IIH-MSP 2018
The 14th International Conference on Intelligent Information Hiding and Multimedia Signal Processing
Program and Abstract Book
26-28 November, 2018
Sendai, Japan
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The 14th International Conference on
Intelligent Information Hiding and
Multimedia Signal Processing

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The Fourteenth International Conference on Intelligent Information Hiding and Multimedia Signal Processing (IIH-MSP 2018), is technically co-sponsored by Research Institute of Electrical Communication, Tohoku University in Japan, Fujian University of Technology in China, Taiwan Association for Web Intelligence Consortium, Shandong University of Science and Technology in China, and IEEE Signal Processing Society Sendai Chapter.

The conference proceedings will be published in the book series of Smart Innovation, Systems and Technologies by Springer. Normally, papers in this series are indexed by EI.
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Conference Venue

Aoba Memorial Hall, Tohoku University
6-6 Aramaki aza Aoba, Aoba-ku, Sendai 980-8579 Japan
Aobayama East Campus, Tohoku University

Floor Plan
Aoba Memorial Hall

Room 1

Lobby
EV
WC

4F

Restaurant
Shikisai

Reception on 25
Lunch on 26
Lunch on 27

3F

Room 2

Lobby
EV
WC

5F
Directions to the campus

Access from Sendai Station

- **Subway [Sendai Subway Tozai Line]**
  From “Sendai” station, take the Subway bound to “Yagiyama Zoological Park”. Get off at “Aobayama” station. It takes 9 minutes and the fare is 250 JPY.

- **Taxi**
  You may take a taxi to the School of Engineering from Sendai Airport or Sendai Station. Fares are about 6,000 yen from Sendai Airport and 1,600 yen from Sendai Station. Taxi can be found at the taxi stands in front of Sendai Airport or Sendai Station.

Campus Map
Social Events

Welcome reception

November 25 (Sun.) 6:00 PM
Restaurant Shikisai, Aoba Memorial Hall 3F

Dinner

November 26 (Mon.) 6:30 PM
Hotel Metropolitan Sendai (next to Sendai Station)
https://www.sendaimetropolitan.jp/en-gb

Banquet

November 27 (Tue.) 7:00 PM
Restaurant Shokeikaku
Shokeikaku, a restaurant in the former Date family residence. Overlooking the splendid garden from a traditional Japanese style (Shoin style) room, you can taste various local dishes served in a small Sendai Tansu (a Japanese chest of drawers).

Excursion

November 28 (Wed.) 1:20 PM
Fee: free (including a lunchbox), reservation needed
A bus tour, visiting Matsushima Bay, one of the three scenic spots in Japan. In addition to the bay cruise using a pleasure boat, you will see the traces of the Great East Japan Earthquake and tsunami. The bus returns to Sendai Station in the evening.
Program at a glance
Keynote Speakers

Keynote 1: Hardware Security: Research Field Expanding in IoT Era

Prof. Naofumi Homma
Research Center for Electrical Communication, Tohoku University
26 November, Room 1, 9:20-10:20

Abstract: Hardware security in mobile and embedded systems is drawing much attention in the context of the rapid growth of Internet-of-Things. Due to the easier accessibility, security threats and vulnerabilities for "things" located everywhere are more critical in comparison with PCs and servers in a room. In particular, the threats of side-channel attacks are non-trivial because they can be done by relatively low-cost equipment in a non-destructive manner. This talk will start with an overview of researches on hardware security, and then introduce the-state-of-the-art side-channel attacks and countermeasures.

Bibliography: Naofumi Homma received the PhD degrees in information sciences from Tohoku University, Sendai, Japan, in 2001. Since 2016, he has been a Professor in the Research Institute of Electrical Communication, Tohoku University. In 2009-2010 and 2016-2017, he was a visiting professor at Telecom ParisTech in Paris, France. His research interests include computer arithmetic, VLSI design methodology, and hardware security. He received a number of awards including the Best Symposium Paper Award at the 2013 IEEE International Symposium on Electromagnetic Compatibility (EMC 2013), the Best Paper Award at the 2014 IACR International Conference on Cryptographic Hardware and Embedded Systems (CHES 2014), the JSPS Prize in 2018, and German Innovation Award in 2018. He served as a Program Co-Chair of 2017 IACR International Conference on Cryptographic Hardware and Embedded Systems (CHES 2017).
Keynote 2: Recent Advances in Visual Sensor Systems

