

SISA 2011

2011 International Workshop on
Smart Info-Media Systems in Asia
October 31 – November 2, 2011
Nagasaki Brick Hall, Nagasaki, Japan



Sponsored by
Smart Info-media System (SIS) Technical Committee,
Engineering Science Society (ESS),
The Institute of Electronics, Information and Communication Engineers (IEICE)



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Smart Info-Media Systems in Asia

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The Institute of Electronics, Information and Communication Engineers (IEICE)

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1 Messages

1.1 Message from General Chair

It is my great pleasure to host the 2011 International Workshop on Smart Info-Media Systems in Asia (SISA 2011) in Kyushu, the third largest island of Japan and the most southwestern island of the four main islands in Japan.

On behalf of SISA 2011 organizing committee, I would like to sincerely welcome you to the 2011 workshop. The venue of SISA 2011 is the Nagasaki Brick Hall, Nagasaki. Nagasaki is an attractively situated port city on the island of Kyushu. As one of Japan's closest port cities to the Asian mainland, Nagasaki has played a prominent role in foreign trade relations for many centuries. In more recent history, Nagasaki became the second city after Hiroshima to be destroyed by an atomic bomb towards the end of World War II.

The SISA 2011 is aiming at promoting young researchers in the field of multimedia systems and wireless communications. We have scheduled three poster sessions for regular papers as well as one invited talk and two special sessions during the two days. As an invited speaker, Prof. Kazuaki Goshi, Kyushu Sangyo University, Japan, is invited. Prof. Goshi will give a talk of "Safe Driving Education System by Multimedia and Network" as a banquet talk. I hope all participants will take such an excellent opportunity to discuss and exchange ideas and results. Hopefully some collaboration can be born from the opportunities you find during the workshop.

I would like to express my sincerely thanks to all the organizing committee members for their excellent jobs. The SISA 2011 would not have been made possible without the valuable contribution from the authors, the special session organizers, the technical program committee members and the reviewers who have done the task of reviewing papers in a short time period. I would like to also express my appreciation for their kind support.

I look forward that all authors and all participants will have a fruitful and enjoyable time at SISA2011.

SISA 2011 General Chair

Akio Miyazaki, Kyushu Sangyo University, Japan

1.2 Message From Technical Program Co-Chairs

On behalf of the Technical Program Committee, it is our pleasure to welcome you to International Workshop on Smart Info-media Systems in Asia (SISA 2011). Communication and multi-media signal processing systems have been very critical technologies for more than a decade. However, recent advances on communication and multi-media system applications require the development of these kinds of technologies faster than ever. Thus traditional signal processing technologies are preferably integrated into “smart” information systems. The technical program of SISA 2011 covers topics in all aspects of multi-media signal processing and communication systems from fundamental theory to practical implementation and emerging technologies. The SISA 2011 is especially aimed at promoting young researchers in the field of these technologies. We planned to organize poster presentations for regular papers. The special sessions of “Wireless Mesh/Sensor Network” and “Intelligent Systems in Medical Engineering” are organized as oral presentations. The Technical Program Committee selected 45 papers, which are to be presented during the workshop.

SISA 2011 also features a keynote speaker, Prof. Kazuaki Goshi. The topic of the keynote is consistent with the theme of the workshop: “Safe Driving Education System”.

We would like to express our special thanks to the reviewers and the Technical Program Committee Members, for their dedicated services. We also would like to thank the keynote speaker and session chairs for their contributions to the technical program. Finally, our sincere thanks also go to the authors for their excellent submissions and participation in SISA 2011. Without them, the workshop would not be the success that it is.

SISA 2011 Technical Program Co-Chairs

Tomoaki Kimura, Kanagawa Institute of Technology, Japan

Huynh Huu Thuan, Vietnam National University Ho Chi Minh City, Vietnam

Joel Joseph S. Marciano, Jr., University of the Philippines Diliman, Philippines

2 Committees

2.1 Organizing Committee

General Chair

Akio Miyazaki, Kyushu Sangyo University, Japan

General Co-chair

Kosin Chamnongthai, King Mongkut's University of Technology Thonburi, Thailand

Technical Program Co-chairs

Tomoaki Kimura, Kanagawa Institute of Technology, Japan

Huynh Huu Thuan, Vietnam National University Ho Chi Minh City, Vietnam

Joel Joseph S. Marciano, Jr., University of the Philippines Diliman, Philippines

Special Session Chairs

Akira Taguchi, Tokyo City University, Japan

Noriaki Suetake, Yamaguchi University, Japan

Publicity Chair

Mitsuji Muneyasu, Kansai University, Japan

Publication Chair

Takao Onoye, Osaka University, Japan

Finance & Registration Chair

Shingo Yoshizawa, Hokkaido University, Japan

Local Arrangement Chair

Masayuki Kurosaki, Kyushu Institute of Technology, Japan

Advisory Board Liaison

Yoshio Itoh, Tottori University, Japan

General Secretaries

Naoto Sasaoka, Tottori University, Japan

Hiroshi Tsutsui, Kyoto University, Japan

2.2 Technical Program Committee

Chairs

Tomoaki Kimura, Kanagawa Institute of Technology, Japan
Huynh Huu Thuan, Vietnam National University Ho Chi Minh, City, Vietnam
Joel Joseph S. Marciano, Jr., University of the Philippines Diliman, Philippines

Members

Akira Asano, Kansai University, Japan
Keiichi Funaki, University of the Ryukyus, Japan
Hiroaki Hata, NTT Communications, Japan
Naofumi Homma, Tohoku University, Japan
Tadayoshi Horita, Polytechnic University, Japan
Yoshio Itoh, Tottori University, Japan
Arata Kawamura, Osaka University, Japan
Tomoaki Kimura, Kanagawa Institute of Technology, Japan
Shigenori Kinjo, Japan Coast Guard Academy, Japan
Katsuya Kondo, Tottori University, Japan
Masayuki Kurosaki, Kyushu Institute of Technology, Japan
Mitsuhiko Meguro, Nihon University, Japan
Akio Miyazaki, Kyushu Sangyo University, Japan
Mitsuji Muneyasu, Kansai University, Japan
Hiroshi Ochi, Kyushu Institute of Technology, Japan
Takao Onoye, Osaka University, Japan
Akira Taguchi, Tokyo City University, Japan
Hirokazu Tanaka, Toshiba Corporation, Japan
Hiroshi Tsutsui, Kyoto University, Japan
Yukitoshi Sanada, Keio University, Japan
Naoto Sasaoka, Tottori University, Japan
Noriaki Suetake, Yamaguchi University, Japan
Hiroshi Yasukawa, Aichi Prefectural University, Japan
Shingo Yoshizawa, Hokkaido University, Japan

2.3 International Steering Committee

Chair

Yoshio Itoh, Tottori University, Japan

Members

Takao Onoye, Osaka University, Japan

Mitsuji Muneyasu, Kansai University, Japan

Naoto Sasaoka, Tottori University, Japan

Shingo Yoshizawa, Hokkaido University, Japan

Mitsuhiko Meguro, Nihon University, Japan

Hiroshi Tsutsui, Kyoto University, Japan

3 Keynote Speech (Banquet Talk)

Safe Driving Education System by Multimedia and Network

Invited Speaker:

Prof. Kazuaki Goshi, Faculty of Information Science, Kyushu Sangyo University

Abstract

One of the goals of Intelligent Transport Systems (ITSs) is to reduce traffic accidents and enhance safety. However, plenty of technologies for safe driving can not prevent traffic accidents, if a driver does not understand what safe driving is exactly. Thus, driver education is quite important even if ITSs spread. In order to educate drivers, supervisors or safe driving managers should obtain information about driving behavior. Recent computer and communication technologies have made it possible to obtain multimedia information concerning driving behavior and record or send the information to a supervisor outside of the vehicle through wireless communication and the Internet. It is believed that the most efficient opportunity to teach safe driving is the moment when a driver is driving dangerously. Therefore, we have developed an Assistant System for Safe Driving by Informative Supervision and Training (ASSIST), a system created to prevent accidents based on our safe-driving theory.

Biography



Dr. Kazuaki Goshi is a professor of Information Science at Kyushu Sangyo University, Japan. After receiving his Ph.D. degree of Computer Science at Kyushu University in 1997, he worked for Kyushu University as a research associate. From 1998 he spent one year and a half at the Queen's University of Belfast in Northern Ireland as a visiting research fellow. In 2002, he moved to Kyushu Sangyo University as an assistant professor and in 2009 he was promoted as a professor. His present research interests include intelligent transport systems and safe driving education.

4 SISA Student Paper Awards

SISA Best Student Paper Award Candidates

On behalf of the SISA2011 technical program committee, I am pleased to inform you that the following three papers has been selected to be the candidates for the SISA Best Student Paper Award.

- | | | |
|--------------|--|--------------------------------------|
| RS2-5 | A Facile Interface for AR System using Human Whistle Sound
Taiki Fuji (Tokyo University of Agriculture and Technology, Keio University), Yasue Mitsukura,
Nozomu Hamada (Keio University) | (pp. 106–109)
[Abstract]
[PDF] |
| RS2-9 | Modified-Error Filtered-x Algorithm Employing Linear Prediction Filter
Shinya Okuno, Yoshinobu Kajikawa (Kansai University) | (pp. 124–129)
[Abstract]
[PDF] |
| RS3-2 | Retransmission Diversity for Single Carrier Block Transmission based on Equi-interval Subcarrier Assignment
Takehiro Yoshida, Teruyuki Miyajima (Ibaraki University) | (pp. 176–181)
[Abstract]
[PDF] |

The SISA2011 technical program committee carefully selected three candidates from regular papers during the review process of the submitted papers. The SISA Best Student Paper Award will be awarded to ONE of these candidates. To other TWO candidates, the SISA Excellent Student Paper Awards will be awarded. The selection will be performed based on the camera-ready papers. The winner will be announced at the SISA Student Paper Awards Ceremony.

