

External Awards

IPSJ Kiyasu Special Industrial Achievement Award

Winner: Kenji Takahashi, NTT Innovation Institute, Inc.; Kuniaki Naoi, NTT Software Innovation Center; Hiroshi Kumeta, Yan Li, and Ichiro Nagano, NTT Software Corporation

Date: June 3, 2015

Organization: Information Processing Society of Japan (IPSJ)

For the contribution to international standardization and practical use of a user identification management technique.

OpenStack Superuser Award

Winner: Toshikazu Ichikawa, Kota Tsuyuzaki, Mitsuhiro Shigematsu, Masahito Muroi, Sampath Priyankara, Takashi Natsume, Hirofumi Ichihara, Kentaro Tanaka, Tomoko Inoue, Daisuke Morita, Kazuhiro Miyahara, Tomonori Fujita, Tomoya Mizobuchi, Koji Iida, Shintaro Mizuno, Kenichi Sato, and Hiroshi Sakai, NTT Software Innovation Center

Date: October 27, 2015

Organization: OpenStack Foundation

The NTT Group has three OpenStack use cases in production, and its team has contributed 1054 total commits, ranking 18 out of 263 organizations. The OpenStack Foundation launched the Superuser Awards to recognize, support and celebrate teams of end-users and operators that use OpenStack to meaningfully improve their businesses while contributing back to the community.

IE Award

Winner: Yukihiro Bandoh, Seishi Takamura, and Atsushi Shimizu, NTT Media Intelligence Laboratories

Date: December 9, 2015

Organization: Institute of Electronics, Information and Communication Engineers (IEICE) Technical Committee on Image Engineering (IE)

For “A Study of Complexity Reduction for Optimal Design of Rate-constraint Quantizer.”

We formulate the design of an optimal quantizer as an optimization problem that finds the quantization indices that minimize quantization error. As a solution to the optimization problem, an approach based on dynamic programming, which is called DP quantization, is proposed. However, conventional DP quantization does not consider the design of the rate-constraint quantizer. In this paper, we propose an optimal design for the rate-constraint quantizer by extending DP quantization.

Published as: Y. Bandoh, S. Takamura, and A. Shimizu, “A Study of Complexity Reduction for Optimal Design of Rate-constraint Quantizer,” IEICE Tech. Rep., Vol. 115, No. 350, IE2015-97, pp. 105–110, Dec. 2015.

Specially Selected Paper

Winner: Hideharu Nakajima, NTT Media Intelligence Laboratories; Hideyuki Mizuno, Tokyo University of Science, SUWA; and Sumitaka Sakauchi, NTT Service Innovation Laboratory Group

Date: December 15, 2015

Organization: IPSJ Journal Editorial Committee

For “Emphasized Accent Phrase Prediction from Advertisement Text for Text-to-expressive Speech Synthesis.”

Realizing expressive text-to-speech synthesis requires develop-

ment of both text processing and the rendering of natural expressive speech. This paper focuses on the former as a front-end task in the production of synthetic speech, and investigates a novel method for predicting emphasized accent phrases from advertisement text information. For this purpose, we examine features that can be accurately extracted by text processing based on current text-to-speech synthesis technologies. Among features, the word surface string of the main content and function words and the parts of speech of the main function words in an accent phrase are found to have higher potential to predict whether the accent phrase should be emphasized or not through the calculation of mutual information between emphasis labels and features of Japanese advertisement sentences. Experiments confirmed that emphasized accent phrase prediction using support vector machine offers an encouraging degree of accuracy for systems which require emphasized accent phrase locations as context information to improve speech synthesis quality.

Published as: H. Nakajima, H. Mizuno, and S. Sakauchi, “Emphasized Accent Phrase Prediction from Advertisement Text for Text-to-expressive Speech Synthesis,” IPSJ Journal, Vol. 56, No. 12, pp. 2384–2394, Dec. 2015.

HCG Symposium 2015 Interactive Presentation Award/ Organized Session Award

Winner: Shiro Kumano, Kazuhiro Otsuka, Ryo Ishii, and Junji Yamato, NTT Communication Science Laboratories

Date: December 17, 2015

Organization: IEICE Human Communication Group (HCG)

For “Automatic Gaze Analysis in Medium-sized Multiparty Conversations Based on Collective First-person Vision.”

Published as: S. Kumano, K. Otsuka, R. Ishii, and J. Yamato, “Automatic Gaze Analysis in Medium-sized Multiparty Conversations Based on Collective First-person Vision,” HCG Symposium 2015, Toyama, Japan, Dec. 2015.

HCG Symposium 2015 Interactive Presentation Award

Winner: Ryo Ishii, Shiro Kumano, and Kazuhiro Otsuka, NTT Communication Science Laboratories

Date: December 17, 2015

Organization: IEICE Human Communication Group (HCG)

For “Predicting Next Speaker Using Gaze and Respiration in Multi-party Meetings.”

Published as: R. Ishii, S. Kumano, and K. Otsuka, “Predicting Next Speaker Using Gaze and Respiration in Multi-party Meetings,” HCG Symposium 2015, Toyama, Japan, Dec. 2015.

