Digital Speech Transmission. Enhancement, Coding and Error Concealment

Description: The enormous advances in digital signal processing (DSP) technology have contributed to the wide dissemination and success of speech communication devices – be it GSM and UMTS mobile telephones, digital hearing aids, or human-machine interfaces. Digital speech transmission techniques play an important role in these applications, all the more because high quality speech transmission remains essential in all current and next generation communication networks.

Enhancement, coding and error concealment techniques improve the transmitted speech signal at all stages of the transmission chain, from the acoustic front-end to the sound reproduction at the receiver. Advanced speech processing algorithms help to mitigate a number of physical and technological limitations such as background noise, bandwidth restrictions, shortage of radio frequencies, and transmission errors.

Digital Speech Transmission provides a single-source, comprehensive guide to the fundamental issues, algorithms, standards, and trends in speech signal processing and speech communication technology. The authors give a solid, accessible overview of
- fundamentals of speech signal processing
- speech coding, including new speech coders for GSM and UMTS
- error concealment by soft decoding
- artificial bandwidth extension of speech signals
- single and multi-channel noise reduction
- acoustic echo cancellation

This text is an invaluable resource for engineers, researchers, academics, and graduate students in the areas of communications, electrical engineering, and information technology.

Contents:

1 Introduction.

2 Models of Speech Production and Hearing.
   2.1 Organs of Speech Production.
   2.2 Characteristics of Speech Signals.
   2.3 Model of Speech Production.
   2.4 Anatomy of Hearing.
   2.5 Performance of the Auditory Organs.

Bibliography.

3 Spectral Transformations.
   3.1 Fourier Transform of Continuous Signals.
   3.2 Fourier Transform of Discrete Signals.
   3.3 Linear Shift Invariant Systems.
   3.4 The z-Transform.
   3.5 The Discrete Fourier Transform.
   3.6 Fast Convolution.
3.7 Cepstral Analysis.
Bibliography.
4 Filter Banks for Spectral Analysis and Synthesis.
4.1 Spectral Analysis Using Narrow-Band Filters.
4.2 Polyphase Network Filter Banks.
4.3 Quadrature Mirror Filter Banks.
Bibliography.
5 Stochastic Signals and Estimation.
5.1 Basic Concepts.
5.2 Expectations and Moments.
5.3 Bivariate Statistics.
5.4 Probability and Information.
5.5 Multivariate Statistics.
5.6 Stochastic Processes.
5.7 Estimation of Statistical Quantities by Time Averages.
5.8 Power Spectral Densities.
5.9 Estimation of the Power Spectral Density.
5.10 Statistical Properties of Speech Signals.
5.11 Statistical Properties of DFT Coefficients.
5.12 Optimal Estimation.
Bibliography.
6 Linear Prediction.
6.1 Vocal Tract Models and Short-Term Prediction.
6.2 Optimal Prediction Coefficients for Stationary Signals.
6.3 Predictor Adaptation.
6.4 Long-Term Prediction.
Bibliography.
7 Quantization.
7.1 Analog Samples and Digital Presentation.
7.2 Uniform Quantization.
7.3 Non-uniform Quantization.
7.4 Optimal Quantization.
7.5 Adaptive Quantization.
7.6 Vector Quantization.
7.6.1 Principle.
Bibliography.
8 Speech Coding.
8.1 Classification of Speech Coding Algorithms.
8.2 Model-Based Predictive Coding.
8.3 Differential Waveform Coding.
8.4 Parametric Coding.
8.5 Hybrid Coding.
8.6 Adaptive Post-Iterating.
Bibliography.
9 Error Concealment and Softbit Decoding.
9.1 Hardbit Source Decoding.
9.2 Conventional Error Concealment.
9.3 Softbits and L-Values.
9.4 Softbit Source Decoding (SD).
9.5 Application to Model Parameters.
9.6 Further Improvements.
Bibliography.
10 Bandwidth Extension of Speech Signals (BWE).
10.1 Narrowband versus Wideband Telephony.
10.2 Speech Coding with Integrated BWE.
10.3 BWE without Auxiliary Transmission.
Bibliography.
11 Single and Dual Channel Noise Reduction.
11.1 Introduction.
11.2 Linear MMSE Estimators.
11.3 Speech Enhancement in the DFT Domain.
11.4 Optimal Non-Linear Estimators.
11.5 Joint Optimum Detection and Estimation of Speech.
11.6 Computation of Likelihood Ratios.
11.7 Estimation of the A Priory Probability of Speech Presence.
11.8 VAD and Noise Estimation Techniques.
11.9 Dual-Channel Noise Reduction.

