

ICASSP 2010 Paper Review Categories

1:00 Audio and Electroacoustics

- 1.1*: Room Acoustics and Acoustic System Modeling
- 1.2*: Transducers
- 1.3*: Loudspeaker and Microphone Array Signal Processing
- 1.4*: Active Noise Control
- 1.5*: Echo Cancellation
- 1.6*: Auditory Modeling and Hearing Aids
- 1.7*: Source Separation and Signal Enhancement
- 1.8*: Spatial and Multichannel Audio
- 1.9*: Audio Coding
- 1.10*: Audio Analysis and Synthesis
- 1.11*: Content-Based Audio Processing
- 1.12*: Audio for Multimedia
- 1.13*: Network Audio
- 1.14*: Audio Processing Systems
- 1.15*: Bioacoustics and Medical Acoustics
- 1.16*: Music Signal Processing

2:00 Bio Imaging and Signal Processing

- 2.1: Medical imaging
 - 2.1.1*: Image formation
 - 2.1.2*: Reconstruction and restoration
 - 2.1.3*: Computed tomography (CT, PET or SPECT)
 - 2.1.4*: Biomedical Imaging
 - 2.1.5*: Magnetic resonance imaging
 - 2.1.6*: Ultrasound imaging
- 2.2: Medical image analysis
 - 2.2.1*: Segmentation
 - 2.2.2*: Registration
 - 2.2.3*: Feature extraction and classification
- 2.3: Bioimaging and microscopy
 - 2.3.1*: Cellular and molecular imaging
 - 2.3.2*: Deconvolution and inverse problems
 - 2.3.3*: Segmentation and analysis
 - 2.3.4*: Tracking and motion analysis
- 2.4: Biomedical signal processing
 - 2.4.1*: Physiological signals (ECG, EEG, ...)
 - 2.4.2*: Detection and estimation
 - 2.4.3*: Feature extraction and classification
 - 2.4.4*: Multi-channel processing
- 2.5: Bioinformatics
 - 2.5.1*: Genomics and proteomics
 - 2.5.2*: Computational biology and biological networks

3:00 Image, Video, and Multidimensional Signal Processing

- 3.1: Image/Video Coding

- 3.1.1*: Still Image Coding
- 3.1.2*: Video Coding
- 3.1.3*: Stereoscopic and 3-D Coding
- 3.1.4*: Distributed Source Coding
- 3.1.5*: Image/Video Transmission
- 3.2: Image/Video Processing
 - 3.2.1*: Image Filtering
 - 3.2.2*: Restoration and Enhancement
 - 3.2.3*: Image Segmentation
 - 3.2.4*: Video Segmentation and Tracking
 - 3.2.5*: Morphological Processing
 - 3.2.6*: Stereoscopic and 3-D Processing
 - 3.2.7*: Feature Extraction and Analysis
 - 3.2.8*: Modeling
 - 3.2.9*: Biometrics
 - 3.2.10*: Interpolation and Super-resolution
 - 3.2.11*: Motion Detection and Estimation
- 3.3: Image Formation
 - 3.3.1*: Remote Sensing Imaging
 - 3.3.2*: Geophysical and Seismic Imaging
 - 3.3.3*: Optical Imaging
 - 3.3.4*: Synthetic-Natural Hybrid Image Systems
- 3.4: Image Scanning, Display, and Printing
 - 3.4.1*: Scanning and Sampling
 - 3.4.2*: Quantization and Halftoning
 - 3.4.3*: Color Reproduction
 - 3.4.4*: Image Representation and Rendering
 - 3.4.5*: Display and Printing Systems
 - 3.4.6*: Image Quality Assessment
- 3.5: Image/Video Storage, Retrieval
 - 3.5.1*: Image and Video Databases
 - 3.5.2*: Image Indexing and Retrieval
 - 3.5.3*: Video Indexing, Retrieval and Editing

4:00 Design and Implementation of Signal Processing Systems

- 4.1*: Algorithm and architecture co-optimization
- 4.2*: Compilers and tools for DSP implementation
- 4.3*: DSP algorithm implementation in hardware and software
- 4.4*: Low-power signal processing techniques and architectures
- 4.5*: Programmable and reconfigurable DSP architectures
- 4.6*: System-on-chip architectures for signal processing

