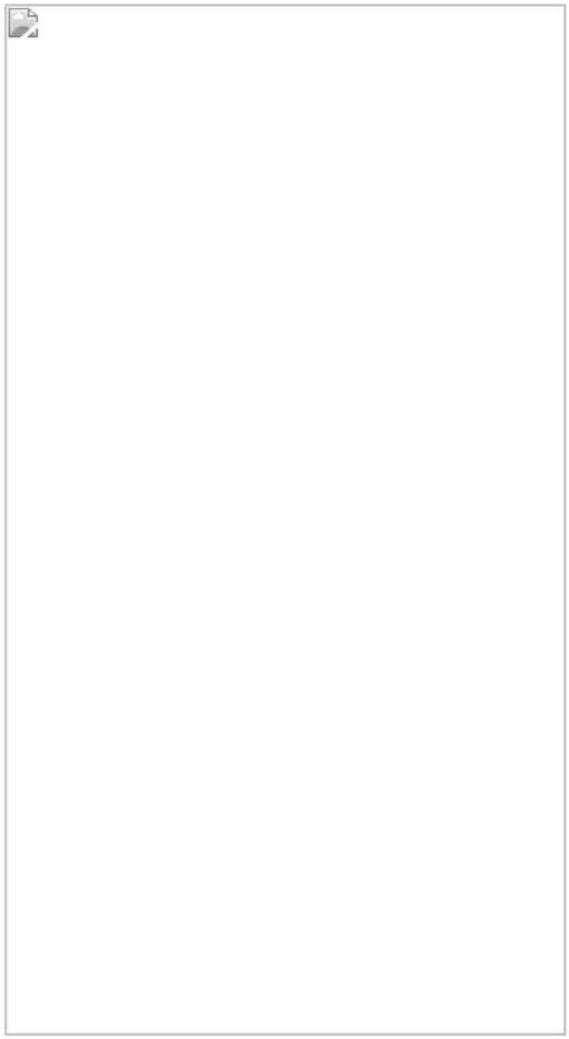
PROGRAM AT A GLANCE

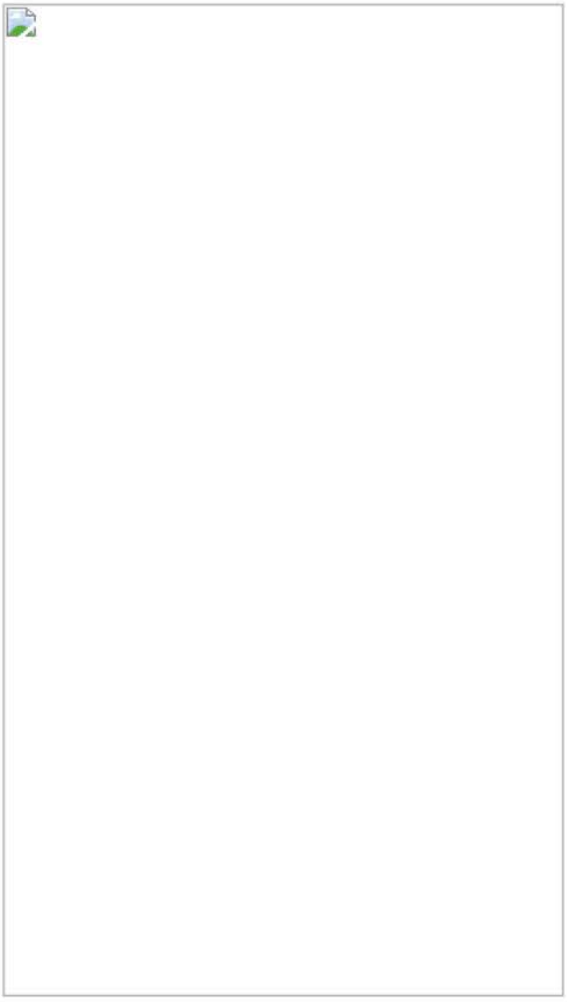












VENUE

EUROSPEECH '97 will be held at the International Convention Centre of Rodos Palace Hotel, the largest and best equipped conference venue in Greece. Rodos Palace is a 5-star hotel complex by the sea, 12 km from the international airport and near the city of Rodos. Set on a 30-acre site, it includes an elegant tower building, vast gardens and excellent sport facilities. The tower building includes deluxe rooms and suites offering an unparalleled panoramic view of the island and the blue Aegean. Situated within the Hotel's picturesque gardens lie spacious apartments and bungalows for those seeking a touch of privacy and relaxation. Adjacent to the tower stands the new 7-storey executive wing, fully designed for the demanding needs of today's executive travelers and conference delegates. All 780 rooms of the complex offer private balcony or patio, private bath, colour TV with satellite programs, 5 channel music, air conditioning and direct dial telephones.