ASRU 2015 Best Paper Award Honorable Mention

Winner: Takuya Yoshioka, Nobutaka Ito, Marc Delcroix, Atsunori Ogawa, Keisuke Kinoshita, Masakiyo Fujimoto, NTT Communication Science Laboratories; Chengzhu Yu, The University of Texas at Dallas; Wojciech J. Fabian, Miquel Espi, Takuya Higuchi, Shoko Araki, Tomohiro Nakatani, NTT Communication Science Laboratories

Date: December 17, 2015

Organization: ASRU 2015 (The 2015 IEEE Automatic Speech Recognition and Understanding Workshop) Committee

For “The NTT CHiME-3 System: Advances in Speech Enhancement and Recognition for Mobile Multi-microphone Devices.”

Published as: T. Yoshioka, N. Ito, M. Delcroix, A. Ogawa, K. Kinoshita, M. Fujimoto, C. Yu, W. J. Fabian, M. Espi, T. Higuchi, S. Araki, and T. Nakatani, "The NTT CHiME-3 System: Advances in Speech Enhancement and Recognition for Mobile Multi-microphone Devices," Proc. of ASRU 2015, pp. 436–443, Scottsdale, Arizona, USA, Dec. 2015.

IEICE Electronics Society LQE Young Researchers Award

Winner: Ryo Nakao, NTT Device Technology Laboratories

Date: December 18, 2015

Organization: IEICE Technical Committee on Lasers and Quantum Electronics (LQE)

For "High-speed Operation of GaAs/InGaAs Metamorphic Lasers

Emitting at 1.3 μm ."

We demonstrate a lattice relaxation control by in situ curvature measurement for a metamorphic buffer. Using this relaxation control, we investigated a thin (240 nm) $\text{In}_{0.15}\text{Ga}_{0.85}\text{As}$ metamorphic buffer for fabricating an un-strained $\text{In}_{0.10}\text{Ga}_{0.90}\text{As}$ quasi-substrate on a GaAs substrate and succeeded in fabricating a 1.3- μm metamorphic InGaAs multiple-quantum well laser diode (LD) on the metamorphic buffer. We confirmed that the LD was directly modulated at 25 Gbit/s with a high-characteristic temperature ($T_0 = 187$ K).

Published as: R. Nakao, M. Arai, W. Kobayashi, T. Yamamoto, and S. Matsuo, "1.3- μm InGaAs MQW Metamorphic Laser Diode Fabricated with Lattice Relaxation Control Based on In Situ Curvature Measurement," IEEE J. Sel. Top. Quantum Electron., Vol. 21, No. 6, p. 1501407, Nov. 2015.

Papers Published in Technical Journals and Conference Proceedings

Adaptive Pre-equalization Using Bidirectional Pilot Sequences to Estimate and Feed Back Amplitude Transfer Function and Chromatic Dispersion

S. Okamoto, M. Yoshida, K. Yonenaga, and T. Kataoka

Proc. of the Optical Fiber Communication Conference and Exhibition (OFC) 2015, Th2A.29, Los Angeles, CA, USA, March 2015.

We propose an adaptive pre-equalization system that compensates the amplitude transfer function and chromatic dispersion using estimates transmitted from the receiver. Two kinds of pilot sequences are used for estimation and mutual communication.

5 x 1-Tb/s PDM-16QAM Transmission over 1,920 km Using High-speed InP MUX-DAC Integrated Module

A. Sano, M. Nagatani, H. Nosaka, and Y. Miyamoto

Proc. of OFC 2015, M3G.3, Los Angeles, CA, USA, March 2015.

We demonstrate wavelength division multiplexed transmission of 75-Gbaud PDM (polarization-division multiplexed)-16QAM (quadrature amplitude modulation) signals over 1,920 km. An InP-based high-speed and compact MUX-DAC (multiplexer-digital-to-analog converter) integrated module with bandwidth exceeding 40 GHz enables the long haul transport of 1-Tb/s superchannels composed of just two subcarriers.

Dense SDM (12-core x 3-mode) Transmission over 527 km with 33.2-ns Mode-dispersion Employing Low-complexity Parallel MIMO Frequency-domain Equalization

K. Shibahara, T. Mizuno, H. Takara, A. Sano, H. Kawakami, D. Lee, Y. Miyamoto, T. Ono, M. Oguma, Y. Abe, T. Kobayashi, T.

Matsui, R. Fukumoto, Y. Amma, T. Hosokawa, S. Matsuo, K. Saito, H. Nasu, and T. Morioka

Proc. of OFC 2015, Th5C.3, Los Angeles, CA, USA, March 2015.

We demonstrate 12-core x 3-mode dense SDM (space division multiplexing) transmission over 527-km graded-index multi-core few-mode fiber without mode-dispersion management. Employing a low baud rate multicarrier signal and frequency-domain equalization enables 33.2-ns differential mode delay compensation with low computational complexity.