Dr. Ivan Lee
University of South Australia
27 November, Room 1, 9:00-10:00

Abstract: The rapid development in smart sensor technologies has major impact across most industries, with rich information collected to assist information management and decision making. Among these, visual sensors acquire rich media data from natural and built environments, which plays crucial role in smart Internet of Things. While visual sensors promise improved services in manufacturing, health, surveillance, monitoring, and vehicular industries, techniques in acquisition, processing, and analysis remain on-going challenges. This keynote address will cover the evolution of visual sensor development in the recent past, and showcase various applications facilitated by visual sensors. Present challenges of visual sensor applications will be presented, and future research directions will be discussed.

Bibliography: Ivan Lee received the B.Eng., M.Com., MER, and Ph.D. degrees from The University of Sydney. He was a software development engineer at Cisco Systems, a software engineer at Remotek Corporation, and an Assistant Professor at Ryerson University. Since 2008, he has been a Senior Lecturer with the University of South Australia. He has served as the Program Co-Chair of the 2008 ACM International Conference on Image and Video Retrieval (CIVR), the General Chair of 2013 Australasian Computer Science Week (ACSW), and the General Co-Chair of 2015 International Conference on Intelligent Information Hiding and Multimedia Signal Processing (IIH-MSP). He was a recipient of the Lockheed Martin Best Paper Award of 2015 SPIE Defense + Security, Automatic Target Recognition XXV, and the Best Paper Award of 2007 Pacific-Rim Conference on Multimedia. His research findings have been disseminated in over 100 peer-reviewed publications, including IEEE Transactions on Image Processing, IEEE Transactions on Multimedia, IEEE Transactions on Circuits and Systems for Video Technology, IEEE Transactions on Emerging Topics in Computing, IEEE Transactions on Industrial Informatics, and Advanced Functional Materials. His research interests include smart sensors, multimedia systems, and scholarly data analytics.
Technical Programs

**MOA1A: Recent Advances in Information Hiding and Signal Processing for Audio and Speech Signals**
26 November, 11:00-12:20 Room 1 Session Chair: TBD

**MOA1A-1** An Interrogation Speech Manipulation Detection Method using Speech Fingerprinting and Watermarking
Shinya Takahashi and Kazuhiro Kondo

**MOA1A-2** Digital Audio Watermarking Method Based on Singular Spectrum Analysis with Automatic Parameter Estimation Using a Convolutional Neural Network
Kasorn Galajit, Jessada Karnjana, Aakinee Aimmanee and Masahi Unoki

**MOA1A-3** Muting Machine Speech Using Audio Watermarking
Akinori Ito

**MOA1A-4** Leveraging a Small Corpus by Different Frame Shifts for Training of a Speech Recognizer
Akinori Ito

**MOA1B: Emerging Techniques and Its Applications in Computer Science 1**
26 November, 11:00-12:20 Room 2 Session Chair: TBD

**MOA1B-1** A Hybrid NSGA-II for Matching Biomedical Ontology
Xingsi Xue, Jie Chen, Junfeng Chen, Dongxu Chen

**MOA1B-2** Multi-attributes Graph Algorithm for Association Rules Mining over Energy Internet
Ling Wang, Fu Tao Ma, Tie Hua Zhou, Xue Gao

**MOA1B-3** Real-time Electricity Pricing Trend Forecasting based on Multi-density Clustering and Sequence Pattern Mining
Tie Hua Zhou, Cong Hui Sun, Ling Wang, Gong Liang Hu

**MOA1B-4** TDT_CC: A Hot Topic Detection and Tracking Algorithm based on Chain of Causes
Zhen Hong Liu, Gong Liang Hu, Tie Hua Zhou, Ling Wang

**MOP1A: Advances in speech and language processing**
26 November, 13:20-15:20 Room 1 Session Chair: TBD

**MOP1A-1** Evaluation of English Speech Recognition for Japanese Learners Using DNN-based Acoustic Models
Jiang Fu, Yuya Chiba, Takashi Nose and Akinori Ito