Bibliography.

12 Multi-Channel Noise Reduction.
12.1 Introduction.
12.2 Spatial Sampling of Sound Fields.
12.3 Beamforming.
12.4 Performance Measures and Spatial Aliasing.
12.5 Design of Fixed Beamformers.
12.6 Adaptive Beamformers.

Bibliography.

13 Acoustic Echo Control.
13.1 The Echo Control Problem.
13.2 Evaluation Criteria.
13.3 The Wiener Solution.
13.4 The LMS and NLMS Algorithm.
13.5 Convergence Analysis and Control of the LMS Algorithm.
13.6 Geometric Projection Interpretation of the NLMS Algorithm.
13.7 The A ne Projection Algorithm.
13.8 Least-Squares and Recursive Least-Squares Algorithms.
13.9 Block Processing and Frequency-Domain Adaptive Filters.
13.9.1 Block LMS Algorithm.
13.10 Additional Measures for Echo Control.
13.11 Stereophonic Acoustic Echo Control.

A Codec Standards.

B Speech Quality Assessment.

Bibliography.
Order by Post - print the order form below and send to

Research and Markets,
Guinness Centre,
Taylors Lane,
Dublin 8,
Ireland.
Fax Order Form
To place an order via fax simply print this form, fill in the information below and fax the completed form to 646-607-1907 (from USA) or +353-1-481-1716 (from Rest of World). If you have any questions please visit http://www.researchandmarkets.com/contact/

Order Information
Please verify that the product information is correct.

Product Name: Digital Speech Transmission. Enhancement, Coding and Error Concealment
Web Address: http://www.researchandmarkets.com/reports/2181255/
Office Code: SCLOPGUB

Product Format
Please select the product format and quantity you require:

Quantity
Hard Copy (Hard Back):
USD 134 + USD 28 Shipping/Handling

* Shipping/Handling is only charged once per order.

Contact Information
Please enter all the information below in BLOCK CAPITALS

Title: Mr □ Mrs □ Dr □ Miss □ Ms □ Prof □
First Name: __________________________ Last Name: __________________________
Email Address: * __________________________
Job Title: __________________________
Organisation: __________________________
Address: __________________________
City: __________________________
Postal / Zip Code: __________________________
Country: __________________________
Phone Number: __________________________
Fax Number: __________________________

* Please refrain from using free email accounts when ordering (e.g. Yahoo, Hotmail, AOL)
Payment Information

Please indicate the payment method you would like to use by selecting the appropriate box.

☐ Pay by credit card: You will receive an email with a link to a secure webpage to enter your credit card details.

☐ Pay by check: Please post the check, accompanied by this form, to:
Research and Markets,
Guinness Center,
Taylors Lane,
Dublin 8,
Ireland.

☐ Pay by wire transfer: Please transfer funds to:

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account number</td>
<td>833 130 83</td>
</tr>
<tr>
<td>Sort code</td>
<td>98-53-30</td>
</tr>
<tr>
<td>Swift code</td>
<td>ULSBIE2D</td>
</tr>
<tr>
<td>IBAN number</td>
<td>IE78ULSB9853308313083</td>
</tr>
<tr>
<td>Bank Address</td>
<td>Ulster Bank, 27-35 Main Street, Blackrock, Co. Dublin, Ireland.</td>
</tr>
</tbody>
</table>

If you have a Marketing Code please enter it below:

Marketing Code: __________________________

Please note that by ordering from Research and Markets you are agreeing to our Terms and Conditions at http://www.researchandmarkets.com/info/terms.asp

Please fax this form to:

(646) 607-1907 or (646) 964-6609 - From USA
+353-1-481-1716 or +353-1-653-1571 - From Rest of World