5:00 Industry Technology Track

- 5.1: DSP Chips and Architectures
 - 5.1.1*: Mixed Signal Processing
 - 5.1.2*: Special-Purpose and FPGA DSPs
 - 5.1.3*: Host-Based Signal Processing

- 5.1.4*: Multiprocessor Architectures
- 5.2: DSP Tools and Rapid Prototyping
 - 5.2.1*: DSP Simulation Tools
 - 5.2.2*: Rapid Prototyping and languages
 - 5.2.3*: DSP Libraries
 - 5.2.4*: Operating Systems
- 5.3: Communication Technologies
 - 5.3.1*: Cellular and Satellite Telephony
 - 5.3.2*: Data Communications and Networking
 - 5.3.3*: Software-Defined Radios
 - 5.3.4*: Vocoders
 - 5.3.5*: Power Line Communication
 - 5.3.6*: RFID
- 5.4: Speech Processing Applications
 - 5.4.1*: Speaker Recognition
 - 5.4.2*: Speech Compression
 - 5.4.3*: Speech Enhancement
 - 5.4.4*: Speech Recognition
 - 5.4.5*: Speech Synthesis
- 5.5: Multimedia and DTV Technologies
 - 5.5.1*: DSP Implementations of Music, Speech, and Audio
 - 5.5.2*: Image and Video Applications
 - 5.5.3*: Standards and Format Conversions
 - 5.5.4*: Internet and Teleconferencing
- 5.6: Adaptive Interference Cancellation
 - 5.6.1*: Smart Antennas
 - 5.6.2*: Active Sound Reduction
 - Acoustic and Electrical Noise and Echo
 - 5.6.3*: Cancellation
 - 5.6.4*: Hands-Free Telephony
- 5.7: Automotive Applications
 - Intelligent Dashboards, Vehicles, and Highways
 - 5.7.1*: (IVHS)
 - 5.7.2*: Engine Management
 - 5.7.3*: Route Planning and Tracking
 - 5.7.4*: New Consumer Applications
- 5.8: Defense and Security Applications
 - 5.8.1*: Optical Correlation
 - 5.8.2*: Decluttering Target Identification and Tracking
 - DSP-Based Cryptography, Stenography, and
 - 5.8.3*: Watermarking
 - 5.8.4*: Radar and Sonar
- 5.9: Emerging DSP Applications
 - 5.9.1*: Biometrics
 - 5.9.2*: Biomedical
 - 5.9.3*: Power Systems and Motor Controls

- 5.9.4*: Machine Learning
- 5.10*: Other ITT Topics

6:00 Information Forensics and Security

- 6.1: Watermarking and Data Hiding
 - 6.1.1*: Robust Watermarking
 - 6.1.2*: Steganography and Steganalysis
 - 6.1.3*: Fingerprinting and Tracing
 - 6.1.4*: Theoretical models
- 6.2: Cryptography and Signal Processing
 - 6.2.1*: Signal Encryption and Decryption
 - 6.2.2*: Signal Hashing and Authentication Codes
- 6.3: Biometrics
 - 6.3.1*: Biometric Methods and Modalities
 - 6.3.2*: Biometric Security
 - 6.3.3*: Biometric Protocols
 - 6.3.4*: Theoretical Analysis
- 6.4: Forensic Analysis
 - 6.4.1*: Channel Identification

 - 6.4.2*: Detection and Identification of Anomalous Events

 - 6.4.3*: Acquisition and Validation of Forensic Evidence
- 6.5: Applications
 - 6.5.1*: Digital Rights Management
 - 6.5.2*: Content Identification
 - 6.5.3*: Surveillance
 - 6.5.4*: Architectures and Protocols

7:00 Machine Learning for Signal Processing

- 7.1*: Learning Theory and Modeling
- 7.2*: Bayesian Learning and Modeling
- 7.3*: Sequential learning; sequential decision methods
- 7.4*: Information-theoretic learning
- 7.5*: Neural network learning
- 7.6*: Graphical and kernel models
- 7.7*: Bounds on performance
- 7.8*: Blind Signal Separation and Independent Component
- 7.9*: Signal detection, Pattern Recognition and Classification
- 7.10*: Bioinformatics Applications
- 7.11*: Biomedical Applications and Neural Engineering
- 7.12*: Intelligent Multimedia and Web Processing
- 7.13*: Communications Applications
- 7.14*: Speech and Audio Processing Applications
- 7.15*: Image and Video Processing Applications
- 7.16*: Cognitive Information Processing
- 7.17*: Other Applications