**MOP1A-2** A Study on a Spoken Dialogue System with Cooperative Emotional Speech Synthesis Using Acoustic and Linguistic Information
Mai Yamanaka, Yuya Chiba, Takashi Nose, and Akinori Ito

**MOP1A-3** Comparison of Speech Recognition Performance between Kaldi and Google Cloud Speech API
Takashi Kimura, Takashi Nose, Shinji Hirooka, Yuya Chiba, and Akinori Ito

**MOP1A-4** Segmental pitch control using speech input based on differential contexts and features for customizable neural speech synthesis
Shinya Hanabusa, Takashi Nose, and Akinori Ito

**MOP1A-5** Two-Stage Sequence-to-Sequence Neural Voice Conversion with Low-to-High Definition Spectrogram Mapping
Sou Miyamoto, Takashi Nose, Kazuyuki Hiroshima, Yuri Odagiri, and Akinori Ito
MOP1A-6  Improvement of Accent Sandhi Rules Based on Japanese Accent Dictionaries
Hiroto Aoyama, Takashi Nose, Yuya Chiba, Akinori Ito

MOP1B: Emerging Techniques and Its Applications in Computer Science 2
26 November, 13:20-15:20 Room 2 Session Chair: TBD

MOP1B-1  A New Approximation Algorithm for the d-dimensional Knapsack Problem based on Hopfield Networks
Hsin-Lung Wu, Jui-Sheng Chang, Jen-Chun Chang

MOP1B-2  A Method of Cancellation Interference In CCFD System
Zengyou Sun, Yujie Zhao

MOP1B-3  Power Optimization Method of Magnetic Coupling Resonant Wireless Energy Transmission System
Jianpo Li, Yang Lu, Songjun Pan, Ziqi Dong, Baochun Mu, Fuxin Liu, Cong Zheng

MOP1B-4  PSO-AFSA Global Maximum Power Point Tracking Algorithm with Adaptive Evolutionary Strategy for PV System
Jianpo Li, Pengwei Dong, Cong Zheng, Fuxin Liu, Songjun Pan, Baochun Mu, Ziqi Dong

MOP1B-5  The Design of RFID Localization System for Library Books
Jianpo Li, Jun Wang, Fuxin Liu, Songjun Pan, Cong Zheng, Baochun Mu, Ziqi Dong

MOP1B-6  The Design and Implementation of Automatic Detection and Control Equipment with Unattended Truck Scales
Yun Wu, Xin Hu, XiaoDong Wang

MOP2A: Deep Learning for Information Hiding
26 November, 15:50-17:50 Room 1 Session Chair: TBD

MOP2A-1  Melody Completion Based on Convolutional Neural Networks and Generative Adversarial Learning
Kosuke Nakamura, Takashi Nose, Yuya Chiba, and Akinori Ito

MOP2A-2  Data Collection and Analysis for Automatically Generating Record of Human Behaviors by Environmental Sound Recognition
Takahiro Furuya, Yuya Chiba, Takashi Nose and Akinori Ito

MOP2A-3  DNN-Based Talking Movie Generation with Face Direction Consideration
Toru Ishikawa, Takashi Nose, and Akinori Ito

MOP2A-4  An Image Steganography Algorithm Based on Pixel Block Difference and Variable Modulus Function
Yü Yang, Ru Zhang, Jianyi Liu, Yuhan Wang and Fuhong Huang

MOP2A-5  Attack Pattern Mining Algorithm Based on Fuzzy Clustering and Sequence Pattern from Security Log
Jianyi Liu, Keyi Li, Yang Li, Ru Zhang and Xi Duan

MOP2A-6  Calculating the truck’s box volume with a single image under the circle projection and vanishing points constraint
Wei Sun, Wei Lu, Chun-yu Zhao, Bao-long Guo, Da-jian Li

MOP1B: Emerging Techniques and Its Applications in Computer Science 3
26 November, 15:50-17:50 Room 2 Session Chair: TBD

MOP2B-1  An Interactive Appliances’ Intelligent Control Method Based on Time-sharing Electricity Price
Yun Wu, Qiang Wang, Jian Wang

