## 2017 Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC 2017)

Kuala Lumpur, Malaysia 12-15 December 2017

Pages 1-595



**IEEE Catalog Number: ISBN:** 

CFP1714U-POD 978-1-5386-1543-0

## Copyright © 2017 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

 IEEE Catalog Number:
 CFP1714U-POD

 ISBN (Print-On-Demand):
 978-1-5386-1543-0

 ISBN (Online):
 978-1-5386-1542-3

#### **Additional Copies of This Publication Are Available From:**

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400 Fax: (845) 758-2633

E-mail: curran@proceedings.com Web: www.proceedings.com



# Ninth Asia-Pacific Signal and Information Processing Association Annual Summit and Conference

## **APSIPA ASC 2017**

### **Table of Contents**

Welcome Message from General Co-Chairs

APSIPA 2017 Organizing Committee

**Sponsors** 

Keynotes

**Tutorials** 

Overview Session

**Education Forum** 

Industry Forum

Session	Wa-01	-	Recent	Advances	in	Intelligent	Audio
Processi	ng						

rocessing	
A Segmental DNN/i-vector Approach for Digit-Prompted Speaker Verification	1
Raw Waveform-based Speech Enhancement by Fully Convolutional Networks	6
Generalized Atom and Dictionary Design and Compressive Sensing for Vocal Signal Expansion  Jian-Jiun Ding, Shiang-Chih Hua, Ronald Y. Chang, and Yih-Cherng Lee	13
Acoustic Scene Classification Using Self-Determination Convolutional Neural Network	19
Prediction Techniques for Wavelet Based 1-D Signal Compression	23

Session WA-02 - Signal processing for measurement and
Internet-of-Things (IoT) applications
An Empirical Study on Performance Optimization at District Cooling Plant of Universiti Teknologi PETRONAS27
Zhang Xiaoming, Hidetaka Aoki, Akiko Sato and Mohd Amin Abd Majid
Sequential Decomposition of 2D Apparent Motion Fields Based on Low-Rank and Sparse Approximation.33  Tomoya Sakai, Shun Ogawa and Hiroki Kuhara
Classifying Road Surface Conditions Using Vibration Signals
Fast High-Quality Three-Dimensional Reconstruction from Compressive Observation of Phased Array Weather Radar
Ryosuke Kawami, Hidetomo Kataoka, Daichi Kitahara, Akira Hirabayashi, Takashi Ijiri, Shigeharu Shimamura, Hiroshi Kikuchi, and Tomoo Ushio
Graph Reduction Method Using Localization Operator and Its Application to Pyramid Transform50  Akie Sakiyama and Yuichi Tanaka
Session WA-03 - Towards Human-Robot Collaboration:
Enabling Technologies, Interfaces, Learning and Interaction
(Part 1)
Automatic Object Searching by a Mobile Robotwith Single RGB-D Camera
Investigation on the Roles of Human and Robot in Collaborative Storytelling
Sentiment Analysis in Indonesian and French by SentiSAIL
An Integrated Framework for Multimodal Human-Robot Interaction
When industrial robots become social: on the design and evaluation of a multimodal interface for welding Robots
Session WA-04 - Recent Developments in Theory and
Applications of Fractional and Sparse Signal Processing (Part
1)
Spread Spectrum Compressed Sensing Magnetic Resonance Imaging via Fractional Fourier Transform90 Xiaozhi-Zhang, Ya Li, Bingo Wing -Kuen Ling, Chao Song and Kok Lay Teo
Nonuniform sampling theorems for random signals in the offset linear canonical transform domain94  Yi-Ping Bao, Yan-Na Zhang, Yu-E Song, Bing-Zhao Li and Pei Dang

Convolution theorem and Wigner-Ville distribution
The Fractional Fourier Transform on Graphs
Digital Computation of Fractional Fourier and Linear Canonical Transforms and Sparse Image Representation
Session WA-05 - Recent Topics on Active Control of Sound (Part 1)
Maximum A Posteriori Adjustment of Adaptive Transversal Filters in Active Noise Control
Understanding Multiple-Input Multiple-Output Active Noise Control from a Perspective of Sampling and Reconstruction
Chuang Shi, Huiyong Li, Dongyuan Shi, Bhan Lam, and Woon-Seng Gan
Synchronized Amplitude-and-Frequency Modulation for a Parametric Loudspeaker
Statistical-mechanical analysis of the FXLMS algorithm for multiple-channel active noise control136  Tomoki Murata, Yoshinobu Kajikawa, and Seiji Miyoshi
Active Noise Control for Muffler
Session WA-06 - Speech enhancement and segmentation
based on CASA and machine learning (Part 1)
Speech Enhancement based on Binaural Cues
Codebook-driven speech enhancement using DNN and harmonic emphasis
A Maximum Likelihood Approach to Deep Neural Network Based Speech Dereverberation155  Xin Wang, Jun Du and Yannan Wang
Speech Separation By Cost-Sensitive Deep Learning
Using Optimal Ratio Mask as Training Target for Supervised Speech Separation
Session WA-07 - Advanced Technology for End-to-End Speech
Processing
Representing Raw Linguistic Information in Chinese Text-to-Speech System