The address of the Rodos Palace Hotel is :

Rodos Palace
Trianton Ave. , Ixia
851 00 Rodos, Greece
Tel : +30 241 / 25 222 or 26 222
Telex : 29222-213
Fax : + 30 241 / 25350

RHODES

Rodos (Rhodes), the Isle of the Roses, is the largest of the Dodecanese complex and the third largest of the Greek islands. Situated in the South Aegean in the Mediterranean, at the cross-roads of two continents, Rodos combines the worldliness of Europe and the mystery of the Orient in an atmosphere that is truly fascinating.

Discovering Rodos you discover Greece. Ancient cities, a medieval town with its own castle, small villages, sun-drenched beaches are all found on Rodos. But Rodos is more than that. It is one of the most developed islands in the Mediterranean and it provides its visitors with every holiday amenity including large and modern hotels of international standards, yachting harbour, entertaining night life, casino, sports facilities and duty-free shopping.

TRAVEL INFORMATION

You can reach Rodos by plane, by daily boat services from Piraeus and by hydrofoil service from other islands.

There are daily jet services directly to Rodos from Athens and most major European cities. There may be a direct flight from your country/city to Rodos. Olympic Airways (tel. : +30 1 9666 66 66) links Rodos with Athens, Thessaloniki, Heraklion, Karpathos, Kassos, Kos, Megisti, Mykonos and Santorini.

If you will fly to Rhodes via Athens, book your flight as early as possible, September is still high season in Rhodes and demand almost always exceeds supply. The Athens Hellinikon International Airport consists of the West Airport Terminal, used exclusively for domestic or international Olympic Airways flights, and the East Airport Terminal, used by all other international airlines. In case you reach Athens by an international flight to the East Terminal, you need to take the airport bus or a taxi to the West Terminal for your domestic flight to Rodos via Olympic Airways. Taxi rates are approx. DRA 1,800 (USD 6.5).

Rodos Airport is 12 km from the Rodos Palace Hotel. A bus service for the transportation of the participants from the airport to the venue and back to the airport will be established, the day before and after the conference. Another possibility is to hire a taxi just at the airport exit. The fare to the Rodos Palace Hotel is approx. DRA 2,200 (USD 8).

There are also Olympic Airways buses and public buses that run between airport and Rodos with a stop in front of Rodos Palace. The waiting time depends on the hour of the day.

There are daily car ferries between Rodos and Piraeus. Either way the departure is at 17:00 and arrival is at 06:00 the next morning. First class tickets are about DRA 34,000 (USD 120), round trip. For information on ship routes to and from Piraeus contact the Piraeus harbour master (tel. : +30 1 422 6000).

ACCOMMODATION

Accommodation is offered in the Rodos Palace Hotel and in other hotels of various categories at special rates. All hotels are situated along the sea shore and in a distance up to 1km from Rodos Palace. Please book your hotel room with the enclosed registration form as early as possible in order to secure a room at Rodos Palace Hotel or in nearby hotels. Should you have any questions concerning the hotel reservations please contact the Conference Secretariat.

REGISTRATION INFORMATION

Registration Fees Full and limited registration options for ESCA members, non-ESCA members and students are offered. These registration options include the following services as packages, and are fully covered by the corresponding fees.

REGISTRATION	Non student Full	Student Limited	Non student Full	Student Limited

Admission to the scientific programme and exhibition	*Yes*	*Yes*	*Yes*	*Yes*
Transportation(1)	*Yes*	*Yes*	*Yes*	*Yes*
Hard-copy Proceedings	*Yes*	-	*Yes*	-
CD-ROM Proceedings	*Yes*	*Yes*	*Yes*	*Yes*
Welcome Reception	*Yes*	*Yes*	*Yes*	*Yes*
Three Lunches	*Yes*	*Yes*	*Yes(2)*	*Yes(2)*
Banquet	*Yes*	-	*Yes*	-
Coffee and refreshments	*Yes*	*Yes*	*Yes*	*Yes*
Half day excursion to Lindos	*Yes*	-	*Yes*	-

(1) Bus service between Airport and Conference Venue (Sept 21 and Sept 26).
(2) Student lunches.

In addition, the fee for Non-ESCA members includes an ESCA membership for one year (1997). The Special Package includes an ESCA membership for two years (1997, 1998).

Advance Registration

Attendants should fill in the attached Registration form and mail it with included payment (credit card or bank transfer) to the Conference Secretariat (CPR). Please take care to bring to the conference your confirmation of registration or a bank transfer receipt for payment of the conference fee.

On-Site Registration

Registration at the Conference will take place on Sunday, 21 September from 16:00 to 20:00 and on Monday, 22 September from 8:30 to 18:00. The Registration and Information Desk will also be open on Tuesday, 23 September, Wednesday, 24 September and Thursday, 25 September from 8:30 to 13:30 and from 14:30 to 19:00.