SISA 2011 Technical Program Co-Chair
SISA Student Paper Awards Selection Committee Chair
Tomoaki Kimura, Kanagawa Institute of Technology, Japan

SISA Student Paper Awards Selection Committee

Chair

Tomoaki Kimura, Kanagawa Institute of Technology, Japan

Secretary

Hiroshi Tsutsui, Kyoto University, Japan

Members

Akio Miyazaki, Kyushu Sangyo University, Japan
Tomoaki Kimura, Kanagawa Institute of Technology, Japan
Yoshio Itoh, Tottori University, Japan
Takao Onoye, Osaka University, Japan
Mitsuji Muneyasu, Kansai University, Japan
Naoto Sasaoka, Tottori University, Japan
Shingo Yoshizawa, Hokkaido University, Japan
Mitsuhiko Meguro, Nihon University, Japan
Hiroshi Tsutsui, Kyoto University, Japan

5 Program at a Glance

Monday, 31 October 2011

18:30–19:30	Welcome Reception at La Garsboule PALAIS, Nagasaki Brick Hall
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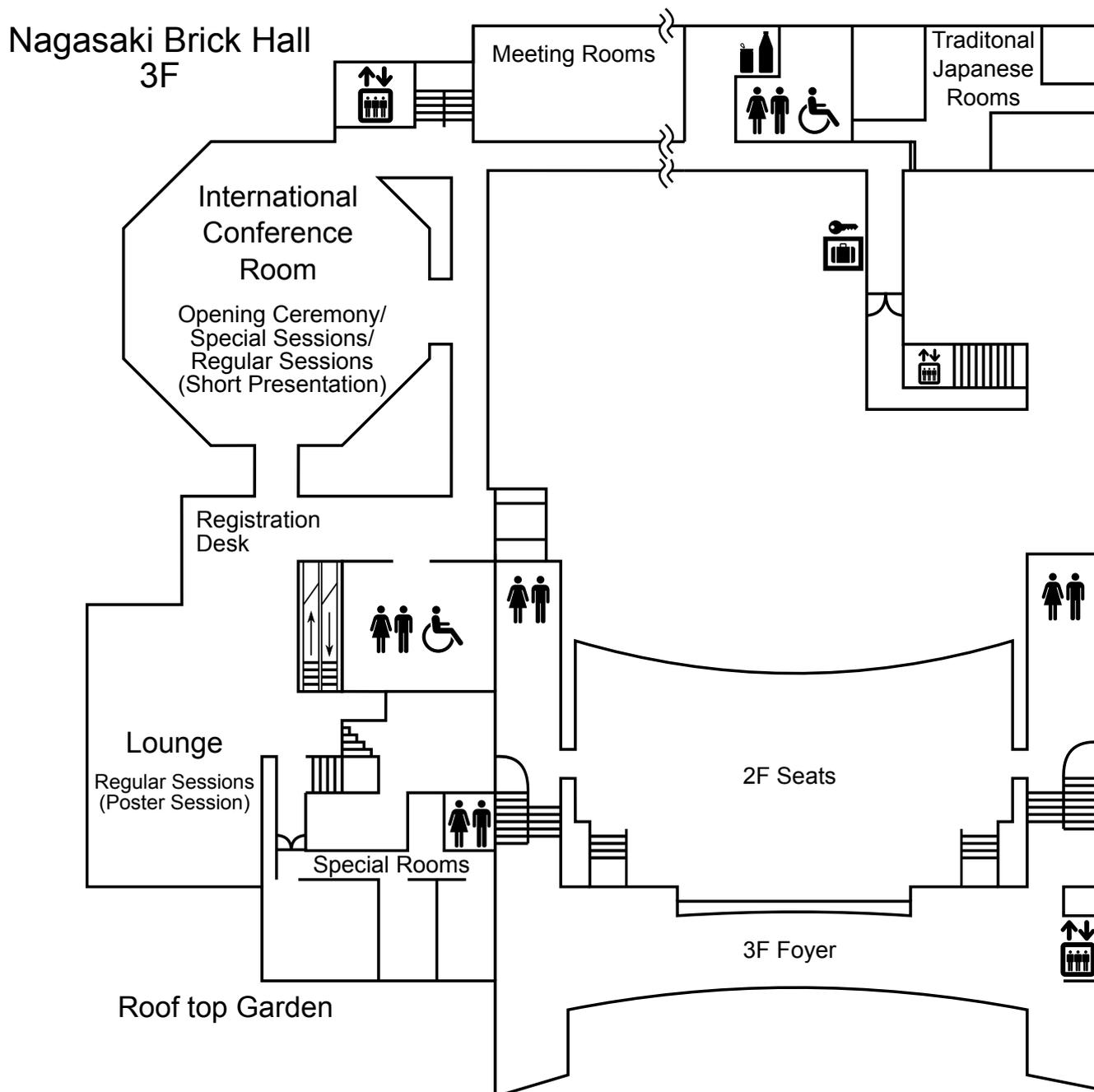
Tuesday, 1 November 2011

9:30–9:40	Opening Ceremony at International Conference Hall
9:40–11:00	Regular Session 1 (RS1): Image Processing (Poster Session) at International Conference Hall Chair: Prof. Kosin Chamnongthai (King Mongkut's University of Technology Thonburi, Thailand) Papers: RS1-1, RS1-2, RS1-3, RS1-4, RS1-5, RS1-6, RS1-7, RS1-8, RS1-9, RS1-10, RS1-11
11:00–11:10	Coffee Break
11:10–12:50	Special Session 1 (SS1): Wireless Mesh/Sensor Network (Oral Session) at International Conference Hall Organizer: Prof. Hiroshi Ochi (Kyushu Institute of Technology, Japan) Chair: Dr. Thet Htun Khine (Radrix Co., Ltd., Japan) Papers: SS1-1, SS1-2, SS1-3, SS1-4, SS1-5
12:50–14:00	Lunch
14:00–15:20	Regular Session 2 (RS2): Multimedia and Systems (Poster Session) at International Conference Hall Chair: Prof. Go Tanaka (Nagoya City University, Japan) Papers: RS2-1, RS2-2, RS2-3, RS2-4, RS2-5, RS2-6, RS2-7, RS2-8, RS2-9, RS2-10, RS2-11, RS2-12
15:20–16:30	Move to Banquet Venue (The Villas, Nagasaki Sunset Marina) by Bus
16:30–17:30	Keynote Speech (Banquet Talk) (KEY): Safe Driving Education System by Multimedia and Network at The Villas, Nagasaki Sunset Marina (2nd Floor, The Private Villa) Organizer: Prof. Akio Miyazaki (Kyushu Sangyo University, Japan) Invited Speaker: Prof. Kazuaki Goshi (Kyushu Sangyo University, Japan) Paper: KEY-1
17:30–17:40	SISA Student Paper Awards Ceremony at The Villas, Nagasaki Sunset Marina (2nd Floor, The Private Villa)
18:00–20:00	Banquet at The Villas, Nagasaki Sunset Marina (2nd Floor, The Terrace Villa)

Wednesday, 2 November 2011

10:00–11:40	Special Session 2 (SS2): Intelligent Systems in Medical Engineering (Oral Session) at International Conference Hall Organizer: Prof. Keiichi Horio (Kyushu Institute of Technology, Japan) Chair: Prof. Keiichi Horio (Kyushu Institute of Technology, Japan) Papers: SS2-1, SS2-2, SS2-3, SS2-4, SS2-5
11:40–11:50	Coffee Break
11:50–13:10	Regular Session 3 (RS3): Communication Systems (Poster Session) at International Conference Hall Chair: Prof. Takahiro Matsumoto (Yamaguchi University, Japan) Papers: RS3-1, RS3-2, RS3-3, RS3-4, RS3-5, RS3-6, RS3-7, RS3-8, RS3-9, RS3-10, RS3-11, RS3-12

6 Floor Plan



Banquet Talk and Banquet Venue

Banquet Talk and Banquet will be held at The Villas. Bus pick-up service is available between Nagasaki Brick Hall and The Villas.

The Villas:

Nagasaki Sunset Marina, 1892, Fukuda Honmachi, Nagasaki City.

Tel: +81-95-834-4155. <http://nagasaki.villas.jp/> (Japanese).

7 Technical Program

7.1 Regular Session 1 (RS1): Image Processing (Poster Session)

Tuesday, 1 November 2011, 9:40–11:00 at International Conference Hall

Chair: Prof. Kosin Chamnongthai (King Mongkut's University of Technology Thonburi, Thailand)

- | | | |
|---------------|---|------------------------------------|
| RS1-1 | A High-Speed Hardware Implementation of Image Compression Compatible with JPEG Standard
Xuan-Thuan Nguyen, Huu-Thuan Huynh, Trong-Tu Bui (University of Science, Ho Chi Minh City) | (pp. 1–6)
[Abstract]
[PDF] |
| RS1-2 | Spacio-Temporal Correction of Film Scratches using Directional Median Filter
Yuki Umeda, Kaoru Arakawa (Meiji University) | (pp. 7–12)
[Abstract]
[PDF] |
| RS1-3 | Human Identification based on Far-view Images using Combined Features of Face, Overall and Partitioned-body Gaits
Prasit Nangtin (Pathumwan Institute of Technology), Pinit Kumhom, Kosin Chamnongthai (King Mongkut's University of Technology Thonburi) | (pp. 13–16)
[Abstract]
[PDF] |
| RS1-4 | An Edge Detection Method using Fuzzy Technique based on Modified Impulse Noise Information
Satoru Ishii, Syo Miura, Hiroyuki Tsuji, Tomoaki Kimura (Kanagawa Institute of Technology) | (pp. 17–20)
[Abstract]
[PDF] |
| RS1-5 | Improvement of Data Embedding and Extracting for Information Retrieval based on Mobile Devices
Hiroshi Kudo, Mitsuji Muneyasu, Kimitoshi Tamaki, Yoshiko Hanada (Kansai University) | (pp. 21–26)
[Abstract]
[PDF] |
| RS1-6 | An Unsupervised Design Method for Vector Median Filters using Genetic Algorithm
Makoto Kamiya, Yoshiko Hanada, Mitsuji Muneyasu (Kansai University) | (pp. 27–32)
[Abstract]
[PDF] |
| RS1-7 | Unsupervised Design of Stack Filters by N-Ary Tree Structure Optimization
Tatsuya Suzuki, Yoshiko Hanada, Mitsuji Muneyasu (Kansai University) | (pp. 33–38)
[Abstract]
[PDF] |
| RS1-8 | A Study on Improvement of Contour Extraction Precision of Active Contour Model with Structuring Elements
Satoshi Urata, Hiroshi Yasukawa (Aichi Prefectural University) | (pp. 39–43)
[Abstract]
[PDF] |
| RS1-9 | Image Decoloring Method for Realization of Color Restoration based on Color Information Embedding
Jyohei Matsuoka (Yamaguchi University), Go Tanaka (Nagoya City University), Noriaki Suetake (Yamaguchi University), Eiji Uchino (Yamaguchi University, Fuzzy Logic Systems Institute) | (pp. 44–47)
[Abstract]
[PDF] |
| RS1-10 | Pixel Value Restoration based on Local Similarity for Digital Images
Go Tanaka (Nagoya City University), Noriaki Suetake (Yamaguchi University), Eiji Uchino (Yamaguchi University, Fuzzy Logic Systems Institute) | (pp. 48–51)
[Abstract]
[PDF] |
| RS1-11 | Recognition of Vehicle License Plate from Degraded Image via MA Model Identification and Stochastic Model
Atsushi Fujioka, Yohei Fukumizu, Hironori Yamauchi (Ritsumeikan University) | (pp. 52–56)
[Abstract]
[PDF] |