An End-to-End Neural Network Approach to Story Segmentation	171
Deep Speaker Verification: Do We Need End to End?	177
Non-native speech conversion with consistency-aware recursive network and generative adversarial network	
End-to-End Speech Emotion Recognition Using Multi-Scale Convolution Network	189
Session WA-08 - Advances in Multimedia Security a	and
Forensic	
Speech Watermarking Scheme Based on Singular-Spectrum Analysis for Tampering Detection and	102
Identification	193
Integrated Algorithm for Block-Permutation-Based Encryption with Reversible Data Hiding	203
Redesigning Data Hiding: Interpolation-based Scrambling-Embedding Method	209
Rewritable Data Insertion in Encrypted JPEG using Coefficient Prediction Method	214
Recent Advances in Biometric Security: A Case Study of Liveness Detection in Face Recognition  Koichi Ito, Takehisa Okano and Takafumi Aoki	220
Poster Session 1 - Digital Signal, Image, and Video Process	ing
Processing	
A New Bilateral Filter for Post-removing the Noise of Synthesis View in 3D Video	228
A New Active Contour Model Based on Complexity of Textures for Segmentation of Natural Image  Hongsheng Liu, Baozhu Guo, Zhizhong Fu, Xiaofeng Li	232
Subpixel Mapping of Hyperspectral Images with Hybrid Endmember Library and Optimized Abundances	237
A Hyperspectral and Multispectral Image Fusion Using Local Spatial-Spectral Dictionary Pair	242
A Fast Non-Convex Regularizer for Low Rank Matrix Completion	247
Identifying and Filling Occlusion Holes on Planar Surfaces for 3-D Scene Editing	251

Initial Depth Estimation using EPIs and Structure Tensor
Panchromatic and Multi-spectral Image Fusion Method Based on Two-step Sparse Representation and Wavelet Transform259
Guiqing He, Siyuan Xing, Dandan Dong and Ximei Zhao
Pseudo Multi-Exposure Fusion Using a Single Image263 Yuma Kinoshita, Taichi Yoshida, Sayaka Shiota and Hitoshi Kiya
Multi-layer Background Sprite Model for 2D-to- 3D Video Conversion
Image Ordinal Estimation: Classification and Regression Benefit Each Other275  Chao Zhang, Ce Zhu, Yipeng Liu, Hongdiao Wen and Zhengtao Wang
Dictionary design and disparity interpolation on distributed compressed sensing for light field image279 Yusaku Akiyoshi, Taichi Sumi, and Yoshimitsu Kuroki
Digital Hologram Data Representation Method
Image Fusion Algorithm Based on Gradient Similarity Filter
Pose-Invariant Kinematic Features for Action Recognition
Salient Object Detection Using Array Images
Accurate Subset Selection for Pose Estimation from Uncertain Points and Lines
A Real Time Micro-expression Detection System with LBP-TOP on a Many-core Processor309  Xin Rong Soh, Vishnu Monn Baskaran, Adamu Muhammad Buhari, Raphael CW. Phan
A Summary of Blind Guiding Methods Converting Images to Sounds
Sliced Voxel Representations with LSTM and CNN for 3D Shape Recognition320  Ryo Miyagi and Masaki Aono
Localization of Harmonic Source Using a Single Moving Sensor of Known Trajectory324  Yi Yang Ang, Nam Nguyen, Joni Polili Lie and Woon Seng Gan
Grid-free Compressive Beamforming Using a Single Moving Sensor of Known Trajectory329  Yi Yang Ang, Nam Nguyen, Joni Polili Lie and Woon Seng Gan
Understanding the Effect of Cannabis Abuse on the ANS and Cardiac Physiology of the Indian Women Paddy-field Workers Using RR Interval and ECG Signal Analyses
Robust Voice Activity Detection Based on LSTM Recurrent Neural Networks and Modulation Spectrum342  Phuttapong Sertsi, Surasak Boonkla, Vataya Chunwijitra, Nattapong Kurpukdee and Chai Wutiwiwatchai

Music Thumbnailing via Neural Attention Modeling of Music Emotion
Session WP-01 – Overview Session 1
Augmented Visualization: Observing as Desired351 Shohei Mori and Hideo Saito
QoE-estimation models for video streaming services357  Kazuhisa Yamagishi
Trends in efficient representation of 3D point clouds
Session WP-02 - Recent Advances in Signal Processing
Application with Internet of Things (IoT) and Industrial IoT
(Industry 4.0)
Time-Domain Subsampling and Reconstruction for Microphone Array370  Yohei Kawaguchi, Ryoichi Takashima, Takashi Endo, and Masahito Togami
A Study on Enhanced Educational Platform with Adaptive Sensing Devices using IoT Features375  Yiqi Tew, Tiong Yew Tang and Yoon Ket Lee
Real Time Image Processing Based Obstacle Avoidance and Navigation System for Autonomous  Wheelchair Application
Automated Classroom Monitoring With Connected Visioning System
Techniques for Overheating Detection and Sensor Allocation in a Real Dual-Core Processor394  Xin Li, Xueting Wei, Wei Zhou and Zhemin Duan
Session WP-03 - Towards Human-Robot Collaboration:
Enabling Technologies, Interfaces, Learning and Interaction
(Part 2)
A perception system for robot arms to convey objects to in-car passengers
Motion Planning of a 6-Dofs Robot Arm for Bandaging Nursing Task
Locomotion Control of a Serpentine Crawling Robot Inspired by Central Pattern Generators414  Jiadong Wang, Wenjuan Ouyang, Wenchao Gao and Qinyuan Ren
Towards Event-Based MCTS for Autonomous Cars
Analysis of Efficient Multimodal Features for Estimating User's Willingness to Talk: Comparison of Human-Machine and Human-Human Dialog