At the Registration Desk, only DRA, Visa, Mastercard or American Express cards can be accepted to pay for registration fees.

A name badge will be included in the conference bag handed over at the registration desk. Please always wear your badge while in the Conference Centre.

Cancellation of Participation

Cancellation of participation must be made in writing to the Conference Secretariat (CPR). For cancellations received by August 15, 1997 80% of the total amount will be reimbursed. After that date, no refund can be made, but the Conference Proceedings will be sent.

CONFERENCE INFORMATION

Language

The official language of EUROSPEECH'97 is English.

Opening Ceremony

The Opening Ceremony will take place on Monday 22, Rodos Palace Hotel, 14:30.

The Minister of Development Mrs.Vasso Papandreou, the Minister of the Aegean Mrs. Elisabeth Papajoi and the Mayor of Rhodes Mr. George Giannopoulos have been invited to give addresses. Furthermore, a multivision

show: "The Dodecanese: A journey in space and time" will be presented and the ESCA medal will be awarded to Prof. Mario Rossi, by the ESCA President Prof. Louis Pols.

Welcome Reception

On Monday September 22, attendants will be offered a Welcome Reception by the Mayor of Rodos Mr George Giannopoulos from 19:30 to 21:30 at the Palace of the Grand Masters. It is the most impressive building of the Knights of St John built around 1350.

Banquet

The official Dinner of the Conference will take place on Wednesday September 24, 21:00 in the Gardens of the Rodos Palace Hotel by the swimming pool organized as a Greek night. It will include Greek specialities and wine, barbecue and an orchestra that will play modern and folk music. The highlight of the night will be the ballet performance by the "Nafsika Dance Theatre" consisting of dance pieces from the well known films "Zorba the Greek" and "Never on a Sunday" choreographed by Sofia Smailou.

Lunches - Dinners

Lunches included in the fees will be offered Tuesday, Wednesday and Thursday between 13:30 and 15:00 at the Rodos Palace Hotel. Additional tickets are offered for accompanying persons at reduced prices.

For dining, the «taverna», the classic Greek eating-place is the most appropriate choice. The cuisine is Greek with emphasis on grilled meat and fish. The old city is full of picturesque tavernas. Of course, there are also restaurants offering international cuisine in addition to Greek specialities and restaurants of various nationalities including Chinese, Lebanese and Cypriot.

Half Day Excursion to Lindos - Wednesday 24, 15:00

Lindos is the most beautiful spot on the island. The shimmering crystal blue bay is surrounded by dazzling white-washed houses and perched high above the village is the Acropolis with its Temple of Athena. Continuing up to the Acropolis, you can view the Castle of the Knights, the restored Temple of the Lindian Athena and look on to St Paul's bay with its tiny chapel.

Proceedings

The hardcopy proceedings of the conference (five volumes) are already available and can be shipped on demand to interested participants. Otherwise they will be handed out at the conference, together with the CD-ROM proceedings, the program with the abstracts of the presentations and the present pocket program. Receiving the proceedings in advance is the best way to get informed in time and avoid the trouble of carrying the heavy volumes or shipping it from Rhodes.

Plenary sessions

There will be five plenary sessions in which seven distinguished scientists will give keynote speeches: On Monday afternoon, just after the opening ceremony, Mario Rossi will speak on "Is Syntactic Structure Prosodically Recoverable?". On Tuesday and Wednesday morning, Victor Zue and Jan van Santen will speak on "Conversational Interfaces: Advances and Challenges" and "Prosodic Modelling in Text-to-Speech Synthesis", correspondingly. On Thursday morning in a plenary session on: "Robust Speech Recognition: Review and Perspectives", Jean-Claude Junqua will speak on "Impact of the Unknown Communication Channel on Automatic Speech Recognition: A Review", Jerome Bellegarda on "Statistical Techniques for Robust ASR: Review and Perspectives" and Richard Lippmann on "Using Missing Feature Theory to Actively Select Features for Robust Speech Recognition with Interruptions, Filtering and Noise".

Oral and Poster Sessions

The Technical Program is organized into 44 Oral Sessions consisting of 264 presentations and 22 Poster Sessions with 453 posters. Four oral sessions with 6 papers each and 90' duration and two poster sessions with approximately 20 papers each will run in parallel. Each poster will be displayed for 180' (the whole morning or afternoon) but the author will stand by the poster for 90', (the part of the session the poster belongs to) in order to present the paper.

Special Sessions

The Technical Program also includes two special sessions: One on "Education for Language and Speech Communication" (Th1D) organized by Gerrit Bloothooft and another on "Towards Robust ASR for Car and Telephone Applications" (Th3C), organized by Jean-Claude Junqua.