7.2 Special Session 1 (SS1): Wireless Mesh/Sensor Network (Oral Session)

Tuesday, 1 November 2011, 11:10–12:50 at International Conference Hall

Organizer: Prof. Hiroshi Ochi (Kyushu Institute of Technology, Japan)

Chair: Dr. Thet Htun Khine (Radrix Co., Ltd., Japan)

- SS1-1 Image Transmission using Encryption Domain Authentication for Mesh Network** (pp. 57–60)
Muneaki Matsuo, Masayuki Kurosaki (Kyushu Institute of Technology), Akio Miyazaki (Kyusyu Sangyo University), Hiroshi Ochi (Kyushu Institute of Technology) [Abstract] [PDF]
- SS1-2 Application of Directional Antennas in Wireless Backhaul Enabled by IPT Forwarding** (pp. 61–66)
Guangri Jin, Hiroshi Furukawa (Kyushu University) [Abstract] [PDF]
- SS1-3 An Implementation of Fixed Backoff-time Switching Method on IEEE 802.11 MAC Protocol for Wireless Internet-access Mesh Network** (pp. 67–72)
Nobuo Funabiki, Sritrusta Sukaridhoto, Zhe Wang, Toru Nakanishi, Kan Watanabe (Okayama University), Shigeto Tajima (Osaka University) [Abstract] [PDF]
- SS1-4 A CSMA/CA based MAC Protocol to Improve TCP Performance in Multi-hop Cognitive Network** (pp. 73–78)
Takamasa Kimura, Takeo Fujii (The University of Electro-Communications) [Abstract] [PDF]
- SS1-5 A Throughput Evaluation of Wireless Internet-access Mesh Network using MIMO and Adaptive Array Antenna** (pp. 79–84)
Shigeto Tajima (Osaka University), Nobuo Funabiki, Shigeru Tomisato, Masaharu Hata (Okayama University), Teruo Higashino (Osaka University) [Abstract] [PDF]

7.3 Regular Session 2 (RS2): Multimedia and Systems (Poster Session)

Tuesday, 1 November 2011, 14:00–15:20 at International Conference Hall

Chair: Prof. Go Tanaka (Nagoya City University, Japan)

- | | | |
|---------------|--|--------------------------------------|
| RS2-1 | Speech Enhancement based on Lattice Type LPEF and Bias Free Equation Error ADF
Shinichi Wada, Naoto Sasaoka (Tottori University), James Okello (NEC Corporation), Yoshio Itoh (Tottori University), Masaki Kobayashi (Chubu University) | (pp. 85–90)
[Abstract]
[PDF] |
| RS2-2 | Fast Noise Suppression Algorithm for DSP Implementation
Hiromasa Terashima, Takahiro Natori, Nari Tanabe, Hideaki Matsue (Tokyo University of Science, Suwa), Toshihiro Furukawa (Tokyo University of Science) | (pp. 91–96)
[Abstract]
[PDF] |
| RS2-3 | Low Computational Robust F_0 Estimation based on Time-Varying Complex Speech Analysis
Keiichi Funaki, Takehito Higa (University of the Ryukyus) | (pp. 97–100)
[Abstract]
[PDF] |
| RS2-4 | Speech Enhancement based on Iterative Wiener Filter using Robust Time-Varying Complex Speech Analysis
Keiichi Funaki, Yusuke Inafuku, Taishi Tamashiro (University of the Ryukyus) | (pp. 101–105)
[Abstract]
[PDF] |
| RS2-5 | A Facile Interface for AR System using Human Whistle Sound
Taiki Fuji (Tokyo University of Agriculture and Technology, Keio University), Yasue Mitsukura, Nozomu Hamada (Keio University) | (pp. 106–109)
[Abstract]
[PDF] |
| RS2-6 | Normalization Method Improving Estimation Speed in Frequency Domain Steepest Descent Type Adaptive Algorithm
Yusuke Kuwahara, Yusuke Iwamatsu, Kensaku Fujii (University of Hyogo), Mitsuji Muneyasu (Kansai University), Masakazu Morimoto (University of Hyogo) | (pp. 110–115)
[Abstract]
[PDF] |
| RS2-7 | Automatic Parameter Adjustment Method for Audio Equalizer Employing Interactive Genetic Algorithm
Yuki Mishima, Yoshinobu Kajikawa (Kansai University) | (pp. 116–119)
[Abstract]
[PDF] |
| RS2-8 | Adaptive Voice Activity Detection for Multiple Simultaneous Speakers
Jaime Lorenzo Trueba, Nozomu Hamada (Keio University) | (pp. 120–123)
[Abstract]
[PDF] |
| RS2-9 | Modified-Error Filtered-x Algorithm Employing Linear Prediction Filter
Shinya Okuno, Yoshinobu Kajikawa (Kansai University) | (pp. 124–129)
[Abstract]
[PDF] |
| RS2-10 | An Efficient Recomputing Concepts Algorithm for Microarray Data Analysis using Biological Lattice
Hidenobu Hashikami, Nur Hasanah, Kazuhito Sawase (University of Tsukuba), Takanari Tanabata, Fumiaki Hirose (National Institute of Agrobiological Sciences), Hajime Nobuhara (University of Tsukuba) | (pp. 130–135)
[Abstract]
[PDF] |
| RS2-11 | Evaluation of Human Mental Stress in Text Reading by Quantitative EEG Analysis
Shinya Tozuka, Kaoru Arakawa (Meiji University) | (pp. 136–140)
[Abstract]
[PDF] |
| RS2-12 | Introduction of 1vs1 SVM Into Biometric Authentication using Intra-Body Propagation Signals
Yuuta Sodani, Isao Nakanishi, Shigang Li (Tottori University) | (pp. 141–145)
[Abstract]
[PDF] |

7.4 Keynote Speech (Banquet Talk) (KEY)

Tuesday, 1 November 2011, 16:30–17:30 at The Villas, Nagasaki Sunset Marina

(2nd Floor, The Private Villa)

Organizer: Prof. Akio Miyazaki (Kyushu Sangyo University, Japan)

Invited Speaker: Prof. Kazuaki Goshi (Kyushu Sangyo University, Japan)

KEY-1 Safe Driving Education System by Multimedia and Network

Kazuaki Goshi, Katsuya Matsunaga (Kyushu Sangyo University)

(pp. 146–149)

[Abstract]

[PDF]

7.5 Special Session 2 (SS2): Intelligent Systems in Medical Engineering (Oral Session)

Wednesday, 2 November 2011, 10:00–11:40 at International Conference Hall

Organizer: Prof. Keiichi Horio (Kyushu Institute of Technology, Japan)

Chair: Prof. Keiichi Horio (Kyushu Institute of Technology, Japan)

- | | | |
|--------------|---|--------------------------------------|
| SS2-1 | A Non-rigid Alignment Method for Triangular Mesh Surface of Lung Field
Guangxu Li, Hyoungeop Kim, Joo Kooi Tan, Seiji Ishikawa (Kyushu Institute of Technology),
Akiyoshi Yamamoto (Kyushu Institute of Technology, Kyoaikai Tobata Kyoritu Hospital) | (pp. 150–153)
[Abstract]
[PDF] |
| SS2-2 | A Novel Registration Method for Digital Subtraction Radiography
Kota Murahira, Akira Taguchi (Tokyo City University) | (pp. 154–157)
[Abstract]
[PDF] |
| SS2-3 | Proposal of Force Feedback Method by Grasping Arm to Control Upper Extremity Prosthesis
Chikamune Wada (Kyushu Institute of Technology), Yuji Akiyama, Masatoshi Hirano, Hisashi
Arizono (Arizono Orthopedic Supplies Co., Ltd.) | (pp. 158–161)
[Abstract]
[PDF] |
| SS2-4 | New Automatic Detection of Carotid Artery Calcification in Digital Dental Panoramic Radiographs Considering Intensity Gradients
Katsuyuki Shinjo, Yoshinori Izumi, Mitsuji Muneyasu (Kansai University), Akira Asano
(Hiroshima University), Keiichi Uchida, Akira Taguchi (Matsumoto Dental University) | (pp. 162–166)
[Abstract]
[PDF] |
| SS2-5 | Relational Higher-Rank SOM for Bacterial Flora Analysis
Hideaki Misawa (Kyushu Institute of Technology), Keiichi Horio (Kyushu Institute of Technology,
Fuzzy Logic Systems Institute), Nobuo Morotomi, Kazumasa Fukuda, Hatsumi Taniguchi
(University of Occupational and Environmental Health) | (pp. 167–170)
[Abstract]
[PDF] |

7.6 Regular Session 3 (RS3): Communication Systems (Poster Session)

Wednesday, 2 November 2011, 11:50–13:10 at International Conference Hall

Chair: Prof. Takahiro Matsumoto (Yamaguchi University, Japan)