**MOP2B-2** Modification Algorithm to Node Localization Error for Wireless Sensor Networks  
Jianpo Li, Na Li, Cong Zheng, Fuxin Liu, Songjun Pan, Baochun Mu, Ziqi Dong

**MOP2B-3** A Real-time Missing Data Recovery Method Using Recurrent Neural Network for Multiple Transmissions  
Bor-Shing Lin, Yu-Syuan Lin, I-Jung Lee, Bor-Shyh Lin

**MOP2B-4** The extraction and application of the Color Texture Feature Based on Quaternion Gabor  
Bo Meng, Xiaolin Wang, Xuejun Liu, Linlin Xia, Guannan Deng, Shengxi Jiao

**MOP2B-5** Analysis and Detection of Android App Privilege Escalation Vulnerability Based on Machine Learning  
Xin Jiang, Wen Zhang, Shaozhong Niu, Yiming Xue

**MOP2B-6** A Watermarking Method for Printed QR Code based on Module Expansion  
Cai-Jie Weng, Jeng-Shyang Pan, Shi-Jian Liu, Mei-Jin Wang

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**TUA1A: Health Informatics and Intelligent Data Hiding**
27 November, 10:30-12:10 Room 1 Session Chair: TBD

**TUA1A-1** An Improved High-Capacity ECG Steganography with Smart Offset Coefficients  
Ching-Yu Yang and Wen-Fong Wang

**TUA1A-2** Preview-versioned Essential Secret Image Sharing  
Shang-Kuan Chen and Rei-Heng Cheng

**TUA1A-3** Visual Cryptography with QR-code transparencies  
Shang-Kuan Chen and Yen-Wu Ti

**TUA1A-4** Solving multiple charging vehicles scheduling problem for wireless rechargeable sensor networks using cuckoo search approach  
Rei-Heng Cheng and Shang-Kuan Chen

**TUA1A-5** A State Codebook Generation Algorithm of Side Match Vector Quantization  
Yang Wang and Zhibin Pan

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**TUA1B: Emerging Techniques and Its Applications in Computer Science 4**
27 November, 10:30-12:10 Room 2 Session Chair: TBD

**TUA1B-1** Research on Optimal Combination of Secondary Hybrid Encryption Algorithm Based on K-means Clustering Algorithm  
Yun Wu, MengKe Wu, HaoJie Shu

**TUA1B-2** Construct Left Ventricular Hypertrophy Prediction Model based on Random Forest  
Ming-Tai Wu, Meng-Hsiun Tasi, Sheng-Han Xiao, Tsu-Yang Wu

**TUA1B-3** The Bayesian Causal Inference in Multisensory Information Processing: a Narrative Review  
Yang Xi, Ning Gao, Mengchao Zhang, Lin Liu, Qi Li

**TUA1B-4** The Neural Mechanism of Audiovisual Integration Modulated by Attention: a DCM Study  
Yang Xi, Mengchao Zhang, Ning Gao, Yue Li, Lin Liu, Qi Li

**TUA1B-5** On the security of a three factor remote user authentication scheme using fuzzy extractor  
Chien-Ming Chen, Yanyu Huang, Xiaoting Deng, Tsu-Yang Wu

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**TUP1A: Cross-Disciplinary Approaches and Applications 1**
27 November, 13:10-15:10 Room 1 Session Chair: TBD
TUP1A-1 A Novel Tamper Detection and Image Recovery Technique for Color Image Demosaicking
Yu-Chen Hu, Pei-Jung Wu, Chia-Mei Chen, and Yi-Hung Liu

TUP1A-2 Improving Latency and Reliability for Vehicle System under Fog Computing Networks
Mao-Lun Chiang, Yu-an Lin, Hui-Ching Hsieh and Weng-Chung Tsai

TUP1A-3 Nominate Connected Dominating Set Algorithm in Mobile Ad Hoc Network
Mao-Lun Chiang, Ze-Yu Chen, Hui-Ching Hsieh and Tsui-Ping Chang

TUP1A-4 The Keywords of Affecting Performance for Live Streaming
Long-Sheng Chen and Yi-Ting Pan