Session WP-04 - Recent developments in theory and
applications of fractional and sparse signal processing (Part 2)
Sparse-based Disturbance Cancellation Approach for Passive Radar
An improved orthogonal matching pursuit based on randomly enhanced adaptive subspace pursuit437  Juan Zhao and Xia Bai
Residual Drum Sound Estimation for RPCA Singing Voice Extraction
Background Subtraction via Truncated Nuclear Norm Minimization
Sub-Nyquist Non-Uniform Sampling for Low-Cost Sound Monitoring
Appearance-based Multiple Fish Tracking for Collective Motion Analysis
Session WP-05 - Recent Topics on Active Control of Sound
(Part 2)
Psychoacoustic Subband Active Noise Control Algorithm
Effectiveness of Headrest ANC System with Virtual Sensing Technique for Factory Noise
Effect of the Audio Amplifier's Distortion on Feedforward Active Noise Control
A Frequency-Domain Adaptive Feedback Cancellation Algorithm Based on Convex Combination474  Caixia Lu, Feiran Yang and Jun Yang
Abnormal sound detection by two microphones using virtual microphone technique
Session WP-06 - Speech enhancement and segmentation
based on CASA and machine learning (Part 2)
Signal Power Estimation Based on Convex Optimization for Speech Enhancement
LSTM-Based Iterative Mask Estimation and Post-Processing for Multi-Channel Speech Enhancement488 Yan-Hui Tu, Jun Du, Lei Sun, and Chin-Hui Lee
A New Data-driven Band-weighting Function for Predicting the Intelligibility of  Noise-suppressed Speech

Speaker Recognition with Cough, Laugh and "Wei"	.497
Robust Children and Adults Speech Identification and Confidence Measure Based on DNN Posteriorgram	.502
Session WP-07 - Recent Advances in Video Coding a	nd
Transmission	
Visual Attention Guided Eye Movements for 360 Degree Images	.506
Random Aliasing Modulation with Decision-Directed Demodulation	.512
Enhancing Wedgelet-based Depth Modeling in 3D-HEVC	.516
A New Intra Prediction Method Based on Consistent Luminance Changes	.520
Collagen Image Compression Using the JPEG-based Predictive Lossless Coding Scheme	.524
Session WP-08 – Computer Vision	
Micro-expression Recognition using Apex Frame with Phase Information	.534
Detection of Meaningful Line Segment Configurations	.538
Disparity Map Refinement Method Using Coarse-to-Fine Image Segmentation	.542
Local Patch Descriptor Using Deep Convolutional Generative Adversarial Network for Loop Closure Detection in SLAM	.546
Dong-Won Shin and Yo-Sung Ho	
Exploring Confusing Scene Classes for the Places Dataset: Insights and Solutions	.550
Poster Session 2 - Voice/Audio and Language Processing	
On the Convergence of INCA Algorithm	.559
Combining Evidences from Detection Sources for Query-by-Example Spoken Term Detection	.563
Compressed High Dimensional Features for Speaker Spoofing Detection	.569

Importance of Non-Uniform Prosody Modification for Speech Recognition in Emotion Conditions573  V. V. Vidyadhara Raju, Hari Krishna Vydana, Suryakanth V Gangashetty, and Anil Kumar Vuppala
Perceptual Evaluation of Singing Quality577  Chitralekha Gupta, Haizhou Li and Ye Wang
Experimental study on source-filter interaction using physical model of the vocal folds
Fast Locally Linear Embedding Algorithm for Exemplar-based Voice Conversion
DNN-based Feature Transformation for Speech Recognition Using Throat Microphone596  Shengke Lin, Takashi Tsunakawa, Masafumi Nishida, Masafumi Nishimura
Robust i-vector extraction tightly coupled with voice activity detection using deep neural networks600  Hitoshi Yamamoto, Koji Okabe, Takafumi Koshinaka
Plastic multi-resolution auditory model based neural network for speech enhancement605  Chen-Yen Lai, Yu-Wen Lo, Yih-Liang Shen, and Tai-Shih Chi
Electrolaryngeal Speech Modification towards Singing Aid System for Laryngectomees610  Kazuho Morikawa and Tomoki Toda
Topic Classification Based on Distributed Document Representation and Latent Topic Information614  Peixin Chen, Wu Guo, Qingnan Wang and Yan Song
Exploiting Imbalanced Textual and Acoustic Data for Training Prosodically-enhanced RNNLMs618  Michael Hentschel, Atsunori Ogawa, Marc Delcroix, Tomohiro Nakatani and Yuji Matsumoto
Feedforward Sequential Memory Networks based Encoder-Decoder Model for Machine Translation622  Junfeng Hou, Shiliang Zhang, Lirong Dai and Hui Jiang
A Study of High Level Tone in Standard Chinese Produced by Prelingually Deaf Adults626  Yu Chen, Yanting Chen, Hua Lin, Jie Hou, Yutong Xing and Jianwu Dang
Energy Distribution Analysis and Nonlinear Dynamical Analysis of Phonation in Patients with Parkinson's Disease
A Study on Landmark Detection Based on CTC and Its Application to Pronunciation Error Detection636  Chuanying Niu, Jinsong Zhang, Xuesong Yang and Yanlu Xie
Investigating Siamese LSTM Networks for Text Categorization
The Acoustic Characteristics of Tone 3 in Standard Chinese Produced by Prelingually Deaf Adults
Dynamic Boundary Detection for Speech Translation651  Nina Zhou, Xuancong Wang and AiTi Aw