- RS3-1 Theoretical Analysis of BER Performance in ASK-SS and M-ary/ASK-SS Systems using Compact Matched Filter Bank for an Optical ZCZ Code Over Rayleigh Fading Channels** (pp. 171–175)
[Abstract]
[PDF]
Takahiro Matsumoto (Yamaguchi University), Hideyuki Torii (Kanagawa Institute of Technology), Shinya Matsufuji (Yamaguchi University)
- RS3-2 Retransmission Diversity for Single Carrier Block Transmission based on Equi-interval Subcarrier Assignment** (pp. 176–181)
[Abstract]
[PDF]
Takehiro Yoshida, Teruyuki Miyajima (Ibaraki University)
- RS3-3 Blind Sparse Channel Estimation with Nonzero Tap Detection for OFDM Systems** (pp. 182–187)
[Abstract]
[PDF]
Takahiro Ueno, Teruyuki Miyajima (Ibaraki University)
- RS3-4 Blind Channel Shortening based on Autocorrelation Sum Minimization for MC-CDMA Systems** (pp. 188–193)
[Abstract]
[PDF]
Mizuki Kotake, Teruyuki Miyajima (Ibaraki University)
- RS3-5 Method of Improving Transmission Characteristic While Maintaining Sound Quality for Use in Acoustic OFDM** (pp. 194–199)
[Abstract]
[PDF]
Masanori Tamura, Yoshinobu Kajikawa (Kansai University)
- RS3-6 OFDM Transmission without using CP Applying Sliding FDE** (pp. 200–205)
[Abstract]
[PDF]
Shoichiro Yamasaki, Yoshimitsu Hama (Polytechnic University)
- RS3-7 Power Supply Overlaid Communication System with OFDM Modulation for Industrial Robot Control** (pp. 206–210)
[Abstract]
[PDF]
Yusuke Yamaguchi (Kyushu Institute of Technology), Hidetsugu Koga (Yaskawa Electric Corporation), Masayuki Kurosaki, Hiroshi Ochi (Kyushu Institute of Technology)
- RS3-8 Maximum Likelihood vs. Genetic Algorithm MIMO Detection for Realistic Rician Fading** (pp. 211–214)
[Abstract]
[PDF]
Kazi Obaidullah, Constantin Siriteanu, Yoshikazu Miyanaga (Hokkaido University)
- RS3-9 All-pass Filter based Blind MIMO-OFDM Equalization without Permutation** (pp. 215–218)
[Abstract]
[PDF]
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8 Abstracts

8.1 Regular Session 1 (RS1): Image Processing (Poster Session)

Tuesday, 1 November 2011, 9:40–11:00 at International Conference Hall

Chair: Prof. Kosin Chamnongthai (King Mongkut's University of Technology Thonburi, Thailand)

RS1-1 A High-Speed Hardware Implementation of Image Compression Compatible with JPEG Standard (pp. 1–6)
[PDF]

Xuan-Thuan Nguyen University of Science, Ho Chi Minh City, Vietnam
Huu-Thuan Huynh University of Science, Ho Chi Minh City, Vietnam
Trong-Tu Bui University of Science, Ho Chi Minh City, Vietnam

This paper presents the system architecture of a System-on-a-Programmable-Chip (SoPC) for fast JPEG-based image compression, which is integrated into a FPGA chip. The BinDCT algorithm is utilized to achieve low-complexity and high-speed processing. Furthermore, many special techniques are applied to speed up the system such as Direct Memory Access (DMA), burst and pipeline transfer etc. The system was tested on a Stratix III Development Board using Stratix III FPGA of Altera Corporation with the help of Quartus II, SoPC Builder, NIOS II IDE, and Modelsim. The processing speed of nearly 500 fps for 640x480 24-bit RGB image at 166 MHz working frequency proves that the system can fully satisfy the requirements of real-time applications.

RS1-2 Spacio-Temporal Correction of Film Scratches using Directional Median Filter (pp. 7–12)
[PDF]

Yuki Umeda Meiji University, Japan
Kaoru Arakawa Meiji University, Japan

This paper proposes a method which removes film scratches in video and restores the scratch area. This method is composed of two parts; one is temporal restoration with exemplar-based inpainting and the other spatial restoration with directional median filtering. The temporal inpainting complements scratch areas with image pixels in similar undamaged image areas in the adjacent frames. The similar image area is searched by block matching algorithm. Inpainting is a powerful method, if similar image areas exist around the missing area, but it does not always happen for actual images. In order to solve this problem, the proposed method newly applies directional median filtering for the scratch area, if the error of the block matching is large. The directional median filter complements the scratch area with image pixels around the scratch in the same frame, taking the line structure of the image into consideration. Computer simulations show the high performance of the proposed method for actual video frames.

RS1-3 Human Identification based on Far-view Images using Combined Features of Face, Overall and Partitioned-body Gaits (pp. 13–16)
[PDF]

Prasit Nangtin Pathumwan Institute of Technology, Thailand
Pinit Kumhom King Mongkut's University of Technology Thonburi, Thailand
Kosin Chamnongthai King Mongkut's University of Technology Thonburi, Thailand

This paper presents human identification from arbitrary views within a walking distance using a feature fusion technique on face, gait and partial gait features for increasing the recognition ratio and solving the partial occlusion. In this method, gait energy image template is separated based on human movement into three templates which are upper part, middle part and lower part energy image templates. We use 2DPCA and 2DLDA combined method to recognize features. We used 46 people with data from Casia dataset B to evaluate performance of the proposed method. The results can solve the partial occlusion and increase the recognition ratio about 10 percent.

RS1-4 An Edge Detection Method using Fuzzy Technique based on Modified Impulse Noise (pp. 17–20)
Information [PDF]

Satoru Ishii	Kanagawa Institute of Technology, Japan
Syo Miura	Kanagawa Institute of Technology, Japan
Hiroyuki Tsuji	Kanagawa Institute of Technology, Japan
Tomoaki Kimura	Kanagawa Institute of Technology, Japan

Edge detection is an important method in image processing. Edge is outline within image that is used image recognition. Target images obtained from camera are generally add on Impulse noise and Gaussian noise when edge detection from mixed noisy image and result have edge information and noise information. Therefore result image can't obtain good result. In this paper, we proposed new edge detection method using sorted local area information to estimate shape information and modified Impulse noise information. Proposed method detect edge correspond to noise. Proposed method shows the better value compared with conventional methods.

RS1-5 Improvement of Data Embedding and Extracting for Information Retrieval based on Mobile (pp. 21–26)
Devices [PDF]

Hiroshi Kudo	Kansai University, Japan
Mitsuji Muneyasu	Kansai University, Japan
Kimitoshi Tamaki	Kansai University, Japan
Yoshiko Hanada	Kansai University, Japan

In this paper we propose an improved data embedding and extraction method for information retrieval considering the use of mobile devices. Although the conventional method has demonstrated good results for images captured by cellular phones, some problems remain with this method. One problem is the lack of consideration of the construction of the code grouping in the code grouping method. In this paper, a new construction method for code grouping is proposed, and it is shown that a suitable grouping of the codes can be found. Another problem is the correction method of lens distortion, which is time-consuming. Therefore, to improve the processing speed, the golden section search method is adopted to estimate the distortion coefficients. Moreover, we propose an improved method for estimating the distortion coefficients with greater accuracy. In the proposed method, all sides of the image are used in the correction. In addition, a new tuning algorithm for the gain coefficient in the embedding process is also proposed. Experimental results show an increase in the detection rate for the embedding data and a reduction of the processing time.

RS1-6 An Unsupervised Design Method for Vector Median Filters using Genetic Algorithm (pp. 27–32)
[PDF]

Makoto Kamiya	Kansai University, Japan
Yoshiko Hanada	Kansai University, Japan
Mitsuji Muneyasu	Kansai University, Japan

In this paper, an unsupervised design of vector median filters for recovering color texture images from the impulse noise is proposed. Vector median filters consider the correlation among color components in the filtering process, which can improve both the estimation accuracy and the preservation of the detail without the color shift in the processing result by adjusting its window shape. Here, we assume that a filtering window which detects noise with high accuracy is a suitable window for recovering the image from impulse noise and the window is optimized by minimizing the distance between premise and estimated noise distributions. In this paper we apply a genetic algorithm. To construct the objective function, we extend rank-ordered logarithmic difference that is an indicator for a noise detection in grayscale images to color images to detect corrupt pixels directly from the degraded image. Through experiments, it was shown that our unsupervised method obtained filtering windows that resemble the characteristics of the textures and they outperformed compared to typical filtering windows.

RS1-7 Unsupervised Design of Stack Filters by N-Ary Tree Structure Optimization(pp. 33–38)
[PDF]

Tatsuya Suzuki Kansai University, Japan
 Yoshiko Hanada Kansai University, Japan
 Mitsuji Muneyasu Kansai University, Japan

Stack filters consist of logical AND/OR or integer MIN/MAX operations between two elements of the filter window, which can be described as complete binary tree structures. The shape of filter window and the combination of MIN and MAX operators widely affect the processing result of the filter. However to describe variable filters basically require large size or depth of tree structures since there are only two kinds of operator and the operators have only two operands. For solving the problem, we extend complete binary tree structure to N-ary tree structure. Moreover, we introduce RANK r operators generalizing MIN and MAX operators. RANK r operators give the r th smallest operand out of N operands. By using RANK r operations, preferable performance filters can be described with smaller size or depth of tree structures. Experimental results show that the proposed method can obtain smaller size of tree structures while maintaining performance.

RS1-8 A Study on Improvement of Contour Extraction Precision of Active Contour Model with Structuring Elements(pp. 39–43)
[PDF]

Satoshi Urata Aichi Prefectural University, Japan
 Hiroshi Yasukawa Aichi Prefectural University, Japan

To achieve enhanced image recognition, it is necessary to accurately extract the contour of the recognition target from the input image in a preprocessing step. Contour extraction methods based on the active contour model (Snakes) require the operator to specify the parameter values that best catch the shape of the target. However, it is difficult to guess the parameter values since the relationship between target shape and values is unclear. One solution is the active contour model with structuring elements since its parameters are easily determinable. However, this method is not really practical since it fails if the boundary between the target and its background is not clear. Moreover, it is not efficient for natural images, since the backgrounds are not monotone. This paper introduces an improved contour extraction method based on the Sobel filter and thresholding.