Session Identifiers

Each session identifier indicates the day, the time and the identity of the session. There are oral and poster session identifiers.

The day is indicated by the following letters both for the oral and poster sessions:

- M for Monday
- T for Tuesday
- W for Wednesday
- Th for Thursday

The time is indicated for the oral sessions by the figures 1 to 4 corresponding to the time slots:

- 10:00-11:30 (1)
- 12:00-13:30 (2)
- 15:00-16:30 (3)
- 17:00-18:30 (4)

For the poster sessions the letter M indicates the morning session (10:00-13:30), the letter A the afternoon session (15:00-18:30).

The sessions of a specific time slot are distinguished between each other by the identity letters A, B, C and D both for oral and poster sessions. For the latter, the letters A, B correspond to the first part of the morning or afternoon session, the letters C, D to the second part.

An identifier with both letters and a figure indicates an oral session, an identifier with only letters indicates a poster session.

Examples:

The identifier T3C indicates an oral session, taking place on Tuesday (T), in the third time slot (15:00-16:30) and having the identity C.

The identifier ThMD indicates a poster session taking place on Thursday (Th) in the morning (M) and having the identity letter D which belongs to the second part of the morning session. This means that the posters of this session will be displayed the whole morning (from 10:00 to 13:30) but the authors will stand by their posters in the second part of the session (12:00 - 13:30).

INTERNET ACCESS

Eurospeech '97 will provide several terminals for conference participants to access the Internet and electronic email. Access to the terminals will be possible during conference hours.

OLYMPICS

ELSNET/ELRA have organized a contest for the best student papers and a competition between man-machine dialogue systems over the telephone named "Olympics". Prizes for the best student paper at Eurospeech '97 and the best student paper with focus on language resources at Eurospeech '97, will be awarded to the winners by ELSNET and ELRA correspondingly at the closing ceremony.

The competition between man-machine dialogue systems will be carried out during the conference as follows:

Testing Spoken Dialogue Information Systems Over the Telephone

ELSNET offers Eurospeech97 participants the opportunity to test spoken dialogue information systems over the telephone world-wide. Anytime during the conference, telephone lines will be available for delegates to test participating dialogue systems for free in the ALPHA room. Available systems use one of the following languages: English, German, French, Spanish, Italian, Dutch, Slovenian. After each call the user is invited to fill in a short questionnaire to quantify the experiences with the system.

At the closing ceremony (Thursday, 25 September, 18:45h) the organizers will comment on the results and will award a prize for the system which is judged to have achieved the highest approval ratings.

Action steering committee:
Norman Fraser University of Surrey, UK
Els den Os KPN, The Netherlands

EXHIBITION

A scientific and industrial exhibition will be held during Eurospeech'97. Companies, Publishers, Research Institutes, Universities and Consortia of EU-supported projects will have the opportunity to show their products and research results either with attended stands or with unattended posters.

The Exhibition will take place in the "Salon des Roses" in the heart of the Convention Centre from Monday, September 22, to Thursday, September 25. The stands will be staffed as follows:

Monday, September 22: 16:30 - 18:30
Tuesday, September 23: 09:00 - 18:30
Wednesday, September 24: 09:00 - 13:30
Thursday, September 25: 09:00 - 17:00

Exhibiting companies and research institutes which confirmed their participation at press time include:

ANKO SA
CARSTENS MEDIZIN- ELEKTRONIK GmbH
CPK
CSELT
THE DRAGON SYSTEMS INC.
ELSEVIER SCIENCE
THE ENTROPIC GROUP
ILSP
INTRAKOM SA
KAYELEMETRICS
KNOWLEDGE SA
LINGLINK, ANITE SYSTEMS
S. KARGER AG
STAT SA

WALTER DE GRUYTER & CO
WCL

The following EU projects will be exhibited at the stands of LINGLINK-ANITE SYSTEMS:

ACCeSS: Automated Call Center Through Speech Understanding System
ARISE: Automatic Railway Information Systems for Europe
CAVE: Caller Verification in Banking and Telecommunications
ELRA: European Language Resources Association
SPEECHDAT: Speech Databases for Creation of Voice Driven Teleservices
SPEEDATA: Speech Recognition for Data-entry Applications
VODIS: Advanced Speech Technologies for Voice Operated Driver Information Systems
SPRACH: Speech Recognition Algorithms for Connectionist Hybrids (ESPRIT Long Term Research)
THISL: Thematic Indexing of Spoken Language (ESPRIT Long Term Research)

USEFUL INFORMATION

Passport and Visa

A valid passport is required for entry into Greece. An identity card is sufficient for citizens of the EU member countries. No visas are required for visitors from West European countries, USA, Japan, many South American countries and the British Commonwealth. For all other countries, visas are issued on a reciprocal basis. Please consult the Greek Consulate nearest to you for more details.