120.7-Tb/s MCF-ROPA Unrepeated Transmission of PDM-32QAM Channels over 204 km

H. Takara, T. Mizuno, H. Kawakami, Y. Miyamoto, H. Masuda, K. Kitamura, H. Ono, S. Asakawa, Y. Amma, K. Hirakawa, S. Matsuo, K. Tsujikawa, and M. Yamada

Journal of Lightwave Technology, Vol. 33, No. 7, pp. 1473–1478, April 2015.

We demonstrate the unrepeated transmission of over 100 Tb/s by employing a multicore-fiber-based remote optically pumped amplifier. We establish 120.7-Tb/s, 204-km seven-core fiber transmission with the aggregate spectral efficiency (SE) of 53.6 b/s/Hz, a record capacity per fiber and the highest SE for unrepeated transmission. We also realized the highest capacity per core of 17.2 Tb/s (180 x 95.8 Gb/s) and SE of 7.6 b/s/Hz by using the polarization-division-multiplexed 32-quadrature amplitude modulation format for unrepeated transmission.

Filtering-tolerant Transmission by the Walsh-Hadamard Transform for Super-channel beyond 100 Gb/s

K. Shibahara, A. Masuda, H. Kishikawa, S. Kawai, and M. Fukutoku

Optics Express, Vol. 23, No. 10, pp. 13245–13254, May 2015.

Super-channel transmission is a promising solution to increase the capacity of a channel beyond 100 Gb/s in next-generation optical networks. The performance of a super-channel comprising multiple subcarriers, however, degrades if optical filtering distortions occur in particular subcarriers. In this paper, we propose a method that improves super-channel performance by dispersing the distortions over all subcarriers. We also numerically demonstrate that the method effectively mitigates the filtering induced penalty suffered by super-channels.

Optical 8-dimensional Time-polarization Modulation Using Square-QAM-constellation and a Simple Decoding Algorithm

M. Nakamura, M. Yoshida, F. Hamaoka, and K. Yonenaga

Proc. of the 20th Opto-Electronics and Communications Conference (OECC 2015), JThA.93, Shanghai, China, June/July 2015.

We propose optical 8D time-polarization modulation using square-QAM-constellation and a simple decoding algorithm. Experiments show that the proposed modulation format can achieve significant gain and that the decoding algorithm has the same performance as conventional maximum-likelihood-detection.

High-capacity Multicore Fiber Transmission Technology

H. Takara, T. Mizuno, A. Sano, and Y. Miyamoto

Proc. of OECC 2015, JThA.11, Shanghai, China, June/July 2015.

This paper reviews recent work on and issues with high-capacity multicore fiber transmission for terrestrial systems. Unrepeated transmission of over 100 Tb/s by employing an MCF-ROPA (multicore-fiber-based remote optically-pumped amplifier) is also described.

Multi-stage Successive Interference Cancellation for Spectrally-efficient Super-Nyquist Transmission

K. Shibahara, A. Masuda, S. Kawai, and M. Fukutoku

Proc. of ECOC 2015 (the 41st European Conference on Optical Communications), Valencia, Spain, September/October 2015.

The use of multi-stage successive interference cancellation (M-SIC) for super-Nyquist transmission is proposed. Simulation and transmission experiment results showed carrier spacing was reduced by 20% for QPSK (quadrature phase-shift keying) signals. Signal performance was enhanced when M-SIC was used with non-uniform

power transmission.

Impact of Management Data Placement in NFV Service Coordinated across Multiple Datacenters and WANs

A. Taniguchi, T. Yamazaki, Y. Yoshida, T. Kawabata, N. Sakaida, and T. Shimizu

Proc. of CNSM (the 11th International Conference on Network and Service Management), Barcelona, Spain, November 2015.

As network functions virtualization (NFV) technologies have emerged, some standardization bodies such as the European Telecommunications Standards Institute have advanced standardization activities on their functional blocks and interfaces. However, several issues such as where virtual network configuration information should be placed or how a virtual network configuration among Virtualized Infrastructure Managers (VIMs) should be handled have not been standardized yet. This paper proposes several candidates to address these issues, and discusses their advantages and disadvantages from various viewpoints such as security.

The Behavior Generation Modeling Method to Extract the Reason to Select Shops

N. Takaya, K. Esaki, K. Ishiguro, and Y. Ichikawa

IPSJ Journal, Vol. 57, No. 1, pp. 145–156, January 2016 (in Japanese).

We propose SHOP-LDA, which captures latent patterns of user product adoption behaviors. The proposed model is a probabilistic generative model that extracts “topics,” explaining why users select shops and items. Experimental results with real-world e-commerce user log data show that the proposed model is able to estimate user segments that are interpretable and possibly are beneficial for business practices. Furthermore, this method is applicable to emerging services that use several shop orchestration services such as ID cooperation and point alliance.

Commuting Quantum Circuits with Few Outputs are Unlikely to be Classically Simulatable

Y. Takahashi, S. Tani, T. Yamazaki, and K. Tanaka

Quantum Information and Computation, Vol. 16, No. 3&4, pp. 251–270, March 2016.

We show that there exists a commuting quantum circuit that is not classically simulatable unless the polynomial hierarchy collapses to the third level. This is the first formal evidence that a commuting quantum circuit is not classically simulatable even when the number of output qubits is exponentially smaller than that of input qubits.