RS1-9 Image Decoloring Method for Realization of Color Restoration based on Color Information Embedding(pp. 44–47)
[PDF]

Jyohei Matsuoka Yamaguchi University, Japan
 Go Tanaka Nagoya City University, Japan
 Noriaki Suetake Yamaguchi University, Japan
 Eiji Uchino Yamaguchi University, Japan
 Fuzzy Logic Systems Institute, Japan

In this paper, we propose a decoloring method, in which the monochrome image to reproduce the color one is obtained. In the proposed method, the decoloring excelled in the color restoration is realized by embedding the color information of the original color image into local regions of the resultant monochrome one. Furthermore, the high speed processing is also realized by simplifying the decoloring algorithm. Through the experiments, the effectiveness of the proposed method is verified.

RS1-10 Pixel Value Restoration based on Local Similarity for Digital Images(pp. 48–51)
[PDF]

Go Tanaka Nagoya City University, Japan
Noriaki Suetake Yamaguchi University, Japan
Eiji Uchino Yamaguchi University, Japan
 Fuzzy Logic Systems Institute, Japan

In this paper, a pixel value restoration method for impulse noise corrupted images is proposed. For impulse noise removal, a switching type filtering is effective. Noise corrupted pixels are detected and restored, and another pixels are regarded as noise-free original signals and unfiltered in the filtering. This selective process prevents original signals image from filtering distortion. The proposed method is for the restoration process in a switching type filter. The method is based on local similarity of digital images, and especially effective for ordered regions, that is, the regions which have patterns. Experiments show the effectiveness of the proposed method.

RS1-11 Recognition of Vehicle License Plate from Degraded Image via MA Model Identification and Stochastic Model(pp. 52–56)
[PDF]

Atsushi Fujioka Ritsumeikan University, Japan
Yohei Fukumizu Ritsumeikan University, Japan
Hironori Yamauchi Ritsumeikan University, Japan

Recognizing vehicle license plate has been much researched in many countries. Since the layout of license plates is different for each country, recognition system is also diffe this paper, we propose the system which distinguishes numbers (0 to 9) printed on the standard Japanese license plate. For predicting probability of unknown number, we construct the stochastic model with training data. We adopt classification based on the Gaussian process. In this research, we take up license plates photographed in low resolution images, thus number classification problem includes estimati degradation process. The process that we cannot know specific degradation function can be identified by determining Moving Average (MA) model parameters. We estimate MA model parameters by using recursive stochastic gradient method. Experimental results successfully demonstrate the proposed system is efficient in estimating of numbers in low resolution images.

8.2 Special Session 1 (SS1): Wireless Mesh/Sensor Network (Oral Session)

Tuesday, 1 November 2011, 11:10–12:50 at International Conference Hall

Organizer: Prof. Hiroshi Ochi (Kyushu Institute of Technology, Japan)

Chair: Dr. Thet Htun Khine (Radrix Co., Ltd., Japan)

SS1-1 Image Transmission using Encryption Domain Authentication for Mesh Network

(pp. 57–60)
[PDF]

Muneaki Matsuo	Kyushu Institute of Technology, Japan
Masayuki Kurosaki	Kyushu Institute of Technology, Japan
Akio Miyazaki	Kyushu Sangyo University, Japan
Hiroshi Ochi	Kyushu Institute of Technology, Japan

In this paper, we propose an encryption and authentication system using Paillier encryption for digital cinema. We suppose to use the system in a home theater with file format of movie is JPEG 2000. The proposed system can check the ID in encrypted domain using Paillier encryption which has homomorphic mapping. In addition, the frame work of proposed system is conformed to JPEG 2000 part 8 (JPSEC). Therefore the proposed system has backward compatibility. We confirm the secrecy and the authentication of the proposed system by computer simulation.

SS1-2 Application of Directional Antennas in Wireless Backhaul Enabled by IPT Forwarding

(pp. 61–66)
[PDF]

Guangri Jin	Kyushu University, Japan
Hiroshi Furukawa	Kyushu University, Japan

We have proposed Intermittent Periodic Transmission (IPT forwarding) as an efficient packet relay method for wireless backhaul. In IPT forwarding, source node sends packets to destination node with a certain time interval so that signal interference between relay nodes which simultaneously send packets are reduced and frequency reuse is realized thereby system performance is improved. In this paper, we apply directional antennas to enhance the performance of IPT forwarding. Directional antennas offer reduced interference and hence better spatial reuse. However, they also present difficult coordination problems such as deafness and directional hidden terminal problem. In order to reduce the complexity of using directional antennas, we proposed the concept of fixed directional antennas system (FDA) in which each node contains multiple wireless interfaces and each interface is equipped with a directional antenna. We applied FDA to wireless backhaul with IPT forwarding. We also devised a new routing method and extended IPT forwarding for FDA system. The proposed concept is implemented into testbeds and evaluated under indoor environment. Experiment results show that the extended IPT forwarding with FDA system achieves better performance than the traditional IPT forwarding with omni-directional antennas.

SS1-3 An Implementation of Fixed Backoff-time Switching Method on IEEE 802.11 MAC Protocol for Wireless Internet-access Mesh Network (pp. 67–72)
[PDF]

Nobuo Funabiki	Okayama University, Japan
Sritrusta Sukaridhoto	Okayama University, Japan
Zhe Wang	Okayama University, Japan
Toru Nakanishi	Okayama University, Japan
Kan Watanabe	Okayama University, Japan
Shigeto Tajima	Osaka University, Japan

A variety of aspects in the *Wireless Internet-access Mesh NETWORK (WIMNET)* have been studied to provide a cost-efficient solution of a scalable Internet-access network. WIMNET is composed of multiple wireless *Access Points (APs)* to hosts that are also connected with each other through wireless links, where one AP acts as a gateway to the Internet. Previously, we have proposed the concept of the *CSMA-based Fixed Backoff-time Switching (CSMA-FBS) method* to improve the performance of WIMNET by assuring necessary link activation chances for multi-hop communications. In this paper, we present the detailed procedure of the CSMA-FBS method on the *IEEE 802.11 MAC protocol* and the implementation in the *QualNet* simulator. The simulation results in two network topologies confirm the effectiveness of our proposal.

SS1-4 A CSMA/CA based MAC Protocol to Improve TCP Performance in Multi-hop Cognitive Network (pp. 73–78)
[PDF]

Takamasa Kimura	The University of Electro-Communications, Japan
Takeo Fujii	The University of Electro-Communications, Japan

In this paper, we propose a novel MAC protocol to improve the TCP performance in a cognitive multi-hop mobile ad hoc network (CR MANET). CR MANET shares the spectrum with a legacy wireless LAN to increase the spectrum efficiency. In order to realize such spectrum sharing system, it is required to protect legacy wireless LAN and to improve the performance of CR MANET. However, the existence of the legacy wireless LAN decreases the CR MANET performance due to time variant appearance of legacy system. In particular, TCP performance degrades because a congestion control of TCP is worked by the existence of the legacy wireless LAN even if congestion is not appeared. In this paper, in order to improve the performance of CR MANET, we propose an adaptive contention window size control method. In the proposed method, the contention window size is controlled according to the TCP congestion window (cwnd) size at a TCP transmitter of each secondary users. The performance of the proposed method is evaluated by using computer simulations and we confirm the effectiveness of the proposed method.

SS1-5 A Throughput Evaluation of Wireless Internet-access Mesh Network using MIMO and Adaptive Array Antenna (pp. 79–84)
[PDF]

Shigeto Tajima	Osaka University, Japan
Nobuo Funabiki	Okayama University, Japan
Shigeru Tomisato	Okayama University, Japan
Masaharu Hata	Okayama University, Japan
Teruo Higashino	Osaka University, Japan

As a flexible, cost-efficient solution for a scalable Internet-access network, we have studied the architecture and design optimization issues of the *Wireless Internet-access Mesh NETWORK (WIMNET)*. WIMNET is composed of wirelessly connected multiple access-points (APs) as mesh routers, where two types of APs are used together to achieve the scalability with sufficient bandwidth and low costs. One is an expensive, programmable *Smart AP (SAP)* that has multiple antennas for wider band communications and implements various functions for the Internet access. Another is an inexpensive, non-programmable *Conventional AP (CAP)* that has a single antenna. To enhance the performance of WIMNET by increasing the transmission capacity, the adoption of *Multiple-Input and Multiple-Output (MIMO)* and *Adaptive Array Antenna (AAA)* technologies at a SAP can be a good solution. In this paper, we first present a simple simulation model that represents the packet transmission/reception behaviors at APs in WIMNET when they are adopted. Then, we evaluate the throughput improvement by using the WIMNET simulator that has been modified based on the model.

8.3 Regular Session 2 (RS2): Multimedia and Systems (Poster Session)

Tuesday, 1 November 2011, 14:00–15:20 at International Conference Hall

Chair: Prof. Go Tanaka (Nagoya City University, Japan)

RS2-1 Speech Enhancement based on Lattice Type LPEF and Bias Free Equation Error ADF

(pp. 85–90)
[PDF]

Shinichi Wada	Tottori University, Japan
Naoto Sasaoka	Tottori University, Japan
James Okello	NEC Corporation, Japan
Yoshio Itoh	Tottori University, Japan
Masaki Kobayashi	Chubu University, Japan

In order to reduce background noise in noisy speech, we have investigated a speech enhancement based on a noise reconstruction system (NRS) with a linear prediction error filter (LPEF) and a noise reconstruction filter (NRF). The NRS assumes that the background noise is generated by exciting a linear system with white noise. First, the LPEF estimate the white noise. Next, the NRF estimates the background noise from the white noise. However, the conventional system uses finite impulse response (FIR) filters. The estimated white noise therefore contains the residual speech. As a result, the quality of enhanced speech is degraded. Furthermore, at the NRF, a kind of background noise, which can be estimated, is limited. In order to solve these problems, we introduce a lattice filter and an equation error adaptive digital filter (ADF) as the LPEF and the NRF respectively. Since a lattice filter approximates a vocal-tract filter for the speech production process, the residual speech is reduced. In addition, an equation error ADF with bias free is used as the NRF, then it can improve the estimation accuracy of background noise and the quality of enhanced speech.