Car Rental - International Driver's Licence

Rodos is a wonderful place for exploring by car. Rent-a-car is not expensive. Furthermore, Hertz offers a 20% discount for Eurospeech ’97 attendees. For reservations call +30 241 21 819 or check the desk at Rodos Palace.

If you wish to drive a car while in Greece, you must obtain a European or an international driver's license in your home country.

Currency exchange

The Greek currency unit is the drachma (DRA). 1 US dollar is about 280 DRA at the time of printing. Foreign currency can be exchanged at the airport and at most banks. Banking hours for the public are daily from 7:30 to 13:30 except weekends. Centrally located banks also provide «Exchange Service» from Monday to Friday afternoon (5:00 pm to 7:30 pm) and on Saturday mornings. They also offer ATM service. Banks at Rodos Airport provide services throughout the day as well as a night service for most flights. There is also a bank located inside Rodos Palace Hotel.

Insurance

All kinds of insurance, including medical coverage, is left to your responsibility. We recommend that you discuss insurance coverage with your travel agent.

Electricity

Three-pin flat electric (220 V, 50 Hz) outlets are provided.

Credit Cards

Most shops, hotels and restaurants accept VISA, Diners Club and American Express credit cards as well as Eurochecks and Eurocards.

Shopping

Shops are open from 8:00 to 13:00 and from 17:00 to 20:30 on Tuesday, Wednesday and Friday, from 8:00 to 13:30 on Monday, Thursday and Saturday. Large stores including supermarkets are open from 8:30 to 21:00.

Climate-Clothing

Greece enjoys a Mediterranean climate, especially the regions which are close to the sea. During September the temperature is around 22o Celsius, (72o Fahrenheit). Being in one of the most beautiful Mediterranean islands during this period of the year, we suggest you bring summer clothes, cameras, and of course, bathing suits to enjoy swimming in an extraordinary blue sea. Include something more substantial for the evenings.

Transport within the town: Bus-Taxi

There are 7 public bus lines serving the town, the terminal of which is in the new market at Mandraki. The west coast where Rodos Palace is situated, is served by buses leaving every 10 to 15 minutes. The fare is DRA 300. Taxi is perhaps the best way to move in town. The fare between Rodos Palace and Downtown Rodos is approx. DRA 800. It is easy to get a taxi all day except in the rush hours in the morning and in the evening .

Tips

In restaurants , tips are included in the bill but if you are very satisfied with the service you may give a tip of 5 to 10% on the bill. In taxis you may round up the fare.

Telephones

Telephone calls from the hotel are more expensive than public telephones, as usual. Public telephones accept mostly cards which can be bought for 1,500 DRA (USD 5) at kiosks, supermarkets and corner stores. In Rodos Palace they are available at the drugstore.

Useful Phone Numbers

Country code (Greece): 30
Area code (Rodos): (0) 241
Olympic Airways: 24 571 - 5
Rodos Airport: 92 839
Rodos Port Authority: 28 888, 27 695
Tourist Police: 27 423
Tourist Organization: 23 255, 23 655
Taxi: 27 666
First Aid: 22 222
Rodos Palace Hotel: 25 222

Eurospeech '97 Secretariat:

> Before the conference: + 30 61 270 388, 223 335
> During the conference: + 30 241 25 222 + 30 241 73 317 (fax)

WELCOME TO RHODES

Rhodes is the largest of a complex of more than 200 islands known as the Dodecanese. The name means "twelve islands", and refers to the principal inhabited islands, which in fact are thirteen. Rhodes has an area of 1,400 sq. km and a population of 90,000. Its climate is mild with 300 days of sunshine a year on average.

History

Strategically placed, the island has had a tumultuous past linked with the sea. Rhodes was already inhabited in prehistoric times. The island gradually expanded its influence and became the main commercial link in the Mediterranean.

In 408 BC, the island's three important Doric cities Ialissos, Lindos and Kamiros united to found the city of Rhodes on the island's northeastern edge. This marked a new era in the history of the island. The sun-worshipping city of Rhodes (Rodos) became an important political, commercial and religious centre. Its golden era lasted from the 5th to the 3rd century BC.

Rhodes extended its rule, minted its own coin, introduced the first maritime law rules, advanced the arts, theater and sports. Its school of Rhetoric became famous and attracted many well-known Romans and Greeks. In the 2nd century BC, Rhodes became an ally of Rome: this led to a gradual weakening of the island, which from the 1th century AD became a roman prefecture. St. Paul visited the island and recruited the first Christians 57 AD; when in 395 AD the Roman Empire split, Rhodes and the other islands of «Provincia insularum» were included in the Byzantine Empire.

New seafarers attacked and often looted the city in the following centuries.