8:00 Multimedia Signal Processing

- 8.1: Multimodal signal processing
 - Joint processing/presentation of audio-visual information
 - 8.1.1*: information
 - 8.1.2*: Synchronization of audio and visual data
 - Fusion/fission of sensor information or multimodal data
 - 8.1.3*: data
 - Integration of media, art, and multimedia technology
 - 8.1.4*: technology
- 8.2: Virtual reality and 3D imaging
 - 2D and 3D graphics/geometry coding and animation
 - 8.2.1*: animation
 - 8.2.2*: 3D audio and video processing
 - Virtual reality and mixed-reality in networked environments
 - 8.2.3*: environments
- 8.3: Multimedia communications and networking
 - 8.3.1*: Wireless and mobile multimedia communication
 - Media streaming, media content distribution, and storage
 - 8.3.2*: storage
 - 8.3.3*: Quality of service provisioning
 - 8.3.4*: Cross-layer design for multimedia communication
 - Overlay, peer-to-peer, and peer-assisted networking for multimedia
 - 8.3.5*: networking for multimedia
 - 8.3.6*: Home networking for multimedia
 - 8.3.7*: Location-aware multimedia computing
 - 8.3.8*: Multimedia sensor and ad hoc networks
 - Media compression and related standardization activities
 - 8.3.9*: activities
 - 8.3.10*: Multimedia watermarking
 - 8.3.11*: Distributed source and source-channel coding
- 8.4: Multimedia security and content protection
 - 8.4.1*: Data hiding
 - 8.4.2*: Authentication
 - 8.4.3*: Access control
 - 8.4.4*: Single and multi-media security
 - 8.4.5*: Multimedia forensics
 - Security applications of watermarking and fingerprinting
 - 8.4.6*: fingerprinting
- 8.5: Multimedia human-machine interface and interaction
 - 8.5.1*: Human perception modelling
 - 8.5.2*: Modeling of multimodal perception
 - 8.5.3*: Human-human and human-computer dialog
 - 8.5.4*: Multimodal interfaces
 - 8.5.5*: Brain-computer interfaces

- 8.6: Quality Assessment
 - 8.6.1*: Subjective visual quality assessment
 - 8.6.2*: Objective visual quality assessment
 - 8.6.3*: Subjective auditory quality assessment
 - 8.6.4*: Objective auditory quality assessment
 - 8.6.5*: Evaluation of user experience, cross-modal assessment
 - 8.6.6*: Standardization activities
- 8.7: Multimedia databases and digital libraries
 - 8.7.1*: Visual indexing, analysis and representation
 - 8.7.2*: Audio indexing, analysis and representation
 - 8.7.3*: Content-based and context-based information retrieval
 - 8.7.4*: Knowledge and semantics in media annotation and retrieval
 - 8.7.5*: Fingerprinting and duplicate detection
- 8.8: Multimedia computing systems and applications
 - 8.8.1*: Multimedia system design
 - 8.8.2*: Distributed multimedia systems
 - 8.8.3*: Entertainment and gaming
 - 8.8.4*: e-Health and telemedicine
 - 8.8.5*: IP video/web conferencing
 - 8.8.6*: e-learning
- 8.9: Hardware and software for multimedia systems
 - 8.9.1*: Multimedia hardware design
 - 8.9.2*: Real-time multimedia systems
 - 8.9.3*: Implementations on graphics processing units (GPUs)
 - 8.9.4*: Implementations on general-purpose processors, multimedia processors, DSPs, multi-core processors
 - 8.9.5*: Implementations in portable/wearable systems
 - 8.9.6*: Power-aware systems for multimedia
- 8.10: Haptic technology and interaction
 - 8.10.1*: Processing and rendering of haptic signals
 - 8.10.2*: Compression and transmission of haptic signals
 - 8.10.3*: Audio-visual-haptic environments
 - 8.10.4*: Multimedia applications using haptics
- 8.11: Bio-inspired multimedia systems and signal processing
 - 8.11.1*: Bio-inspired signal processing for multimedia
 - 8.11.2*: Multimodal signal fusion in humans and animals
 - 8.11.3*: Joint bio-inspired and conventional multimedia signal processing