# Session TA-01: Artificial Intelligence Approaches to Visual Understanding

FasterMDNet: Learning Model Adaptation by RNN in Tracking-by-Detection based Visual Tracking657 Hung-Wei Hsu, Jian-Jiun Ding
Efficient CTU-based Intra Frame Coding for HEVC Based on Deep Learning
Multimodal Decomposition for Enhanced Subtle Emotion Recognition
Enhanced Block Truncation Coding Image using Digital Multitone Screen
Detection of Sculpted Faces on Building Facades
Session TA-02: Recent Advances in Deep Learning with
Applications (Part 1)
A Deep Learning Approach to Drone Monitoring
Stop Line Detection and Distance Measurement for Road Intersection based on  Deep Learning Neural Network
Future Trend of Deep Learning Frameworks - From the perspective of Big Data analytics and HPC696  Takuya Araki and Yuichi Nakamura
Speech Emotion Recognition Based on Multi-Task Learning Using a Convolutional Neural Network704 Nam Kyun Kim, Jiwon Lee, Hun Kyu Ha, Geon Woo Lee, Jung Hyuk Lee and Hong Kook Kim
Robust Template Matching Using Scale-Adaptive Deep Convolutional Features
Session TA-03: Recent Progress on Human Computer/Machine
Interface (HCI/HMI) and its Applications
Development of a multi-modal personal authentication interface
A Drag-and-Drop Type Human Computer Interaction Technique Based on Electrooculogram716 Shohei Ogai and Toshihisa Tanaka
Hybrid EEG-NIRS Brain–Computer Interface Under Eyes-Closed Condition
Simultaneous Bio-signal Measurement System for Multiple Users - Development and Validation724  Sunghan Lee, Hohyun Cho and Sung Chan Jun

Voichap: a standalone real-time voice change application on iOS platform
Session TA-04: Multilingual Speech and Language Processing
for Minority Languages (Part 1)
Free Linguistic and Speech Resources for Tibetan
A Multilingual Language Processing Tool for Uyghur, Kazak and Kirghiz737  Mijit Ablimit, Sardar Parhat, Askar Hamdulla and Thomas Fang Zheng
Language Resource Construction for Mongolian741 Shipeng Xu, Hongzhi Yu, Thomas Fang Zheng, Guanyu Li and Gegeentana
A Free Kazakh Speech Database and a Speech Recognition Baseline745  Ying Shi, Askar Hamdulla, Zhiyuan Tang, Dong Wang and Thomas Fang Zheng
AP17-OLR Challenge: Data, Plan, and Baseline
Session TA-05: Use of Signal/Image Processing Techniques
for Computational Biology and Medical Applications (Part 1)
Portable Vision Screenings System
Compressing Population DNA Sequences Using Multiple Reference Sequences
Lung Sound Classification based on Hilbert-Huang Transform Features and Multilayer Perceptron Network
Automatic Detection of Circulating Tumor Cells based on Microscopic Images
A Markerless Visual-motor Tracking System for Behavior Monitoring in DCD Assessment
Session TA-06: New Perspectives in Signal Processing for
Hearing Devices: Combining Neural and Psychophysical
Factors
Perceptual Roles of Temporal and Segmentation Cues in Single-channel  Noise Reduction Processing
Improving speech intelligibility for bilateral cochlear implant users using Weiner filters and its impact on cognitive load