TUP1A-5 Mobile Coupons Using Blockchain Technology
Sue-Chen Hsueh and Jia-He Zeng

TUP1A-6 Dual Image Reversible Data Hiding Based on Modified LSB Matching Method
Hsien-Wen Tseng, Hui-Xin Lu and Hui-Shih Leng

TUP1B: Advances in Machine Learning Technology for Industrial Applications 1
27 November, 13:10-15:10 Room 2 Session Chair: TBD

TUP1B-1 Security Analysis of a Public Key Authenticated Encryption with Keyword Search Scheme
Tsu-Yang Wu, Chien-Ming Chen, King-Hang Wang, Jimmy Ming-Tai Wu, Jeng-Shyang Pan

TUP1B-2 The research about Topic Extraction Method Based on the DTS-ILDA Model
Xiaoli Guo, Li Feng, Yuhan Sun, Ping Guo

TUP1B-3 The Study of Power Server operations Information Visualization Key Technologies
Xiaoli Guo, Ping Guo, Li Feng, Wei Yue

TUP1B-4 Heart Rate Detection Based on Facial Feature Points Tracking
Chuan-Yu Chang and Hsiang-Chi Liu

TUP1B-5 3D MODELING FOR UPPER OF SHOE BASED ON BILATERAL TRIANGULATION
Hsien-Huang Wu, Ying-Dong Lian, Ya-Yung Huang

TUP1B-6 A New Application of Hyperspectral Techniques in Drug Classification
Shih-Yu Chen, Yen-Chung Chen, and Chou-Tien Lien

TUP2A: Cross-Disciplinary Approaches and Applications 2
27 November, 15:40-17:40 Room 1 Session Chair: TBD

TUP2A-1 A Survey of Semi-Fragile Watermarking Authentication
Chin-Feng Lee, Jau-Ji Shen, Fang-Wei Hsu

TUP2A-2 A High Payload Edge Detection-Based Image Steganography Robust to RS-Attack by Using LSB Substitution and Pixel Value Differencing
Chin-Feng Lee, Jau-Ji Shen, Ting-Yi Ou-Yang

TUP2A-3 High-Capacity Reversible Data Hiding Based on Star-Shaped PVO Method
Chin-Feng Lee, Jau-Ji Shen, Yu-Chi Kuo

TUP2A-4 New Anatomy of Consensus in a Multiple Damage Communication VANET
Shu-Ching Wang, Kuo-Qin Yan and Wei-Shu Xiong

TUP2A-5 Customer Management and Marketing Strategy Development in the Internet of Things
Kuo-Qin Yan, Shu-Ching Wang, Wei-Shu Xiong, Ke-Yin Lu and Yun-Ju Cha

TUP2A-6 Privacy-Preserving Reversible Watermarking for Data Extration Prevention Through Lexico-graphic Permutations
Ching-Chun Chang and Chang-Tsun Li
TUP2B: Advances in Machine Learning Technology for Industrial Applications 2
27 November, 15:40-17:40 Room 2 Session Chair: TBD

TUP2B-1 Evaluation of DoS Attacks on Vehicle CAN Bus System
Shi-Huang Chen and Chun-Hung Richard Lin

TUP2B-2 Deep Learning-based Identification of Steel Products
Li-Wei Kang, You-Ting Chen, Wei-Chen Jhong and Chao-Yung Hsu

TUP2B-3 Reinforcement Learning-based Two-Wheel Robot Control
Ching-Lung Chang

TUP2B-4 A localization approach based on Fixed 3D Objects for Autonomous Robots
Chien-Chou Lin

TUP2B-5 Clockwise and counter-clockwise torsion in different operational angles on transverse plane
Dengchuan Cai, Jhongpei Wu and Chuan-Yu Chang

TUP2B-6 Micro Physiological Vibration Detection for Human Heartbeats
Wen-Fong Wang, Ying-Peng Huang, Chuan-Yu Chang and Ching-Yu Yang

WEA1A: Multimedia System and Intelligent Computing 1
28 November, 9:00-10:40 Room 1 Session Chair: TBD