- 9.1: Sensor Array Processing
 - 9.1.1*: Beamforming
 - 9.1.2*: Physics-based sensor array processing
 - 9.1.3*: Inverse methods
 - 9.1.4*: Array calibration methods
 - 9.1.5*: Synthetic aperture methods
 - 9.1.6*: Signal detection and parameter estimation
 - 9.1.7*: Direction-of-arrival estimation
 - 9.1.8*: Source localization, separation, classification, and tracking
 - 9.1.9*: Blind source separation and channel identification
- 9.2: Adaptive Array Signal Processing
 - 9.2.1*: Adaptive beamforming
 - 9.2.2*: Space-time adaptive processing
 - 9.2.3*: MIMO radar and waveform diversity
- 9.3: Multi-channel Signal Processing
 - 9.3.1*: Channel modelling and equalization
 - 9.3.2*: Multi-channel transceiver design
 - 9.3.3*: Sparsity structures in multichannel signal processing
 - 9.3.4*: Multi-channel processing with non-wave based sensors
- 9.4: Multi-antenna and Multi-channel Signal Processing for
 - 9.4.1*: MIMO systems and algorithms
 - 9.4.2*: Space-time coding and decoding algorithms
 - 9.4.3*: MIMO space-time code design and analysis
 - 9.4.4*: Multi-user MIMO networks
 - 9.4.5*: Array processing for wireless communications
 - 9.4.6*: Multi-antenna/multi-channel processing for cognitive radios
- 9.5: Sensor and Relay Networks
 - 9.5.1*: Sensor and relay network signal processing
 - 9.5.2*: Network beamforming and coding
 - 9.5.3*: Distributed and cooperative processing
 - 9.5.4*: Data fusion and decision fusion from multiple sensor types
- 9.6: Applications of Sensor Array and Multi-channel Signal
 - 9.6.1*: Radar array processing
 - 9.6.2*: Sonar array processing
 - 9.6.3*: Microphone array processing
 - 9.6.4*: Multi-channel imaging
 - 9.6.5*: Multi-channel biological and medical modelling and processing
 - 9.6.6*: Other applications of SAM signal processing