RS2-2 Fast Noise Suppression Algorithm for DSP Implementation

(pp. 91–96)
[PDF]

Hiromasa Terashima	Tokyo University of Science, Suwa, Japan
Takahiro Natori	Tokyo University of Science, Suwa, Japan
Nari Tanabe	Tokyo University of Science, Suwa, Japan
Hideaki Matsue	Tokyo University of Science, Suwa, Japan
Toshihiro Furukawa	Tokyo University of Science, Japan

In this paper, we propose a Kalman filter based fast noise suppression algorithm with colored driving source. The algorithm aims to achieve robust noise suppression with reduced computational complexity by modifying canonical state space model. The remarkable features of the proposed algorithm are that it can be realized by 3 multiplications and that it has the better performances, using only Kalman filter algorithm for the proposed canonical state space models with the colored driving source: (i) a vector state equation is composed of the only speech signal, and (ii) a scalar observation equation is composed of speech signal and additive noise. We have confirmation of validity of the proposed canonical state space models with the colored driving source, and also show the effectiveness through numerical results and subjective evaluation results using the TMS320C6713 DSP of Texas Instruments.

RS2-3 Low Computational Robust F_0 Estimation based on Time-Varying Complex Speech Analysis (pp. 97–100)
[PDF]

Keiichi Funaki University of the Ryukyus, Japan
Takehito Higa University of the Ryukyus, Japan

We have already proposed robust fundamental frequency (F_0) estimation based on robust ELS (Extended Least Square) time-varying complex-valued speech analysis for an analytic speech signal. It has been reported that the method performs better for IRS filtered speech corrupted by white Gauss noise or pink noise since speech spectrum can be accurately estimated in low frequencies. However, a large amount of computational cost is required in the method since correlations of residual signal corresponding to 50–400 [Hz] have to be calculated. In this paper, computational cost is reduced by introducing a pre-selection based on spectral peak pinking. The performance of the low computational method is evaluated using Keele pitch database. The evaluation demonstrates that the fast method can estimate more accurate F_0 for male speech.

RS2-4 Speech Enhancement based on Iterative Wiener Filter using Robust Time-Varying Complex Speech Analysis (pp. 101–105)
[PDF]

Keiichi Funaki University of the Ryukyus, Japan
Yusuke Inafuku University of the Ryukyus, Japan
Taishi Tamashiro University of the Ryukyus, Japan

Iterative Wiener filter (IWF) method has been adopted as the speech enhancement in which speech and noise power spectra are estimated by LPC analysis iteratively. In this paper, we propose an improved IWF method by introducing an ELS-based robust complex LPC speech analysis instead of the conventional LPC analysis. The robust complex speech analysis can estimate more accurate spectrum in low frequencies, thus it is expected that it can perform better for the IWF. The objective evaluation has been performed for speech signal corrupted by white Gaussian or pink noise. The results demonstrate that the proposed method can perform better than MMSE-based one.

RS2-5 A Facile Interface for AR System using Human Whistle Sound (pp. 106–109)
[PDF]

Taiki Fuji Tokyo University of Agriculture and Technology, Japan
Keio University, Japan
Yasue Mitsukura Keio University, Japan
Nozomu Hamada Keio University, Japan

Human whistle sound composes of single frequency with little individual variation, and its strong line spectrum appears. Therefore, the sound is manageable as the amount of characteristic. In this paper, we propose to use human whistle sound as an operator interface for the augmented reality (AR) system and mixed reality (MR). When considering the AR system such as virtual furniture placement in a condominium and support work in a factory, it is desirable for a hands-free, and must be a valid user and system interfaces. Moreover, the processing is desirable to conduct the lightly processing cost in real time. Thus, the human whistle sound would be effective for the AR interface. In order to show the effectiveness of our proposed system, we perform some simulations using the human whistle sounds to operate the AR system in real time.

RS2-6 Normalization Method Improving Estimation Speed in Frequency Domain Steepest Descent Type Adaptive Algorithm (pp. 110–115)
[PDF]

Yusuke Kuwahara	University of Hyogo, Japan
Yusuke Iwamatsu	University of Hyogo, Japan
Kensaku Fujii	University of Hyogo, Japan
Mitsuji Muneyasu	Kansai University, Japan
Masakazu Morimoto	University of Hyogo, Japan

In this paper, we propose a normalization method of the gradient vector forming frequency domain steepest descent type adaptive algorithms and show that the estimation speed of coefficients of adaptive filter is thereby improved. The frequency domain adaptive algorithm using discrete Fourier transform (DFT) requires replacing the former half of the elements of the difference vector forming the gradient vector with zeros for implementing linear convolution. The replacement, however, generates a non-diagonal matrix expressing the correlation between the components of DFT of reference signal used for the identification of unknown system. In this case, the simplest normalization method of the gradient vector is the division by the trace of the matrix. We first show that the trace is excessive for the normalization, which reduces the estimation speed. We hence propose another normalization method dividing the gradient vector by the sum of the diagonal and two adjoining elements of the matrix, and verify using computer simulations that the estimation speed can be improved.

RS2-7 Automatic Parameter Adjustment Method for Audio Equalizer Employing Interactive Genetic Algorithm (pp. 116–119)
[PDF]

Yuki Mishima	Kansai University, Japan
Yoshinobu Kajikawa	Kansai University, Japan

In this paper, we propose an automatic parameter adjustment method for audio equalizers using an interactive genetic algorithm (IGA). It is very difficult for ordinary users who are not familiar with audio devices to appropriately adjust the parameters of audio equalizers. We therefore propose a system that can automatically adjust the parameters of audio equalizers on the basis of user's evaluation of the reproduced sound. The proposed system utilizes an IGA to adjust the gains and Q values of the peaking filters included in audio equalizers. Listening test results demonstrate that the proposed system can appropriately adjust the parameters on the basis of the user's evaluation.

RS2-8 Adaptive Voice Activity Detection for Multiple Simultaneous Speakers (pp. 120–123)
[PDF]

Jaime Lorenzo Trueba	Keio University, Japan
Nozomu Hamada	Keio University, Japan

The proposed voice activity detection (VAD) system offers a novel way of mixing monaural and microphone array techniques; monaural mechanisms are used to provide the desired robustness while array techniques add directional capabilities to the system. This is implemented by applying a preliminary cochlear filtering with a subsequent channel selection process to remove interferences. Then a set of acoustic criteria is enforced in order to be able to obtain the harmonic structures of the sources, which are finally used to obtain the VAD masks. Additionally, an adaptive feedback loop is included to allow for environmental SNR variations. The proposed VAD system proves capable of working in real-time on multiple simultaneous input signals of SNR as low as -5 dB with an average misdetection probability of less than 4%.

RS2-9 Modified-Error Filtered-x Algorithm Employing Linear Prediction Filter(pp. 124–129)
[PDF]Shinya Okuno Kansai University, Japan
Yoshinobu Kajikawa Kansai University, Japan

A feedback active noise control (ANC) system, which is effective for narrowband noise, can obtain an input signal and monitor the noise reduction performance using only an error microphone. Ordinary ANC systems generally have a secondary path following the noise control filter. Therefore, the noise control filter should be updated by the Filtered-x algorithm. However, this algorithm diverges if the phase error of the secondary path model does not satisfy the stability condition of $-\pi/2$ to $\pi/2$. In this paper, we focus on a modified-error feedback ANC system that can update the noise control filter using an ordinary adaptive algorithm such as NLMS instead of the Filtered-x algorithm. The modified-error feedback ANC system has an advantage that the rate of convergence can be improved compared with that of the feedback ANC system using the Filtered-x algorithm. However, the modified-error feedback ANC system has the possibility of divergence because broadband noise such as background noise always corrupts the input signal for the system. In this paper, we propose a modified-error feedback ANC system using a linear prediction filter to suppress the broadband disturbance. Simulation results show that the proposed system is superior to the conventional system in terms of the rate of convergence and the noise attenuation level while maintaining stability.

RS2-10 An Efficient Recomputing Concepts Algorithm for Microarray Data Analysis using Biological Lattice(pp. 130–135)
[PDF]

Hidenobu Hashikami	University of Tsukuba, Japan
Nur Hasanah	University of Tsukuba, Japan
Kazuhito Sawase	University of Tsukuba, Japan
Takanari Tanabata	National Institute of Agrobiological Sciences, Japan
Fumiaki Hirose	National Institute of Agrobiological Sciences, Japan
Hajime Nobuhara	University of Tsukuba, Japan

We propose a data-analytic system for microarray gene expression data based on Formal Concept Analysis (FCA). The purpose of the system is to systematically organize the data and build a biological lattice that can analyze complex relations among genes and give better biological interpretation of microarray data. In the system, because FCA handles binary data, the microarray data is binarized by setting up a threshold value. Previously, when change was occurred, formal concepts that are nodes of the lattice were computed from the beginning, but the calculation is inefficient. We propose a new algorithm that uses detection matrix and updating concepts to efficiently update only altered concepts from previously generated concepts. Experiments of running time show that the algorithm processes an average time of 0.94 seconds for real microarray data containing 43734 genes and 6 gene expression values.

RS2-11 Evaluation of Human Mental Stress in Text Reading by Quantitative EEG Analysis(pp. 136–140)
[PDF]Shinya Tozuka Meiji University, Japan
Kaoru Arakawa Meiji University, Japan

In order to clarify the mental influence of electronic books, which are becoming popular nowadays, human mental stress is evaluated by analyzing electroencephalogram (EEG), in reading text printed on paper and those displayed on electronic display respectively. Here, subjects read three types of text written in different-sized letters, small, middle, and large on two types of text media. The amounts of alpha waves and beta waves in the EEG data are analyzed, and the results show that the amount of beta waves is dominant when subjects read text in smaller letters than larger ones on both paper and electronic media. Especially when they read on the electronic display, the ratio of the amount of beta waves to that of alpha waves is higher in the case of smaller letters with significance. Since this ratio is known to indicate the degree of mental stress, we can say that mental stress caused by reading small-sized letters is larger in reading on electronic display than on paper.