Electrically-evoked frequestrainstem responses (E. Jing Chen, Zhen Fu,	ABRs) in gui	inea pig	s	,				.793
Objective Neurophysiolo Hearing-Impaired Listen Rebecca E. Millman	ers							.803
A Deep Learning based Recipients in the Presence Syu-Siang Wang, Yo	ce of Compe	eting Sp	eech Noise					
Session TA-07	: Signa	l Pro	cessing	Methods ar	nd Al	lgor	ithms	for
Next Generati	on Com	nmur	nications	Systems				
Resource Allocation and Chih-Chiang Chen,						S		.813
MSE-Optimized CP-Base Tzu-Chiao Lin and S			in OFDM Syste	ms over Multipath C	Channe	ls		.818
Successive MMSE Grou under Pilot Contaminatio YW. Peter Hong, A	n			•			•	.823
Trellis Coded Generalize Syu-Siang Long, Pe								.832
Low-Complexity Zero-Fo Chia-Yang Mei and			rge-scale MIM	O-OFDM systems .				.838
Session TA-08	: Multir	medi	a Securi	ty and Fore	nsic	s (P	art 1)	
A new detector for JPEG Yanhong Wu, Xiaolo			•					.842
Block-DCT Based Altera with Superior Localizatio Omer Hemida, Yaon	n							.846
Robust Image Identificat Double-Compressed JPI Kenta lida and Hitos	EG Images.							.852
Image Manipulation on S Tatsuya Chuman, Ke			• •	ompression System	ıs			.858
Detection and Classificate Liuying Sun, Anthon				•				.864
Poster Sess	ion 3	3:	Signal	Processing	g -	+	Wirele	SS
Communicatio	n and I	Netw	orking/					

Wavelet Scattering Transform for Variability Reduction in Cortical Potentials Evoked by Pitch Matched Electroacoustic Stimulation in Unilateral Cochlear Implant Patients	N/A
On the Selection and Design of Filter Banks in Normalised Subband Adaptive Filters (NSAF)	877
Between Homomorphic Signal Processing and Deep Neural Networks: Constructing Deep Algorithm for Polyphonic Music Transcription	
Array shape calibration using near field pilot sources with unknown distance	892
Density-based Multi-Manifold ISOMAP for Data Classification	897
Doubly Adaptive Kernel Filtering	904
Active Enumeration of Local Minima for IIR Filter Design Using PSO	910
A Fairness Aware and Resource Reuse Algorithm for LTE Layered Video Multicast Service	918
A study on Quantitative Computation for Prosodic Strength of Mandarin Speech	926
Joint Estimation of Signal and Mutual Coupling Parameters Based on Spatially Spread Polarization Sensitive Array	931
Min-Max IIR Filter Design for Feedback Quantizers	938
Diffusion LMS Using Consensus Propagation	943
Fast electromagnetic tracking algorithms with coplanar transmitting coil array	N/A
Enhanced Array Manifold Matrices for L-Shaped Microphone Array-based 2-D DOA Estimation  Bandhit Suksiri and Masahiro Fukumoto	955
Swallowing function evaluation using deep-learning-based acoustic signal processing	961
A fast and energy efficient FPGA-based system for real-time object tracking	965
Optimal Kernel in Kernel Regression Problems with Autocorrelation Prior	969
An Efficient Method for Adapting Step-size Parameters of Primal-dual Hybrid Gradient Method in Application to Total Variation Regularization	973

F0 Estimation Using Empirical Mode Decomposition and Complex Cepstrum Analysis
in Reverberant Environments
Construction of Semi-Markov Ergodic Maps with Selectable Spectral Characteristics via the Solution of the Inverse Eigenvalue Problem
A New Pool Control Method for Boolean Compressed Sensing Based Adaptive Group Testing994 Yujia Lu and Kazunori Hayashi
Defence Mechanisms Evaluation against RA Flood Attacks for Linux-Victim Node
Session TP-01: Overview Session 2
Automatic Meeting Transcription System for the Japanese Parliament (Diet)
Common Visual Pattern Discovery and Search
Online Unsupervised Kernel Learning Algorithms
Session TP-02: Recent Advances in Deep Learning with
Applications (Part 2)
Multi-Query Image Retrieval using CNN and SIFT Features
Understanding Multi-layer Perceptrons on Spatial Image Steganalysis Features
Cross-lingual Speaker Verification with Deep Feature Learning
Accelerating Deep Learning by Binarized Hardware
Understanding CNN via Deep Features Analysis
Session TP-03: Intelligent Autonomous Driving Systems and
IoT driven Applications
A Multiple-Lane Vehicle Tracking Method for Forward Collision Warning System Applications
Highly-Distributed Sensor Processing using IoT for Critical Infrastructure Monitoring

Automatic Vehicle Classification using Center Strengthened Convolutional Neural Network
Zynq-based Full HD Around View Monitor System for Intelligent Vehicle
Wide Angle Virtual View Synthesis Using Two-by-Two Kinect V2
Session TP-04: Multilingual Speech and Language Processing
for Minority Languages (Part 2)
Memory-augmented Chinese-Uyghur Neural Machine Translation
Development of Under-Resourced Bahasa Indonesia Speech Corpus
Generalization of Thai Tone Contour in HMM-Based Speech Synthesis
The Longitudinal Development of Focus Duration of Korean Chinese Learners
Patterns of Vowels in Uyghur Tri-syllabic Words
Session TP-05: Use of Signal/Image Processing Techniques
for Computational Biology and Medical Applications (Part 2)
Correlation Between Different DNA Period-3 Signals: An Analytical Study for Exons Prediction1123  Ismail M. El-Badawy, Ashraf M. Aziz, Zaid Omar and M.B. Malarvili
Comparison Analysis of ICA versus MCA-KSVD Blind Source Separation on Task-related fMRI Data1129  Nam H. Le, Khang N. Nguyen and Hien M. Nguyen
Toward effective noise reduction for sub-Nyquist high-frame-rate MRI techniques with deep learning1136 Yudai Suzuki, Keigo Kawaji, Amit R.Patel, Satoshi Tamura and Satoru Hayamizu
Compressed Sensing Reconstruction of MR Phase-varied Images using Multi-scale  Complex Sparsifying Transform
Distinction between Healthy Individuals and Patients with Confident Abnormal Respiration
Session TP-06: Learning Approaches and Video Scene
Restoration
Light Field Scene Flow With Occlusion Regularization
Single Image Superresolution by Multiple Geometrical Regressors

