External Awards

IPSJ/IEEE Computer Society Young Computer Researcher Award
Winner: Mitsuaki Akiyama, NTT Social Informatics Laboratories
Date: January 17, 2022
Organization: Information Processing Society of Japan (IPSJ)/Institute of Electrical and Electronics Engineers (IEEE) Computer Society

For research on offensive cybersecurity measurement and countermeasure.

DBSJ Kambayashi Young Researcher Award
Winner: Maya Okawa, NTT Human Informatics Laboratories
Date: February 27, 2022
Organization: The Database Society of Japan

For her international achievement in the areas of database, media content, information management, and social computing such as the papers "Deep Mixture Point Processes: Spatio-temporal Event Prediction with Rich Contextual Information" at the ACM SIGKDD Conference on Knowledge Discovery and Data Mining Knowledge Discovery and Data Mining (KDD) in 2019 and "Dynamic Hawkes Processes for Discovering Time-evolving Communities' States behind Diffusion Processes" at KDD in 2021.

37th Telecommunications Advancement Foundation Award
Winners: Maya Okawa, NTT Human Informatics Laboratories; Tomoharu Iwata, Yusuke Tanaka, NTT Communication Science Laboratories; Hiroyuki Toda, Takeshi Kurashima, NTT Human Informatics Laboratories
Date: March 4, 2022
Organization: Telecommunications Advancement Foundation

For "Dynamic Hawkes Processes for Discovering Time-evolving Communities' States behind Diffusion Processes."
Published as: M. Okawa, T. Iwata, Y. Tanaka, H. Toda, and T. Kurashima, "Dynamic Hawkes Processes for Discovering Time-evolving Communities' States behind Diffusion Processes," Proc. of KDD 2021, Aug. 2021.

The 3rd Fumiko Yonezawa Memorial Prize of the Physical Society of Japan
Winner: Keiko Takase, NTT Basic Research Laboratories
Date: March 10, 2022
Organization: The Physical Society of Japan

For research on quantum transport and control of spin-orbit interaction in novel semiconductor materials.

IPSJ SIG Software Engineering Contribution Award
Winner: Haruto Tanno, NTT Software Innovation Center
Date: March 15, 2022
Organization: IPSJ Special Interest Group on Software Engineering

For his significant contribution to activities of IPSJ SIG Software Engineering while serving as a secretary from fiscal 2017 to 2020.

Young Researcher's Award
Winner: Riku Ohmiya, NTT Access Network Service Systems Laboratories
Date: March 17, 2022
Organization: The Institute of Electronics, Information and Communication Engineers (IEICE)

For "Multiple RIS Control Method for Intelligent Radio-wave Design" and "Experimental Area Coverage Evaluation Based on Intelligent Reflector Control."
Published as: R. Ohmiya, T. Murakami, M. Iwabuchi, T. Ogawa, Y. Takatori, Y. Hama, D. Kitayama, and Y. Kishiyama, "Multiple RIS Control Method for Intelligent Radio-wave Design," Proc. of the 2021 IEICE General Conference, B-5-10, Online, Mar. 2021.
R. Ohmiya, R. Taniguchi, T. Murakami, K. Takahashi, R. Kudo, T. Ogawa, and Y. Takatori, "Experimental Area Coverage Evaluation Based on Intelligent Reflector Control," Proc. of the 2021 IEICE Society Conference, B-5-48, Online, Sept. 2021.

Young Researcher's Award
Winner: Yoshifumi Wakisaka, NTT Access Network Service Systems Laboratories
Date: March 17, 2022
Organization: IEICE

For "Frequency-division-multiplex Technique Enabling Both Sampling Rate Enhancement and Fading Noise Reduction in Phase-OTDR Vibration Sensing" and "Crosstalk Impact and Its Suppression in Frequency-division-multiplex Phase-OTDR Distributed Vibration Sensing."
Published as: Y. Wakisaka, D. Iida, Y. Koshikiya, and H. Nazuki, "Frequency-division-multiplex Technique Enabling Both Sampling Rate Enhancement and Fading Noise Reduction in Phase-OTDR Vibration Sensing," Proc. of the 2021 IEICE General Conference, B-13-1, Online, Mar. 2021.
Y. Wakisaka, D. Iida, Y. Koshikiya, and H. Nazuki, "Crosstalk Impact and Its Suppression in Frequency-division-multiplex Phase-OTDR Distributed Vibration Sensing," Proc. of the 2021 IEICE Society Conference, B-13-4, Online, Sept. 2021.

Young Researcher's Award
Winner: Yoko Yamashita, NTT Access Network Service Systems Laboratories
Date: March 17, 2022
Organization: IEICE

For "Design Guideline for Wideband 2-mode Long Period Grating with Arbitrary Coupling Efficiency" and "Study on an Optical Tap Composed of a Long-period Fiber Grating and an Asymmetric Waveguide."
Published as: Y. Yamashita, T. Mori, T. Matsui, and K. Nakajima, "Design Guideline for Wideband 2-mode Long Period Grating with Arbitrary Coupling Efficiency," Proc. of the 2021 IEICE General Conference, B-13-27, Online, Mar. 2021.
Y. Yamashita, T. Mori, T. Matsui, and K. Nakajima, "Study on an Optical Tap Composed of a Long-period Fiber Grating and an Asymmetric Waveguide," Proc. of the 2021 IEICE Society Conference, B-13-21, Online, Sept. 2021.