The Knights of the Order of Saint John were established in Rhodes in 1309 AD. Their stay has endowed the city with a series of majestic buildings protected by a fortified wall.

From 1522 onwards the Dodecanese islands form part of the Ottoman Empire until 1912 AD, when they came under Italian rule. In 1948 the islands were united with Greece.

The City

Present-day Rhodes is a medieval/modern amalgam which impresses and fascinates visitors. Its medieval aspect, fortified behind an impressive wall, merges harmoniously with the refined, cosmopolitan air of a modern resort with luxurious hotels, broad tree-lined avenues, and rich commercial stores.

Sightseeing in the old town

It is fascinating to walk in the medieval town, full of impressive 15th century buildings, stone-paved lanes with arches and vaults, rows of little shops, a modern touch to the medieval picture, offering a surprising variety of commodities.

Perhaps the best starting point for a journey through medieval Rhodes is the wall (14th century; 5km long). As we cross one of the most famous gates, Pili Elefterias (Freedom gate) we encounter traces of the Temple of Venus (3rd century BC), also the Inn of Auvergne Knights, the Arsenal, the Museum of Decorative Arts (folklore exhibits from the Dodecanese Islands), the Byzantine Museum (in a 13th century church), the majestic Harbour Gate.

The Archaeological Museum (tel. 0241 27 674), housed in the 15th century building of the Knights' Hospital, includes collections of coins, pots and sculptures from the Mycenean up to the Roman era. We note the kneeling Venus of Rhodes (1st century AD) and the sepulchral column of Tymarista and Crito.

The Knights' Road, the official street of the medieval city, follows the ancient road to the Palace of the Grand Masters. Along the road lie the Inns of the Knights of Seven Languages, of which four still remain.

The Palace of the Grand Masters or Knights' Palace (14th century) is a palace and fortress that dominates the old town. It was destroyed in 1856 and rebuilt in 1940. Floors are covered with ancient mosaics of the island of Cos. There is an interesting collection of 16th and 17th century Western furniture, and an impressive arcade used as a place for meetings. The Palace has been renovated and is used to house important international functions. Other remarkable sights of the old town are the Mosque of Sulleiman, an old church with a beautiful Italian door, the Castellania (a 16th century building now housing the Library) with its beautiful fountain, St. Catherine's'

Hospital, the Admiralty Palace to its right, finally the Folk Dance Theater that presents traditional music, dances and costumes in their purest form.

The new town

On entering Mandraki (yacht harbour), the most picturesque of the three ports of the city, we are welcomed by two deer in bronze. Erected, probably where the famous Colossus of Rhodes used to stand, they have become the modern emblem of the town. Nearby on the wharf stands the lighthouse tower of St. Nicholas and the three old colourful windmills. Numerous monumental buildings surround Mandraki and add to its majestic air - among others the New Market (Nea Agora), a polygonal building with courtyard, the Archbishop's Palace, the Evangelismos (Annunciation) Church, the Central Post Office, the Town Hall, the Theater and the Government House - all four impressive buildings along the pier. Next to the Theater one admires Murad Reis Mosque and its graceful minaret. At the north end of the town stands the Institute of Marine Biology (Aquarium).

The Ancient City

Although Rhodes was a large city, relatively few ruins have been found. The ancient Acropolis stood on the eastern city of the Monte Smith hill, overlooking the city. Further on one sees the Stadium (3rd century BC) and the curiously square sized Odeum (both rebuilt). Performances of ancient drama are held every summer in the Odeum. There are also a few ruins of the temples of Polias Athena, Pythian Apollo and Zeus.

Sights near the city

Only 3km from the city lies the luscious greenery of Rodini Park, with many flower-gardens, picturesque lanes and ponds. From Rodini one can visit the Tomb of Ptolemies and the ruins of a Roman aqueduct.

East coast

The most fascinating site on east coast is Lindos (47km from the city of Rhodes), built on the ruins of the ancient Doric town of the same name. In medieval times Lindos was the second most important centre of the island, after the city of Rhodes itself. The ancient Acropolis was then built into a castle. It is said that St. Paul the apostle landed here when he came to the island of Rhodes, accordingly the tiny harbour on the other side of the village has been named «Agios Pavlos».

Under the steep cliff of the Acropolis lies the present townlet, charming with its whitewashed houses and pebbled courtyards. Houses retain traditional interiors, heavy ironwork on balconies and brown windows. Some 15th century houses have been officially declared traditional buildings to be preserved. One should also visit the church of the Virgin Mary (Panagia) of Lindos and the chapel of Agios Pavlos.

A series of steps leads to the Acropolis. Inside the main gate we discern the ruins of the Knights' Lodge and the Byzantine church of St. John.