Efficient Edge-Oriented Based Image Interpolation Algorithm for Non-Integer Scaling Factor
Image Super-Resolution Based on Error Compensation with Convolutional Neural Network1160 Wei-Ting Lu and Chien-Wei Lin and Chih-Hung Kuo and Ying-Chan Tung
Exemplar-Based Image Inpainting Based on Pixel Inhomogeneity Factor
Session TP-07: Image Processing
A Parallel Computation Algorithm for Super-Resolution Methods Using Convolutional Neural Networks
Infrared and Visible Image Fusion Based on Innovation Feature Simultaneous Decomposition1174  Guiqing He, Dandan Dong, Siyuan Xing and Ximei Zhao
Joint Bilateral based Image Denoising using Multi-sized 2D Hard Threshold
Multi-focus Image Fusion Using Gaussian Filter and Dynamic Programming
Natural Scene Statistics Based Publication Classification Algorithm Using Convolutional Neural Network
Session TP-08: Multimedia Security and Forensics (Part 2)
Data Embedding In Scalable Coded Video
Investigating the use of Scattering Coefficients for Replay Attack Detection
Study on method for protecting speech privacy by actively controlling speech transmission index in simulated room
Reversible Data Hiding for Compression-friendly Image Encryption Method
Multi-Channel Neural Network for Steganalysis
Poster Session 4: Machine Learning For Speech And
Language + For Image / Video
Tibetan-Mandarin Bilingual Speech Recognition Based on End-to-End Framework
Learning the Number of Nodes in DNNs with Activation Mask

Data Augmentation and Feature Extraction using Variational Autoencoder for Acoustic Modeling1222 Hiromitsu Nishizaki
End-to-end Speech Recognition for Languages with Ideographic Characters
Multimodal Speech Recognition Using Mouth Images from Depth Camera
Deep Learning-Based Speaking Rate-Dependent Hierarchical Prosodic Model for Mandarin TTS1237 Yen-Ting Lin and Chen-Yu Chiang
Automatic Identification of Pathological Voice Quality Based on the GRBAS Categorization
Selecting Type of Response for Chat-like Spoken Dialogue Systems Based on Acoustic Features of User Utterances
An Investigation to Transplant Emotional Expressions in DNN-based TTS Synthesis
Voice conversion based on deep neural networks for time-variant linear transformations
Exploiting end of sentences and speaker alternations in language modeling for multiparty conversations
Word Level Prosody Prediction Using Large Audiobook Dataset
Deep Acoustic-to-Articulatory Inversion Mapping with Latent Trajectory Modeling
CNN-based Bottleneck Feature for Noise Robust Query-by-Example Spoken Term Detection1278  Hyungjun Lim, Younggwan Kim, Yoonhoe Kim and Hoirin Kim
Age/Gender Classification with Whole-Component Convolutional Neural Networks (WC-CNN)1282 Chun-Ting Huang, Yueru Chen, Ruiyuan Lin and CC. Jay Kuo
Multi-Scale Salient Object Detection with Pyramid Spatial Pooling
An Effective Segmentation Algorithm of Apple Watercore Disease Region Using Fully Convolutional Neural Networks
Session FA-01: Advanced Signal Processing and Machine
Learning for Audio and Speech Applications (Part 1)
Utilizing Neural Network and Critical Band Processing for Speech Enhancement

Modulation spectrum- speech synthesis usir Shinnosuke Taka	ng FFT spectra					1308
Music Chord Recogni Takeshi Hori, Kaz	tion From Audio Dat zuyuki Nakamura ar	-		coder-decoder L	STMs	1312
Online Sound Structu Keisuke Imoto, N	re Analysis Based o Jobutaka Ono, Masa				Sequences	1316
Session FA-0	)2: Signal pr	ocess	sing and a	artificial i	ntelligenc	e for
multimedias	surveillance	<b>;</b>				
Low-Resource Spoke Distinctive Feature Th						1322
-	Boon Pang Lim, \son, Wenda Chen, \		_	•••		
Sound sensing using Sunao Hara, Asa	smartphones as a c ko Hatakeyama, Sh					1328
An Investigation of Re Akira Tamamori,	ecurrent Neural Netw Tomoki Hayashi, To		•	-	ulti-modal Signa	ıls1334
-	ng System and Its Fie u, Masahiro Tani, Ta ma, Yuzo Senda an	akahiro T	oizumi, Nariset			
Convolutional Neural Tin Lay Nwe, Tra	Network with Multi-7 n Huy Dat and Bin I		rning Scheme fo	r Acoustic Scen	e Classification	1347
Session FA-	03: Affect	and	Emotion	Processi	ng in Hu	man-
Machine Inte	eraction					
Speech Emotion Reco	ognition via Ensemb exian Zou and Dong	-				1351
Emotion Recognition Expressing Reactive Yuanchao Li, Ca and Tatsuya Kaw	Emotion by Humand rlos Toshinori Ishi,	oid Robot				
Mandarin Electrolaryr Non-negative Matrix Ming Li, Luting W						1360
On the Construction of Movie Dialogue Data Rafael E. Banchs						1364
Facial Action Recogni Wan Ding, Dong-	ition using Very Dee Yan Huang, Zhuo C				Distribution	1368