10.1*: Signal Processing Education

11:00 Signal Processing for Communications and Networking

11.1: Signal Transmission and Reception

Signal detection, estimation, separation and

11.1.1*: equalization

Channel modeling and estimation, training

11.1.2*: schemes

11.1.3*: Capacity and performance analysis/optimization

11.1.4*: Acquisition, synchronization and tracking

Signal representation, modulation, coding and

11.1.5*: compression

Joint source-channel coding and quantization,

11.1.6*: iterative decoding algorithms

11.2: Communication Systems and Applications

11.2.1*: Multi-carrier, OFDM, and DMT communication

Multi-rate, CDMA and spread spectrum

11.2.2*: communication

11.2.3*: Ultra wideband communication

Telephone networks, DSL and powerline

11.2.4*: communication

Applications involving signal processing for

11.2.5*: communication

11.3: MIMO Communications and Signal Processing

MIMO precoder/decoder design, receiver

11.3.1*: algorithms

11.3.2*: MIMO channel estimation and equalization

11.3.3*: MIMO capacity and performance

MIMO space-time code design, analysis and

11.3.4*: decoding algorithms

11.3.5*: MIMO multi-user and multi-access schemes

11.4: Communication and Sensing aspects of Sensor Networks,

11.4.1*: Distributed and collaborative signal processing

Distributed channel and source coding, information-

11.4.2*: theoretic studies

11.4.3*: Ad-hoc wireless networks

11.4.4*: Physical layer issues, cross-layer design

11.4.5*: Scheduling and queuing protocols

Power control, resource management, system level

11.4.6*: optimization

11.4.7*: Cognitive Radio and Dynamic Spectrum Access

12:00 Signal Processing Theory and Methods

12.1: Sampling and Reconstruction

12.1.1*: Sampling theory and methods

- 12.1.2*: Quantization
- 12.1.3*: Extrapolation and interpolation
Signal reconstruction, restoration and
- 12.1.4*: enhancement
- 12.1.5*: Multidimensional sampling and reconstruction
- 12.2: Signal and System Modeling, Representation and Estimation
 - 12.2.1*: System modeling
 - 12.2.2*: Signal and noise modeling
 - 12.2.3*: System identification and approximation
 - 12.2.4*: Multidimensional systems
 - 12.2.5*: Non-stationary signals and time-varying systems
 - 12.2.6*: Time-frequency and time-scale analysis
 - 12.2.7*: Blind and semi-blind source separation
- 12.3: Statistical Signal Processing
 - 12.3.1*: Detection and estimation theory and methods
 - 12.3.2*: Classification and pattern recognition
 - 12.3.3*: Cyclostationary signal analysis
Higher-order and fractional lower-order statistical
 - 12.3.4*: methods
 - 12.3.5*: Performance analysis and bounds
 - 12.3.6*: Spectrum estimation theory and methods
 - 12.3.7*: Robust methods
 - 12.3.8*: Independent component analysis
 - 12.3.9*: Monte-Carlo based signal processing methods
- 12.4: Adaptive Signal Processing
 - 12.4.1*: Adaptive filter analysis and design
 - 12.4.2*: Fast algorithms for adaptive filtering
Frequency-domain and transform-based adaptive
 - 12.4.3*: filtering
 - 12.4.4*: Sequential decision theory and methods
 - 12.4.5*: Performance analysis and bounds
 - 12.4.6*: Distributed and collaborative signal processing
- 12.5: Nonlinear Systems and Signal Processing
 - 12.5.1*: Median, rank-order and stack type filters
 - 12.5.2*: Non-Gaussian distribution filters
 - 12.5.3*: Nonlinear signal and system models
 - 12.5.4*: Nonlinear random process models
 - 12.5.5*: Nonlinear adaptive filters
- 12.6: Filter Design
 - 12.6.1*: Filter design criteria and optimization methods
 - 12.6.2*: Filter architectures
 - 12.6.3*: Performance analysis
- 12.7: Multirate Signal Processing
 - 12.7.1*: Multirate architectures
 - 12.7.2*: Filterbanks and wavelets

- 12.7.3*: Multirate processing and multiresolution methods
Hierarchical models and tree-structured signal processing
- 12.7.4*: processing

13:00 Speech Processing

- 13.1: Speech Production (SPE-SPRD)
 - 13.1.1*: Physical models of the vocal production system
 - 13.1.2*: Singing and properties of the musical voice
- 13.2: Speech Perception and Psychoacoustics (SPE-SPER)
 - 13.2.1*: Models of Speech Perception
 - 13.2.2*: Hearing and Psychoacoustics
 - 13.2.3*: Physiological models and applications thereof
 - 13.2.4*: Audiology applications
- 13.3: Speech Analysis (SPE-ANLS)
 - Spectral and other time-frequency analysis techniques
 - 13.3.1*: techniques
 - 13.3.2*: Distortion measures
 - 13.3.3*: Pitch/fundamental frequency analysis
 - 13.3.4*: Timing/duration/speaking rate analysis
 - 13.3.5*: Acoustic-phonetic features (e.g., formants etc)
Extraction of non-linguistic information (e.g., gender, emotion, etc)
 - 13.3.6*: gender, emotion, etc)
 - 13.3.7*: Voice quality/speech disorders
- 13.4: Speech Synthesis and Generation, including TTS (SPE-
 - 13.4.1*: Segmental-Level and/or concatenative synthesis
 - 13.4.2*: Signal Processing/Statistical Model for synthesis
 - 13.4.3*: Articulatory Synthesis
 - 13.4.4*: Parametric Synthesis
 - 13.4.5*: Prosody, Emotional, and Expressive Synthesis
 - 13.4.6*: Text-to-phoneme conversion
 - 13.4.7*: Voice Quality
 - 13.4.8*: Voice Transformation
 - 13.4.9*: Audio/Visual speech synthesis
 - 13.4.10*: Multilingual synthesis
 - 13.4.11*: Quality assessment/evaluation metrics in synthesis
 - 13.4.12*: Tools and data for speech synthesis
 - 13.4.13*: Text processing for speech synthesis (text normalization, syntactic and semantic analysis)