Young Researcher's Award
Winner: Masanori Koike, NTT Network Service Systems Laboratories

Date: March 17, 2022
Organization: IEICE

For "A Study on Extension of ITU-T P.1204.3 Model for VR Video Streaming" and "VR Video Quality Estimation Model Considering the Difference in Viewport Tile Quality."
Published as: M. Koike, Y. Urata, K. Yamagishi, "A Study on Extension of ITU-T P.1204.3 Model for VR Video Streaming," Proc. of the 2021 IEICE General Conference, B-11-28, Online, Mar. 2021.
M. Koike, Y. Urata, and K. Yamagishi, "VR Video Quality Estimation Model Considering the Difference in Viewport Tile Quality," Proc. of the 2021 IEICE Society Conference, B-11-8, Online, Sept. 2021.

Young Researcher's Award
Winner: Hiroki Iwasawa, NTT Network Service Systems Laboratories
Date: March 17, 2022
Organization: IEICE

For "Proposal of Dynamic TSN Scheduling in a Multitenancy Environment" and "Proposal of Inter-container TSN Arbitration in a Multitenancy Environment."

Published as: H. Iwasawa, N. Azuma, T. Kitsu, H. Masutani, and T. Kuwahara, "Proposal of Dynamic TSN Scheduling in a Multitenancy Environment," Proc. of the 2021 IEICE General Conference, B-6-39, Online, Mar. 2021.
H. Iwasawa, N. Azuma, T. Kitsu, H. Masutani, and T. Kuwahara, "Proposal of Inter-container TSN Arbitration in a Multitenancy Environment," Proc. of the 2021 IEICE Society Conference, B-6-18, Online, Sept. 2021.

ITU-AJ Accomplishment Award
Winner: Shinya Otsuki, NTT Access Network Service Systems Laboratories
Date: May 17, 2022
Organization: The ITU Association of Japan

For his contribution to the creation and revision of the International Telecommunication Union Radiocommunication Sector (ITU-R) Recommendations/Reports regarding fixed wireless access and broadband wireless access as well as the revision of the Radio Regulations regarding 5-GHz-band wireless local area networks through the activities of ITU-R Study Group 5 Working Parties 5A/5C.

Papers Published in Technical Journals and Conference Proceedings

Switching Independent Vector Analysis and Its Extension to Blind and Spatially Guided Convolutional Beamforming Algorithms

T. Nakatani, R. Ikeshita, K. Kinoshita, H. Sawada , N. Kamo, and S. Araki

IEEE/ACM Trans. Audio, Speech, Language Process., Vol. 30, pp. 1032–1047, Mar. 2022.

This paper develops a framework that can accurately perform denoising, dereverberation, and source separation using a relatively small number of microphones. It has been empirically confirmed that Independent Vector Analysis (IVA) can blindly separate N sources from their sound mixture even with diffuse noise when a sufficiently large number ($= M$) of microphones are available (i.e., $M \gg N$). However, the estimation accuracy is seriously degraded when the number of microphones, or more specifically $M - N$ (≥ 0), decreases. To overcome this IVA limitation, we propose switching IVA (swIVA) in this paper. With swIVA, the time frames of an observed signal with time-varying characteristics are clustered into several groups, each of which can be well handled by IVA with a small number of microphones, and thus accurate estimation can be achieved by individually applying IVA to each group. Conventionally, a switching mechanism was introduced into a Minimum-Variance Distortionless Response (MVDR) beamformer, and this paper extends the mechanism to work with a blind source separation algorithm. To incorporate dereverbera-

tion capability, we further extend swIVA to a blind convolutional beamforming algorithm (swCIVA) that integrates swIVA and switching Weighted Prediction Error-based dereverberation (swWPE) in a jointly optimal way. With swCIVA, two different time-varying characteristics of an observed signal are captured for dereverberation and source separation to achieve effective estimation. We show that both swIVA and swCIVA can be optimized effectively based on blind signal processing, and their performance can be further improved using a spatial guide for initialization. Experiments demonstrate that both the proposed methods largely outperformed conventional IVA and its convolutional beamforming extension (CIVA) in terms of objective signal quality and automatic speech recognition scores when using relatively few microphones.

Efficiently Generating Ground States Is Hard for Postselected Quantum Computation

Y. Takeuchi, Y. Takahashi, and S. Tani

The 25th Annual Conference on Quantum Information Processing (QIP 2022), Mar. 2022.

In this paper, we show that if ground states of any 3-local Hamiltonians can be approximately generated in quantum polynomial time with postselection, then PP = PSPACE. Our result is superior to the

existing findings in the sense that we reduce the impossibility to an unlikely relation between classical complexity classes.