Session FA-04: Advanced topics in linear and nonlinear adaptive signal and information processing in adverse environments

A Combined Variable Step Size Strategy for Two Microphones Acoustic Feedback Cancellation using Proportionate Algorithms
A Fast Affine Projection Algorithm Based on a Modified Toeplitz Matrix
Impulsive Noise Suppression Using Interpolated Zero Phase Signal
Binaural Beamforming with Spatial Cues Preservation for Hearing Aids in Real-life Complex Acoustic Environments
Application of Mean-shift Clustering for Removing Flux Trapping Noise from Geomagnetic Field Signals Measured using HTS-SQUID Magnetometers
Session FA-05: Bioinformatics and Applications
Reduced Contact Lifting of Latent Fingerprint
Two-Dimensional Winner-Takes-All Hashing in Template Protection based on Fingerprint and Voice Feature Level Fusion
SCFT: Sector-based Cancelable Fingeprint Template
Epileptic Focus Localization Based on Bivariate Empirical Mode Decomposition and Entropy1426  Tatsunori Itakura and Toshihisa Tanaka
Real-time Digitized Neural-Spike Storage Scheme in Multiple Channels for Biomedical Applications1430 Anand Kumar Mukhopadhyay, Indrajit Chakrabarti and Mrigank Sharad
Session FA-06: Advanced Image Processing and Computer
Vision Techniques (Part 1)
An Image Compression Algorithm Based on the Karhunen Lo`eve Transform1436  Jae Woong Soh, Hyun-Seung Lee and Nam Ik Cho
A Rail Detection Algorithm Based on Pair Particles Filtering
Gradient-based Contrast Enhancement and Color Correction for Underwater Images1444  Eunpil Park and Jae-Young Sim

Ensemble of Binary Tree Structured Deep Convolutional Network for Image Classification14  Ji-Eun Lee, Min-Joo Kang and Je-Won Kang	48
Deep Recurrent Resnet for Video Super-Resolution	152
Session FA-07: Open Source OAI and Algorithms to 5	G
Networking	
Functional Verification and Performance Testing for OpenAirInterface (OAI) eNodeB14  Chih-Yuan Lo, Yu-Wei Hua, Wei-Chuan Yu, Yu-Min Chuang	l56
An Investigation of Application-aware Mobile Edge Computing in 5G Networks	/A
Multiband Hierarchical Ad Hoc Network with Wireless Environment Recognition	64
On the Performance Impact of Virtual Link Types to 5G Networking	70
Teaching and Learning Next Generation Mobile Communication Networks through Open Source OpenAirInterface Testbeds	ŀ75
Session FA-08: Multimedia Security and Privacy	
Detection of various image operations based on CNN	l <b>7</b> 9
Secure Data Management System with Traceability against Internal Leakage	86
Searchable Encryption of Image based on Secret Sharing Scheme	95
Identifying Computer-Generated Text Using Statistical Analysis	
Image Origin Identification for Online Social Networks (OSNs)	512
Poster Session 5: Speech, Language, And Audio	
Delta-Modulated Cross-Correlation method for Delay Estimation on Source Localization	516
An Investigation of How to Design Control Parameters for Statistical Voice Timbre Control	
Enhanced F0 generation for GPR-based speech synthesis considering syllable-based prosodic features	524

A Novel Filtering-based F <sub>0</sub> Estimation Algorithm with an Application to Voice Conversion
Personality Trait Perception from Speech Signals Using Multiresolution Analysis and Convolutional Neural Networks
Transformation of Prosody in Voice Conversion
A Dual Alignment Scheme for Improved Speech-to-Singing Voice Conversion
Accurate estimation of f <sub>o</sub> and aperiodicity based on periodicity detector residuals and deviations of phase derivatives
Acceleration for Query-by-Example Using Posteriorgram of Deep Neural Network
An Investigation of Spectral Feature Partitioning for Replay Attacks Detection
I2R-NUS Submission to Oriental Language Recognition AP16-OL7 Challenge
A Comparison Study of Information Contributions of Phonemic Contrasts in Mandarin
Enhanced Neural Machine Translation by Learning from Draft
Joint Unsupervised Adaptation of N-gram and RNN Language Models via  LDA-based Hybrid Mixture Modeling
An Application of Noise-Robust Speech Translation Using Asynchronous Smart Devices
Improving N-gram Language Modeling for Code-switching Speech Recognition
Topic Embedding of Sentences for Story Segmentation
A Study of Automatic Annotation of PETs with Articulatory Features
Emotional Statistical Parametric Speech Synthesis Using LSTM-RNNs
Acoustic Modeling with a Shared Phoneme Set for Multilingual Speech Recognition without Code-Switching