- 13.5: Speech Coding (SPE-CODI)
 - 13.5.1*: Narrow-band and wide-band Speech Coding
Theory and techniques for signal coding (e.g., waveform, transform)
 - 13.5.2*: Modulation and source/channel coding
 - 13.5.3*: Quantization and compression
 - 13.5.4*: Robust coding for noisy channels
 - 13.5.5*: Voice Over IP (VOIP)
 - 13.5.6*: Quality assessment/evaluation metrics (e.g., PESQ) in coding
- 13.6: Speech Enhancement (SPE-ENHA)
 - Control and reduction of channel noise (e.g., reverb, room response)
 - 13.6.1*: Perceptual enhancement of non-noisy speech
 - 13.6.2*: Speech enhancement for humans with hearing impairments
 - 13.6.3*: Non-acoustic microphones for enhancement
 - 13.6.4*: Bandwidth expansion
 - 13.6.5*: Noise Reduction
- 13.7: Acoustic Modeling for Automatic Speech Recognition (SPE-
 - 13.7.1*: Feature Extraction
 - 13.7.2*: Low-level feature modeling - Gaussians & beyond
 - 13.7.3*: Pronunciation modeling at the acoustic level
 - 13.7.4*: State clustering and novel state definitions
 - 13.7.5*: Prosody and other speech characteristics
 - 13.7.6*: Dialect, accent, and idiolect at the acoustic level
 - 13.7.7*: Discriminative Acoustic Training Methods for ASR
 - 13.7.8*: Articulatory and physiological modeling
 - 13.7.9*: Feature Transformation and Normalization
- 13.8: Robust Speech Recognition (SPE-ROBU)
 - Features specifically for robust ASR (noise, channel, etc)
 - 13.8.1*: Model/backend based robust ASR
 - 13.8.2*: Confidence measures and rejection
 - 13.8.3*: Speech Activity/End-point/Barge-in detection
 - 13.8.4*: Non-acoustic microphones for ASR
- 13.9: Speech Adaptation/Normalization (SPE-ADAP)
 - 13.9.1*: Speaker adaptation and normalization (e.g., VTLN)
 - 13.9.2*: Speaker adapted training methods
 - 13.9.3*: Environmental/Channel adaptation
 - 13.9.4*: Idiolect adaptation
 - 13.9.5*: Register and/or dialect adaptation
- 13.10: General Topics in Speech Recognition (SPE-GASR)

- Distributed Speech Recognition - Client/Server
 - 13.10.1*: methods
 - Alternative Statistical/Machine Learning Methods
 - 13.10.2*: (e.g., no HMMs)
 - 13.10.3*: Word spotting
 - Metadata (e.g., emotion, speaker, accent)
 - 13.10.4*: extraction from acoustics
 - New algorithms, computational strategies, data-
 - 13.10.5*: structures for ASR
 - Multi-modal (such as audio-visual) speech
 - 13.10.6*: recognition
 - 13.10.7*: Corpora, annotation, and other resources
 - 13.10.8*: Algorithm approximation methods in ASR
 - 13.10.9*: Structured classification approaches
- 13.11: Multilingual Recognition and Identification (SPE-MULT)
 - 13.11.1*: Language (LID) and dialect (DID) identification
 - 13.11.2*: Multilingual Speech recognition
 - 13.11.3*: Processing of non-native accents
- 13.12: Lexical Modeling and Access (SPE-LEXI)
 - 13.12.1*: Pronunciation modeling at the lexical level
 - 13.12.2*: Dialect, accent, and idiolect at the lexical level
 - 13.12.3*: Multilingual aspects (e.g., unit selection)
 - 13.12.4*: Automatic lexicon learning
- 13.13: Large Vocabulary Continuous Recognition/Search (SPE-
 - 13.13.1*: Decoding algorithms and implementation
 - 13.13.2*: Lattices
 - 13.13.3*: Multi-pass strategies
 - 13.13.4*: Miscellaneous Topics
- 13.14: Speaker Recognition and Characterization (SPE-SPKR)
 - Features and characteristics for speaker
 - 13.14.1*: recognition
 - 13.14.2*: Robustness to variable and degraded channels