Outside the Doric Stoa the prow of a Lindian Hellenistic trireme has been carved in a rock (4.5 x 5m). We cross the Doric Stoa (5th century BC) with its 42 columns (20 have been restored) and climb the majestic staircase to a higher terrace with Propylean ruins (5th century BC). From this point we reach the Sanctuary of Lindian Athena, with its elegant bi-prostyle temple on the edge of the cliff (4th century). Ruins of an ancient theater have been found on the slope of the Acropolis.

There are other beauties on this part of the island besides antiquities. Koskinou (10km) is an inland village with charming traditional houses. Kalithea (10.5km) is built around a colourful pine-covered bay with old spas; Faliraki (14km) is a cosmopolitan resort with an exquisite beach, Ladiko boasts a beautiful coast, Afandou (21km) is an old Rhodian village with an interesting church and a golf course. To the right of the Kolimbia coast a road leads to the enchanting Seven Springs (Epta Piges), a cool oasis with pine and plane-trees and crystal-clear waters. Tsambika has a beautiful sandy coast and a mountain where the monastery of the Virgin Mary stands.

Arhangelos (29km) is note worthy for its beautiful traditional houses, ceramics and carpet workshops. Haraki, a charming fishing village, lies on the beginning of the marvelous coast which leads to the Vilha Bay, and includes the medieval castle of Faraklos. To the south of Lindos we meet traditional villages here and there and charming coasts until the road abandons the coastline and turns left towards Katavia (80km), a major village in southern Rhodes. But the journey is not yet over. It's worthwhile to follow the unpaved earth road leading to the Prassonissi peninsula, full of sand dunes and accessible only in the summer, as the sea transforms it into a true island in winter.

West coast

Populous resorts, important archaeological sites, picturesque villages await us on this side of the island as well.

Following the road to the west, we cross the great coast where most of the island's hotels are clustered and reach Trianda (8km) or Ialissos, a townlet surrounded by orchards. The beach of Ialissos marks the end of the great chain of hotels starting from the beach of the city of Rhodes. One should visit here the church of the Dormition of Theotokos (Virgin Mary, Mother of God) with its famous wood carved temple, and then follow the winding picturesque road crossing the pine-wood up to the Acropolis of Ialissos (6km) the important Doric city built on the flat top of Mt. Filerimos, strategically overlooking the island.

Places of archaeological interest include the temple of Polias Athena (3rd century BC), the Baptismal Font of an early Christian church, the brilliantly restored church of Panagia Filermos, the monastery, the ruins of a medieval castle, the Doric fountain and the ancient necropolis.

Further to the west on the coast road, after Kremasti and Paradissi, one should go up left and reach the lush greenery of the famous Petaloudes (Butterflies) valley (25km), unique in the whole of Greece. Millions of butterflies gather here in the summer. Returning to the coast road we reach the side-road leading to Ancient Kamiros, third in importance commercial centre of Antiquity (34km). We discern parts of houses and buildings, the Agora, with its Doric Stoa (3rd century), a Hellenistic temenos with Doric temple, ruins of an aqueduct and remnants of the peripheral temple of Kamiriad Athena. Beside the foundations of that temple stands the Panagia Monastery, near to a proto-Christian catacomb.

The west road continues for a while along the coast, reaches the village Scala Kamirou (51km), then turns inland. From this village, with picturesque windmills and a panoramic view to the opposite islets, one can reach Chalki by caique. The traveler will be pleasantly surprised by the amphitheatric Kritinia village (55km), with a nearby medieval castle, then Siana, (69km), full of old stone houses, and Monolithos, built on pine covered slopes of Mt. Ataviros. To the south one crosses endless green fields to reach Apolakia (84km), famous for its marriage feasts, and finally the opposite side - Katavia (102km).

Inland

Not only coastal Rhodes is worth a visit. An inland journey uncovers beautiful traditional villages, untouched by the cosmopolitan spirit of tourist resorts. If we start out from Agios Syllas monastery, lost among the pine and beach, we can reach Profitis Ilias (altitude 720m) with its monastery and panoramic view of the sea. This is an enchanting journey, leading to idyllic villages on hill-tops or built on gentle slopes, with stone houses, whitewashed or ochre. Villages like Apolona, Agios Isidoros, Embonas, Laerma, Askiplio, Messanagros, Psithos and Salakos, stay in the visitor's memory for ever, each for its own charms but all with equally gentle and hospitable inhabitants.

TOURS FOR ACCOMPANYING PERSONS

Full day Rodos Island Tour

A perfect opportunity to see a lot of the island with its interesting landscape and numerous villages. The tour begins with a drive along the East Coast of the Island and the first stop is Seven Springs, a pretty wooded area with a fascinating tunnel leading to one of the springs. Continuing along the East Coast, you visit Archangelos,

the second largest village, then we make our way to Kiotari. A stop is made here for lunch and a swim. After lunch you cross the island at the centre towards the West Coast. During this horizontal trip through the island you will perceive spectacular scenery. Throughout the year the West Coast remains a very green and fertile region, quite different from the East Coast. A stop is made for photographs at the Castle of Monolithos. Your journey then takes you along the West Coast passing several villages where the locals still live the traditional way of life. A refreshment stop is made at Kamiros Scala, mid-afternoon, before returning to your hotels.