RS2-12 Introduction of 1vs1 SVM Into Biometric Authentication using Intra-Body Propagation Signals (pp. 141–145)
[PDF]

Yuuta Sodani Tottori University, Japan

Isao Nakanishi Tottori University, Japan

Shigang Li Tottori University, Japan

Using intra-body propagation signals in biometric person authentication has been proposed. It is caused by the human body composition; therefore, it has an individual characteristic. Furthermore, it makes easy to detect liveness without additional schemes, so that it has tolerability to spoofing using artifacts. In this paper, we propose to use the one-versus-one (1vs1) classification by the SVM at the verification stage. The 1vs1 SVM is a method of expanding the SVM as the two-class classifier to the multi-class. Each SVM is used to classify two users and integrating the results from all SVMs, the SVMs are learned for all conceivable pairs of users. Final decision is done by a majority rule. In experiments using 20 subjects, the EER of 18 % is obtained.

8.4 Keynote Speech (Banquet Talk) (KEY)

Tuesday, 1 November 2011, 16:30–17:30 at The Villas, Nagasaki Sunset Marina

(2nd Floor, The Private Villa)

Organizer: Prof. Akio Miyazaki (Kyushu Sangyo University, Japan)

Invited Speaker: Prof. Kazuaki Goshi (Kyushu Sangyo University, Japan)

KEY-1 Safe Driving Education System by Multimedia and Network

(pp. 146–149)

[PDF]

Kazuaki Goshi Kyushu Sangyo University, Japan

Katsuya Matsunaga Kyushu Sangyo University, Japan

One of the goals of Intelligent Transport Systems (ITSs) is to reduce traffic accidents and enhance safety. However, plenty of technologies for safe driving cannot prevent traffic accidents, if a driver does not understand what safe driving is exactly. Thus, driver education is quite important even if ITSs spread. In order to educate drivers, supervisors or safe driving managers should obtain information about driving behavior. Recent computer and communication technologies have made it possible to obtain multimedia information concerning driving behavior and record or send the information to a supervisor outside of the vehicle through wireless communication and the Internet. It is believed that the most efficient opportunity to teach safe driving is the moment when a driver is driving dangerously. Therefore, we have developed an Assistant System for Safe Driving by Informative Supervision and Training (ASSIST), a system created to prevent accidents based on our safe-driving theory.

8.5 Special Session 2 (SS2): Intelligent Systems in Medical Engineering (Oral Session)

Wednesday, 2 November 2011, 10:00–11:40 at International Conference Hall

Organizer: Prof. Keiichi Horio (Kyushu Institute of Technology, Japan)

Chair: Prof. Keiichi Horio (Kyushu Institute of Technology, Japan)

SS2-1 A Non-rigid Alignment Method for Triangular Mesh Surface of Lung Field

(pp. 150–153)
[PDF]

Guangxu Li	Kyushu Institute of Technology, Japan
Hyoungseop Kim	Kyushu Institute of Technology, Japan
Joo Kooi Tan	Kyushu Institute of Technology, Japan
Seiji Ishikawa	Kyushu Institute of Technology, Japan
Akiyoshi Yamamoto	Kyushu Institute of Technology, Japan
	Kyoaikai Tobata Kyoritu Hospital, Japan

In Statistical Shape Model (SSM) segmentation method, the fundamental step to obtain the statistical shape models is to align all the training samples to the same spatial modality. In this paper, we propose a simple nonrigid matching method for training samples of organs alignment by using surface Gauss map. It is a feature based alignment method which matches two models depending on the distribution of surface curvature. We suppose the modalities of organs are orientable and could be recognized on Gauss map. According to the rotation and twisting on Gaussian spherical surface, the distances on corresponding parts could be minimized. We applied our proposed method on left lung field alignment. And we also elaborate the triangular polygonal surface generation procedure and a mesh smoothing filter to remove the illogical mapping of vertex. Matching experiments on were performed with an average 4.0 % improvement of uniformity. The availability of proposed method was confirmed.

SS2-2 A Novel Registration Method for Digital Subtraction Radiography

(pp. 154–157)
[PDF]

Kota Murahira	Tokyo City University, Japan
Akira Taguchi	Tokyo City University, Japan

The dental radiograph is used for diagnosis and individual identification. In the case of diagnosis, the digital subtraction radiography (DSR) has been used. The projective distortion between two dental radiographs taken from the same patient is caused by the position of X-ray irradiator. Therefore, for the DSR, the registration of two dental radiographs is required. In general, the registration is performed by the projective transform. In the case of the projective transform, it is necessary for deriving the transformation function to find anatomical same points from two images. In this paper, we propose a novel method to extract suitable anatomical same points from two images accurately in order to achieve the registration exactly.

SS2-3 Proposal of Force Feedback Method by Grasping Arm to Control Upper Extremity Prosthesis (pp. 158–161)
[PDF]

Chikamune Wada Kyushu Institute of Technology, Japan
 Yuji Akiyama Arizono Orthopedic Supplies Co., Ltd., Japan
 Masatoshi Hirano Arizono Orthopedic Supplies Co., Ltd., Japan
 Hisashi Arizono Arizono Orthopedic Supplies Co., Ltd., Japan

We have been developing a force feedback system for body-powered upper extremity prostheses. In our system, the prosthesis user is informed of the grasping force of the prosthesis fingertips exerted by the grasping arm. In the first experiment, we investigated the relationship between the grasping force of the fingertips and the force of the grasping arm. In the second experiment, we investigated whether or not subjects could select designated weights based on the force of the grasping arm by using obtained relationship. From the results, some subjects were able to select weights which the experimenter expected the subjects to select, but other subjects could not select. We hypothesized the reason why subjects could not select weights was that those subjects could not make good relationship between the grasping force of the fingertips and the force of the grasping arm. Then, in the third experiment, we proposed a new relationship between the grasping force of the fingertips and the force of the grasping arm. From the experimental results, by using new relationship, most subjects were able to select proper weights.

SS2-4 New Automatic Detection of Carotid Artery Calcification in Digital Dental Panoramic Radiographs Considering Intensity Gradients (pp. 162–166)
[PDF]

Katsuyuki Shinjo Kansai University, Japan
 Yoshinori Izumi Kansai University, Japan
 Mitsuji Muneyasu Kansai University, Japan
 Akira Asano Hiroshima University, Japan
 Keiichi Uchida Matsumoto Dental University, Japan
 Akira Taguchi Matsumoto Dental University, Japan

The existence of carotid artery calcification as an index for arteriosclerosis has attracted a great deal of attention. Thus, a system for detecting carotid artery calcification from dental panoramic radiographs has been developed to encourage patients to go check up. In this paper, we propose an improved automatic detection method for carotid artery calcification in digital dental panoramic radiographs based on intensity gradients. We reconsider the parameter setting in the conventional method, which is based on the intensity gradients in radiographs. The proposed method can also reduce the misdetection of carotid artery calcification by elimination of the mandible and spine regions. Experimental results show that a good detection performance is obtained.

SS2-5 Relational Higher-Rank SOM for Bacterial Flora Analysis (pp. 167–170)
[PDF]

Hideaki Misawa Kyushu Institute of Technology, Japan
 Keiichi Horio Kyushu Institute of Technology, Japan
 Fuzzy Logic Systems Institute, Japan
 Nobuo Morotomi University of Occupational and Environmental Health, Japan
 Kazumasa Fukuda University of Occupational and Environmental Health, Japan
 Hatsumi Taniguchi University of Occupational and Environmental Health, Japan

Bacterial floras are the communities of bacteria and are represented as groups of bacterial DNA sequences. In bacterial flora analysis, it is necessary to reveal similar and different properties of bacterial floras based on bacterial DNA sequences. A bacterial flora is regarded as a group of relational data, which are given in the form of pairwise similarities or dissimilarities. Higher-rank self-organizing maps (SOMs) can be used to visualize the similarities between groups of vectorial data. However, they cannot be used directly for groups of relational data. We present an extension of the higher-rank SOM to relational data by introducing the relational clustering algorithm. To illustrate the presented method, we apply the method to a bacterial flora dataset.

8.6 Regular Session 3 (RS3): Communication Systems (Poster Session)

Wednesday, 2 November 2011, 11:50–13:10 at International Conference Hall

Chair: Prof. Takahiro Matsumoto (Yamaguchi University, Japan)

RS3-1 Theoretical Analysis of BER Performance in ASK-SS and M-ary/ASK-SS Systems using Compact Matched Filter Bank for an Optical ZCZ Code Over Rayleigh Fading Channels (pp. 171–175) [PDF]

Takahiro Matsumoto Yamaguchi University, Japan

Hideyuki Torii Kanagawa Institute of Technology, Japan

Shinya Matsufuji Yamaguchi University, Japan

The optical ZCZ code, which is a set of pairs of binary and biphasic sequences with zero correlation zone, can provide code division multiple access (CDMA) communication systems without co-channel interference. The M-ary amplitude shift keying spread spectrum (M-ary/ASK-SS) system using this code can detect a desired sequence without interference of undesired sequences. We have proposed the compact construction of a matched filter bank for this code, which is called the compact-type matched filter bank. However, M-ary/ASK-SS system using this filter bank might go down the bit error rate (BER) performance because input-output characteristics of this filter bank for this code with zero correlation zone $4n-2$ are nonlinear characteristics.

In this paper, we clarify that BER performance in ASK-SS and M-ary/ASK-SS systems over the Rayleigh fading channels is not influenced by nonlinear characteristics of this filter bank by the theoretical formula of BER characteristics and the computer simulation. The BER performance in the ASK-SS system using compact-type matched filter under the Rayleigh fading environment go down compared to that using direct-type matched filter as expected. But the BER performance in the M-ary/ASK-SS system using this compact-type matched filter bank under the Rayleigh fading environment is equal compared to that using parallel-type matched filter bank. In fact, this compact-type matched filter bank is effective in the M-ary/ASK-SS system because the BER performance under the Rayleigh fading environment in the M-ary/ASK-SS is not influenced by nonlinear characteristics of compact-type matched filter bank.