WEA1A-1 Denoising of ECG Signal with Power Line and EMG Interference based on Ensemble Empirical Mode Decomposition
Shing-Hong Liu, Li-Te Hsu, Cheng Hsiung Hsieh, Yung-Fa Huang

WEA1A-2 Using the Photoplethysmography Technique to Improve the Accuracy of LVET Measurement in the ICG Technique
Shing-Hong Liu, Zheng-Yu Zhu, Shao-Heng Lai, Tai-Shen Huang

WEA1A-3 Network Anomaly Detection Based on Artificial Intelligence
Chia-Mei Chen, Wen-Ling Lo, Gu-Hsin Lai, Yu-Chen Hu

WEA1A-4 Traffic Flow Correlation Analysis of K Intersections Based on Deep Learning
Hung-Chi Chu, Chi-Kun Wang, and Yi-Xiang Liao

WEA1A-5 Detecting Attention and Meditation EEG Utilized Deep Learning
Chung-Yen Liao, Rung-Ching Chen, Qiano-En Liu

WEA1B: Emerging Trends in Multimedia Systems and Applications
28 November, 9:00-10:40 Room 1 Session Chair: TBD

WEA1B-1 The Properties of Order and Failure Estimation on Redundancy System
Lin Xu, Chao-Fan Xie, Lu-Xiong Xu, Fuquan Zhang

WEA1B-2 Hepatic Texture Synthesis Method Based on the Accelerated CUDA
Lin Xu, Chao-Fan Xie, Lu-Xiong Xu, Na Wang

WEA1B-3 A P2P Multimedia Service System based on Mesh Chords
Zhiming Cai, Xuehong Huang

WEA1B-4 Resolution Reduction for Two-Phase Test Sample Representation in Face Recognition
Ning Wu, Jinzhan Wei

WEA1B-5 Path Finding for Road Accessibility in Maze using BLOB Extraction
Jinzhan Wei, Ning Wu
WEA2A-1  Improving the Implementation of Sensor Nodes for Illegal Logging Detection
Jen-Ting Chen, Chuan-Bi Lin, Jiun-Jian Liaw, Yu-Yan Chen

WEA2A: Multimedia System and Intelligent Computing 2
28 November, 11:10-12:50 Room 1 Session Chair: TBD

WEA2A-2  A Study on CNC Machine Training Based on Virtual Reality Technology
Tzu-Chuen Lu, Rong-Chang Chen, Guang-En Hsuen

WEA2A-3  Forecasting for the Total Electricity Consumption of Taiwan by Fuzzy Time Series
Jing-Rong Chang, Zhong-Qi Liu, Pei-Yu Yu

WEA2A-4  Performance Analysis of Grouping Strategy in Relay-based Cooperative Networks
Jheng-Siam Li and Jyh-Horng WEN

WEA2A-5  The Development of Display Interface for Automatic Identification System and Digital Selective Calling System
Chien Erh Weng, Zhu-Yun Zheng, Lie Yang

WEA2B: Internet of Things: Technologies and Applications
28 November, 11:10-13:10 Room 1 Session Chair: TBD

WEA2B-1  Intelligent Infant Monitoring System Involving a Wi-Fi Wireless Sensor Network
Chi-Chang Lu, Chung-Hsien Wu, Hui-Kai Su

WEA2B-2  Long Lifetime Data Aggregation Using Geographic Division in Wireless Sensor Networks
Chia-Ihsin Cheng, Hui-K'ai Su, Yi-Shiang Chen, Tao-Ping Wang, Feng-Cheng Wu and Yu-An Chen

WEA2B-3  Distortion function for Steganography in Texture Synthesized Images
Lina Shi, Zichi Wang, Zhenxing Qian and Xinpeng Zhang

WEA2B-4  A Design Exploration of Wearable Companion of Smartphone
Wen Qi

WEA2B-5  Research and implementation of fuzzy control method of UAV formation with ad hoc network
Zhen-hao Zhang, Wei Sun, Wei Lu, Lei Bian

WEA2B-6  Design and Implementation of a Host-based Intrusion Detection System for Linux-based Web Server
Cheng-Chung Kuo, Shu-Han Yao, Chia-Ling Hou and Chu-Sing Yang