Full day excursion to the island of Symi

While sailing across the Aegean Sea, you pass very close to the Turkish coastline. Symi is one of the most unspoilt of the Greek islands. You arrive at the small picturesque harbour with its multicoloured houses and dazzling clear water and relax in one of the harbour side taverns. Later the boat will cruise to the West Coast port of Panormitis with its 12th century monastery. A lovely relaxing journey to a beautiful island.

Rodos City Tour

You will be first taken on a drive around the New Town of Rodos and shown various places of interest. Afterwards you will be taken on a panoramic drive to Monte Smith. Here you have a fantastic view of the Old and New Town. A visit will be made to the Temple of Apollo and the Ancient Stadium. You will then visit the Old Town of Rodos and take a walk through the Street of the Knights of St John. The Grand Master Palace and the Ancient Museum will be pointed out to you so that you may explore them some other time. We end our tour with a drive along the east coast to the famous Italian Spa at Kallithea.

ESCA GENERAL ASSEMBLY

Tuesday 18:45, "Delphi" Amphitheatre

SATELLITE EVENTS

EU SPEECH PROJECTS DAY

As in previous years, there will be a Eurospeech satellite event devoted to EU sponsored speech projects. This event will take place on Monday 22 September from 9:00 to 12:30 in the Rodos Palace Hotel Convention Centre. Participation is free of charge and all interested Eurospeech participants are welcome to attend.

The program of the event will be the following:

EU Speech Projects Day

Registration
8:30-9:30

Opening
George Kokkinakis, Eurospeech
Louis Pols, ESCA
Giovanni Battista Varile, EC
9:30-9:40

Roadmap of challenges and achievements in speech processing, with focus on the contribution of EU speech projects

Joseph Mariani, LIMSI-CNRS, France
Roger Moore, DRA, UK
9:40-11:00

Coffee break 11:30-12:00

Future EU activities in Language and Speech

Giovanni Battista Varile, European Commission
11:20-11:50

The role and contribution of the ELSNet, international cooperation, ELRA and EAGLES

Steven Krauwer, ELSNet
Khalid Choukri, ELRA
Roger Moore, EAGLES
11:50-12:20

Questions from the floor 12:20-12:30

Information contact:
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European Commission, DG XIII E5, Language Engineering
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Fax: +352 430 134 999
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ESCA WORKSHOP ON INTONATION

18-20 September 1997, at Athens, Greece

Information contact:
Antonis Botinis
Tel: +30 1 7211119
Fax: +30 1 7228981
E-mail: tonesca@di.uoa.gr
WWW server: http: //www.di.uoa.gr/esca

COCOSDA WORKSHOP '97

Friday, 26 September 1997, 9:00-13:00, Convention Centre, Rodos Palace Hotel.

Information contact:
Mark Liberman
University of Pennsylvania
Tel: +1 215 898 0464
Fax: +1 215 573 2175
E-mail: myl@unagi.cis.upenn.edu

ESCA. ESCOP TUTORIAL & RESEARCH WORKSHOP ON AUDIO-VISUAL SPEECH PROCESSING: Computational & Cognitive Science Approaches

26-27 September 1997, Rodos Palace Hotel

Information contact:
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COST WORKSHOP: Speech Technology in the Public Telephone Network: Where are we today?

Organized by COST Telecom actions 249, 250 and 258 26-27 September 1997, Rodos Palace Hotel

Information contact:
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http://www.elis.rug.ac.be/ELISgroups/speech/cost249/workshop

GRANTS FOR ATTENDEES

Grants have been offered to students and young scientists needing financial assistance as follows:

- 21 grants including free registration, accommodation and full board sponsored by the EU (10 grants) and by Eurospeech '97 (11 grants)
- 11 grants including free registration to Eurospeech '97 sponsored by ESCA
- 3 grants including free registration to satellite workshops of Eurospeech '97 sponsored by ESCA.

EUROSPEECH '99 BUDAPEST

Hungary August 31 - September 3, 1999
Department of Telecommunications and Telematics
Technical University of Budapest (DDT TUB) Szticzej u. 2, Budapest, Hungary, 1111

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EUROPEAN SPEECH COMMUNICATION ASSOCIATION (ESCA)

ESCA is a non-profit organization, whose objective is to promote speech communication science and technology in a European context. If you are interested in joining ESCA or need information about the association, please contact:

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Back to EUROSPEECH'97 Index Page