# Session FP-01: Advanced Signal Processing and Machine Learning for Audio and Speech Applications (Part 2)

Sound Source Localization Using Binaural Difference for Hose-Shaped Rescue Robot
Integrating Online i-vector into GMM-UBM for Text-dependent Speaker Verification1628  Xiaowei Jiang, Shuai Wang, Xu Xiang and Yanmin Qian
Adaptive Feedback Control using Improved Variable Step-Size Affine Projection Algorithm for Hearing Aids1633
Linh T.T. Tran, Henning Schepker, Simon Doclo, Hai H. Dam and Sven E. Nordholm
Modeling and Measuring a Moog Voltage-Controlled Filter
Mood Disorder Identification Using Deep Bottleneck Features of Elicited Speech
Session FP-02: Signal processing and artificial intelligence for
multimedia surveillance
Handling Small Motions without Differential Approximation
Tracking objects using 3D object proposals
A Deep Learning Architecture for Classifying Medical Images of Anatomy Object166 <sup>2</sup> Sameer Khan and Suet-Peng Yong
Fuzzy Qualitative Approach for Micro-Expression Recognition
LiDAR/Camera Sensor Fusion Technology for Pedestrian Detection
Session FP-03: Recent Advances in Spatial and Multichanne
Speech and Audio Processing
Multiple Source Localization by using Energy Weighted Single Source Zone Detection1679  Jundai Sun, Maoshen Jia and Changchun Bao
Blind Speaker Counting in Highly Reverberant Environments by Clustering Coherence Features1684 Shahab Pasha, Jacob Donley and Christian Ritz
Learning a Robust DOA Estimation Model with Acoustic Vector Sensor Cues
Frequency-Invariant Differential Microphone Array Design in the STFT Domain

Spatial Multi-Channel Linear Prediction for Dereverberation of Ad-Hoc Microphones
Session FP-04: Emerging Techniques in Video Analytics and
Video Coding System
Distributed Video Coding Based on Compressive Sensing and Intra-Predictive Coding1701 Suguru Hirokawa, Shin Kurihara and Hisakazu Kikuchi
Optimized Human Detection on the Embedded Computer Vision System
Classification of Spectral Compressive Hyperspectral Images Using Morphological Profiles1712  Yanlong Gao and Yan Feng
SIMD Acceleration for HEVC Encoding on DSP
Efficient Video Coding Using Rigid Object Tracking
Session FP-05: Acoustic Event Classification
Overlapping Acoustic Event Classification Based on Joint Training with Source Separation1730 Soo Hyun Bae, Inkyu Choi, Hyung Yong Kim, Kang Hyun Lee and Nam Soo Kim
Weakly Labeled Acoustic Event Detection using Local Detector and Global Classifier1735  Inkyu Choi, Soo Hyun Bae, Sung Jun Cheon, Won Ik Cho and Nam Soo Kim
Performance Evaluation of Acoustic Scene Classification Using DNN-GMM and Frame-Concatenated Acoustic Features
Speech Emotion Recognition using Convolutional Long Short-Term Memory Neural Network and
Support Vector Machines
Speech Emotion Recognition Using Multichannel Parallel Convolutional Recurrent Neural Networks based on Gammatone Auditory Filterbank
Session FP-06: Advanced Image Processing and Computer
Vision Techniques (Part 2)
Multi-Resolution for Disparity Estimation with Convolutional Neural Networks
PGT: Proposal-Guided Object Tracking
Single-shot High Dynamic Range Imaging via Deep Convolutional Neural Network

Stereo Matching Using Relative Total Variation and Entropy
A New Approach for Image Segmentation with Shape Priors Based on the Potts Model1777 Ying Gu, Mark Rice, Wei Xiong and Liyuan Li
Session FP-07: Large-Scale Stochastic Signal Processing for
Wireless Communications
Binary Vector Reconstruction via Discreteness-Aware Approximate Message Passing1783  Ryo Hayakawa and Kazunori Hayashi
Signal Detection with Belief Propagation in Faster-than-Nyquist Signaling
QR-Decomposed Generalized Belief Propagation with Smart Message Reduction for Low-Complexity MIMO Signal Detection
Design of Adaptively Scaled Belief in Large MIMO Detection for Higher-Order Modulation
A Study of Monitoring System for Radio Leak with Massive Radio Sensors
Session FP-08: Advanced Topics on Structured Dictionary for
Multidimensional Signal Processing
Cube-based Encryption Connected Prior to Motion JPEG Standard
A Robust PET Image Reconstruction Using Constrained Non-negative Matrix Factorization
Four-Dimensional Image Compression with Region of Interest Based on Non-separable Double Lifting Integer Wavelet Transform
Millimeter Wave Radar Image Denoising with Complex Nonseparable  Oversampled Lapped Transform
Multiscale Directional Transforms based on Cosine-Sine Modulated Filter Banks for Sparse Directional Image Representation

#### **Author Index**