RS3-2 Retransmission Diversity for Single Carrier Block Transmission based on Equi-interval Subcarrier Assignment (pp. 176–181) [PDF]

Takehiro Yoshida Ibaraki University, Japan

Teruyuki Miyajima Ibaraki University, Japan

In automatic repeat-request (ARQ) systems based on orthogonal frequency division multiplexing (OFDM), subcarrier reassignment techniques are known to be effective. This paper proposes a subcarrier reassignment scheme for single carrier block transmission whose peak to average power ratio (PAPR) is low. We point out that PAPR can be kept low as long as FFT outputs are reassigned to cyclic shifted subcarriers and/or equi-interval arranged subcarriers for each retransmission. In the proposed scheme, the optimum shift and interval are determined according to channel gains. Computer simulation results demonstrate that the proposed scheme provides significant performance improvement as well as low PAPR.

RS3-3 Blind Sparse Channel Estimation with Nonzero Tap Detection for OFDM Systems(pp. 182–187)
[PDF]Takahiro Ueno Ibaraki University, Japan
Teruyuki Miyajima Ibaraki University, Japan

Many real-world wireless channels tend to have sparse impulse responses with a relative small number of nonzero channel taps. In this paper, we consider blind estimation of sparse channels in OFDM systems. The proposed method consists of two stages, nonzero tap detection and tap coefficients estimation. First, we propose a nonzero tap detection method that exploits the cyclo-stationarity that cyclic prefix induces to transmitted signals. The proposed detection method can detect nonzero taps successfully regardless of the magnitude of the first tap of an impulse response. Second, we propose to combine the nonzero tap detection result with a blind OFDM channel estimation method. Channel estimation accuracy is improved since the number of effective taps can be largely reduced. Simulation results show the superiority of the proposed method to conventional methods.

RS3-4 Blind Channel Shortening based on Autocorrelation Sum Minimization for MC-CDMA Systems(pp. 188–193)
[PDF]Mizuki Kotake Ibaraki University, Japan
Teruyuki Miyajima Ibaraki University, Japan

In multicarrier code-division multiple-access (MC-CDMA), inter-block interference (IBI) due to delayed waves exceeding a cyclic prefix severely limits the performance. To suppress IBI, this paper proposes a channel shortening method using a time-domain equalizer. The proposed method minimizes the sum of equalizer output autocorrelations without the transmission of training symbols. We derive a sufficient condition for the method to shorten a channel and to suppress IBI completely. Simulation results show that the proposed method can significantly suppress IBI by properly shortening a channel.

RS3-5 Method of Improving Transmission Characteristic While Maintaining Sound Quality for Use in Acoustic OFDM(pp. 194–199)
[PDF]Masanori Tamura Kansai University, Japan
Yoshinobu Kajikawa Kansai University, Japan

In this paper, we propose a method of controlling the power of subcarriers using frequency masking for use in acoustic OFDM. The proposed method can improve the transmission characteristic while maintaining the sound quality. Recently, acoustic OFDM (orthogonal frequency division multiplexing), which uses audible sound waves as an information transmission medium, has been studied. In acoustic OFDM, the transmission characteristic deteriorates owing to subcarriers with extremely low power within the frequency band used to embed information because the information is embedded in the phase of an acoustic signal. The position of the corresponding subcarriers depends on the sound source and/or the embedded position. We therefore propose a method of improving the transmission characteristic to solve this problem. The proposed method can improve the transmission characteristic using a psychoacoustic model based on frequency masking regardless of the sound source. We demonstrate the efficiency of the proposed method through simulation results and listening tests.

RS3-6 OFDM Transmission without using CP Applying Sliding FDE(pp. 200–205)
[PDF]Shoichiro Yamasaki Polytechnic University, Japan
Yoshimitsu Hama Polytechnic University, Japan

This study proposes an orthogonal frequency division multiplexing (OFDM) transmission technique without using cyclic prefix (CP). An overlap frequency domain equalization (FDE) has been applied to a single-carrier transmission technique without using CP and it has also been applied to OFDM. The effect of overlap FDE depends on the channel conditions and the residual interference after equalization often degrades the performances. The proposed OFDM without CP in this study applies sliding window to the overlap FDE, and its averaging function suppresses the residual interferences. Computer simulation shows the effect of the proposed technique over the multipath channels.

RS3-7 Power Supply Overlaid Communication System with OFDM Modulation for Industrial Robot Control (pp. 206–210)
[PDF]

Yusuke Yamaguchi Kyushu Institute of Technology, Japan
 Hidetsugu Koga Yaskawa Electric Corporation, Japan
 Masayuki Kurosaki Kyushu Institute of Technology, Japan
 Hiroshi Ochi Kyushu Institute of Technology, Japan

This paper presents a design of power supply overlaid communication system for industrial robot. The power supply overlaid communication provides a way to reduce the control cables in industrial robot. Although the interference from AC/DC power signal and Inter-Symbol Interference occur in the power supply line, OFDM reduce the problem. Hence we designed a FFT based OFDM transmitter and receiver for robot power supply overlaid communication. Our system data rate reaches 81 Mbps. It enables to control the robot which needs real time operation. This paper reports the result of the RTL design and feasibility of the proposed system.

RS3-8 Maximum Likelihood vs. Genetic Algorithm MIMO Detection for Realistic Rician Fading (pp. 211–214)
[PDF]

Kazi Obaidullah Hokkaido University, Japan
 Constantin Siriteanu Hokkaido University, Japan
 Yoshikazu Miyanaga Hokkaido University, Japan

The multiple-input multiple-output (MIMO) concept is being pursued alongside orthogonal frequency-division multiplexing (OFDM) for next generation wireless communications systems. Our paper focuses on the performance and complexity of maximum likelihood (ML) vs. genetic algorithm (GA) MIMO OFDM detection for the advanced WINNER II frequency-selective channel models. WINNER II indicates that fading is typically Rician, and that delay spread (DS), azimuth spread (AS) of the Laplacian power azimuth spectrum, and Rician K -factor have scenario-dependent lognormal distributions and correlations. Previous MIMO evaluations have relied on channel samples generated using custom-built (nonstandard) code, which may yield inconsistent evaluation results. Therefore, herein, we generate channel samples with a newly-introduced MATLAB function (i.e., a standard evaluation tool). Our paper shows numerical simulation results for ML and GA MIMO detection for random vs. average AS, DS, and K -factor in scenarios A1 (indoor office/residential) and C2 (typical urban macro-cell). We find that GA with matched-filter initialization and without incest prevention (which has low complexity) yields near-ML performance.

RS3-9 All-pass Filter based Blind MIMO-OFDM Equalization without Permutation (pp. 215–218)
[PDF]

Shuhei Shibata Tottori University, Japan
 Tatuya Nishimoto Tottori University, Japan
 Naoto Sasaoka Tottori University, Japan
 James Okello NEC Corporation, Japan
 Yoshio Itoh Tottori University, Japan

We propose a blind equalization system using on an all-pass filter for de-mixing the orthogonal frequency division multiplexing (OFDM) symbols in multiple-input multiple-output (MIMO) - OFDM system. In order to solve the problem, each transmitted OFDM symbol of a proposed MIMO-OFDM system is pre-filtering by a unique all-pass filter, which is referred to as Transmit tagging filter (TT-Filter) in this paper. At receiver, an inverse filter of TT-filter is used to blindly equalize a MIMO channel without any permutation.

RS3-10 Effective Adaptive Channel Estimation Technique for MIMO-Constant Envelope Modulation (pp. 219–224)
[PDF]

Ehab Mahmoud Mohamed Kyushu University, Japan
Osamu Muta Kyushu University, Japan
Hiroshi Furukawa Kyushu University, Japan

The authors have proposed Multi-Input Multi-Output (MIMO)-Constant Envelope Modulation, (MIMO-CEM), as power and complexity efficient alternative to MIMO-OFDM, suitable for wireless backhaul networks in which relay nodes are fixed in their positions. One of the major problems to withstand real application of MIMO-CEM is to estimate MIMO channel characteristics. The MIMO-CEM is based upon two contrary schemes; one is nonlinear equalization such as maximum likelihood sequence estimator, which needs accurate channel information to replicate the received signal passing through it. The other is a low resolution analog-to-digital converter (ADC), e.g., 1-bit in the default operation that removes the received signal amplitude fluctuation. In this paper, as a solution to channel estimation problem in MIMO-CEM with low resolution ADC receiver, we propose an adaptive MIMO-CEM channel estimation scheme where iterative adaptive channel estimation is carried out to minimize the error between the received preamble signal and the replicated one. We also prove that Code Division Multiplexing (CDM) preambles transmission is effective and essential in estimating MIMO channel parameters in presence of large quantization noise. Computer simulation results show that MIMO-CEM with the proposed channel estimator using CDM preambles achieves identical BER performance to that with the ideal channel estimation even in presence of severe quantization noise caused by a low resolution ADC.

RS3-11 A Study on Walking Path Estimation based on a Human Detection System (pp. 225–229)
[PDF]

Kodai Yokoo Aichi Prefectural University, Japan
Akitoshi Itai Aichi Prefectural University, Japan
Hiroshi Yasukawa Aichi Prefectural University, Japan

A human detection system based on pressure sensors has been investigated as a part of an inexpensive sensor network system [1][2]. In this system, the pressure data is transmitted by one-way communication links to reduce installation and management costs. Conventional research focuses on the transmission infrastructure for human detection systems. However, human tracking based on pressure data has not been tried yet. This paper proposes and evaluates a walking path estimation scheme that uses pressure data.

RS3-12 MIMO-OFDM Systems Between Rolling Stock and On-ground (pp. 230–234)
[PDF]

Yuma Kuchiishi Tottori University, Japan
Naoto Sasaoka Tottori University, Japan
Yoshio Itoh Tottori University, Japan

In this paper, a railroad wireless LAN system for the in-train digital signage is proposed. The conventional wireless LAN system such as IEEE 802.11n cannot be used for a railroad wireless communication due to Doppler frequency. In addition, the required propagation distance is too long for a wireless LAN. In order to improve the transmission capacity and diversity gain, the proposed system is based on a 8x4 MIMO (Multiple-Input Multiple-Output) - OFDM (Orthogonal Frequency Division Multiplexing) system with V-LSTBC (Vertical-Layered Space-Time Block Coding). In addition, the parameters of the proposed system are set according to the propagation environment between a rolling stock and on-ground. From the simulation results, it can be seen that the proposed system can improve the throughput performance compared with IEEE 802.11n.

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