- 13.14.3*: Verification, identification, segmentation, and clustering
- 13.14.4*: Speaker characterization and adaptation
- 13.14.5*: Speaker recognition with speech recognition
- 13.14.6*: Speaker confidence estimation
- 13.14.7*: Multimodal and multimedia human speaker recognition
- 13.14.8*: Corpora, annotation, evaluation, and other resources
- 13.14.9*: Higher-level knowledge in speaker recognition
- 13.14.10*: Speaker localization (space) (e.g., in meetings)
- 13.14.11*: Speaker diarization (time) (e.g., in meetings)
- 13.14.12*: Speaker clustering (e.g., in Broadcast news)
- 13.15: Resource constrained speech recognition (SPE-RCSR)
 - 13.15.1*: Low-power speech recognition
 - 13.15.2*: Reduced computation speech recognition
 - 13.15.3*: ASR techniques for highly portable/mobile devices

14:00 Spoken Language Processing

- 14.1: Spoken Language Understanding (SLP-UNDE)
 - 14.1.1*: Semantic classification
 - 14.1.2*: Entity extraction from speech
 - 14.1.3*: Spoken document summarization
 - 14.1.4*: Topic spotting and classification
 - 14.1.5*: Question/answering from speech
 - 14.1.6*: Paralinguistic (emotion, age, gender, rate, etc.) information
 - 14.1.7*: Nonlinguistic (meaning external to language) information, gestures, etc.
 - 14.1.8*: Detecting linguistic/discourse structure (e.g., disfluencies, sentence/topic boundaries, speech acts)
 - 14.1.9*: Relation to and interpretation of sign language
- 14.2: Human Spoken Language Acquisition, Development and Language acquisition, development, and learning
 - 14.2.1*: models
 - 14.2.2*: Computer aids for language learning

- Attributes and modeling techniques for assessment
 - 14.2.3*: of language fluency
 - 14.3: Spoken and Multimodal Dialog Systems and Applications
 - Spoken and multimodal dialog systems,
 - 14.3.1*: applications, and architectures
 - 14.3.2*: Stochastic Learning for dialog modeling
 - 14.3.3*: Response Generation
 - 14.3.4*: Technologies for the aged
 - 14.3.5*: Evaluation metrics and standards
 - Speech/voice-based human-computer interfaces
 - 14.3.6*: (HCI)
 - Speech HCI for individuals with impairments
 - 14.3.7*: (blindness, etc.) and universal access (UA)
 - 14.3.8*: Other applications
 - 14.4: Speech Data Mining (SLP-DM)
 - Analysis, Tools, Evaluations, and Applications for
 - 14.4.1*: mining spoken data
 - Speech data mining theory, algorithms, and
 - 14.4.2*: methods
 - 14.4.3*: Mining heterogeneous speech and multimedia data
 - 14.5: Speech Retrieval (SLP-IR)
 - 14.5.1*: Spoken term detection
 - 14.5.2*: Search/retrieval of speech documents
 - 14.5.3*: Voice search
 - 14.6: Machine Translation of Speech (SLP-SSMT)
 - 14.6.1*: Semi-automatic and data driven methods
 - 14.6.2*: Speech processing for MTS
 - 14.6.3*: Corpora, annotation, and other resources
 - 14.6.4*: Interlingua and transfer approaches
 - 14.6.5*: Integration of speech and linguistic processing
 - 14.6.6*: Machine transliteration for named entities
 - 14.6.7*: Evaluation metrics (e.g., BLEU)
 - 14.6.8*: Systems and applications for MTS
 - 14.7: Language Modeling, for Speech and SLP (SLP-LANG)
 - N-grams, their generalizations and smoothing
 - 14.7.1*: methods.
 - 14.7.2*: Language Model Adaptation
 - 14.7.3*: Grammar based language modeling
 - 14.7.4*: Maxent and feature based language modeling
 - 14.7.5*: Dialect, accent, and idiolect at the language level
 - 14.7.6*: Discriminative LM Training Methods
 - 14.7.7*: Other approaches to LMs
 - 14.7.8*: Structured classification approaches
 - 14.8: Spoken language resources and annotation (SLP-REAN)

14.8.1*: General corpora, annotation, and other resources