

# External Awards

## IEEE Signal Processing Society (SPS) Japan Best Paper Award

**Winner:** Takuya Higuchi, Nobutaka Ito, Shoko Araki, Takuya Yoshioka, Marc Delcroix, and Tomohiro Nakatani, NTT Communication Science Laboratories

**Date:** November 14, 2017

**Organization:** The Institute of Electrical and Electronics Engineers (IEEE) Signal Processing Society, Tokyo Joint Chapter

For “Online MVDR Beamformer Based on Complex Gaussian Mixture Model with Spatial Prior for Noise Robust ASR.”

**Published as:** T. Higuchi, N. Ito, S. Araki, T. Yoshioka, M. Delcroix, and T. Nakatani, “Online MVDR Beamformer Based on Complex Gaussian Mixture Model with Spatial Prior for Noise Robust ASR,” *IEEE/ACM Trans. Audio Speech Lang. Process.*, Vol. 25, No. 4, pp. 780–793, Apr. 2017.

## IEEE Signal Processing Society (SPS) Japan Best Paper Award

**Winner:** Daichi Kitamura, The University of Tokyo; Nobutaka Ono, Tokyo Metropolitan University; Hiroshi Sawada and Hirokazu Kameoka, NTT Communication Science Laboratories; Hiroshi Saruwatari, The University of Tokyo

**Date:** November 14, 2017

**Organization:** IEEE Signal Processing Society, Tokyo Joint Chapter

For “Determined Blind Source Separation Unifying Independent Vector Analysis and Nonnegative Matrix Factorization.”

**Published as:** D. Kitamura, N. Ono, H. Sawada, H. Kameoka, and H. Saruwatari, “Determined Blind Source Separation Unifying Independent Vector Analysis and Nonnegative Matrix Factorization,” *IEEE/ACM Trans. Audio Speech Lang. Process.*, Vol. 24, No. 9, pp. 1626–1641, Sept. 2016.

## Prize for Science and Technology (Research Category), the Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology

**Winner:** Naonori Ueda, NTT Communication Science Laboratories

**Date:** April 17, 2018

**Organization:** Ministry of Education, Culture, Sports, Science and Technology

For his research on a machine learning technique for analyzing complex and diverse data.

## The Young Scientists’ Prize, the Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology

**Winner:** Hirokazu Kameoka, NTT Communication Science Laboratories

**Date:** April 17, 2018

**Organization:** Ministry of Education, Culture, Sports, Science and Technology

For his research on audio signal decomposition and auditory scene analysis.

## The Young Scientists’ Prize, the Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology

**Winner:** Takahiro Kawabe, NTT Communication Science Laboratories

**Date:** April 17, 2018

**Organization:** Ministry of Education, Culture, Sports, Science and Technology

For his research on human recognition systems and their applications.

## JSAI Best Paper Award

**Winner:** Sho Takase, NTT Communication Science Laboratories; Naoaki Okazaki, Tokyo Institute of Technology; Kentaro Inui, Tohoku University

**Date:** June 27, 2018

**Organization:** The Japanese Society for Artificial Intelligence (JSAI)

For “Learning to Compose Distributed Representations of Relational Patterns.”

**Published as:** S. Takase, N. Okazaki, and K. Inui, “Learning to Compose Distributed Representations of Relational Patterns,” *Trans. Japanese Society for Artificial Intelligence*, Vol. 32, No. 4, p. D-G96\_1–11, 2017.

## Certificate of Appreciation

**Winner:** Yoshitaka Shimizu, Yasuo Suzuki, Satoshi Kotabe, and Atsushi Yamamoto, NTT Network Innovation Laboratories

**Date:** July 13, 2018

**Organization:** Budhanilkantha Municipality, Nepal

For successfully conducting the MDRU (movable and deployable ICT resource unit) field testing and training program in Nepal.

## Technical Committee on Communication Quality Research Encouragement Award

**Winner:** Takuto Kimura, Arifumi Matsumoto, Takafumi Okuyama, and Jun Okamoto, NTT Network Technology Laboratories

**Date:** July 19, 2018

**Organization:** Technical Committee on Communication Quality, the Institute of Electronics, Information and Communication Engineers (IEICE) Communications Society

For “A Video Bitrate Selection Method to Reduce the Traffic Volume While Maintaining QoE.”

**Published as:** T. Kimura, A. Matsumoto, T. Okuyama, and J. Okamoto, “A Video Bitrate Selection Method to Reduce the Traffic Volume While Maintaining QoE,” *IEICE Tech. Rep.*, Vol. 117, No. 159, CQ2017-49, pp. 111–116, July 2017.

## Technical Committee on Communication Quality Best Research Award

**Winner:** Hideaki Kinsho, Osaka University; Rie Tagyo and Daisuke Ikegami, NTT Network Technology Laboratories; Takahiro Matsuda, Osaka University; Jun Okamoto, NTT Network Technology Laboratories; Tetsuya Takine, Osaka University

**Date:** July 19, 2018

**Organization:** Technical Committee on Communication Quality, IEICE Communications Society

For “Graph Construction for Mobile Delay Tomography Based on Graph Fourier Transform.”

**Published as:** H. Kinsho, R. Tagyo, D. Ikegami, T. Matsuda, J. Okamoto, and T. Takine, “Graph Construction for Mobile Delay Tomography Based on Graph Fourier Transform,” IEICE Tech. Rep., Vol. 117, No. 486, CQ2017-121, pp. 105–110, Mar. 2018.

#### Technical Committee on Communication Quality Volunteer Service Award

**Winner:** Kimiko Kawashima, NTT Network Technology Laboratories

**Date:** July 19, 2018

**Organization:** Technical Committee on Communication Quality, IEICE Communications Society

For her contribution to the planning and management of the workshop on cross-sector collaboration for IoT utilization.

#### 1906 Award

**Winner:** Yoshiharu Akiyama, NTT Network Technology Laboratories

**Date:** July 20, 2018

**Organization:** The International Electrotechnical Commission (IEC)

For proposing a new method for measuring conducted electromagnetic interference at wired network ports and for his technical contributions to developing a method for measuring electromagnetic interference of wireless power transmission.

#### Certificate of Appreciation

**Winner:** Michiharu Takemoto, NTT Network Innovation Laboratories

**Date:** July 25, 2018

**Organization:** IEEE Computer Society

In appreciation for his service as Fast Abstract Chair and his continued support over many years.

#### Best Paper Award

**Winner:** Jun Shimamura, NTT Media Intelligence Laboratories; Taiga Yoshida, NTT Communications; Yukinobu Taniguchi, Tokyo University of Science; Hiroko Yabushita, NTT Media Intelligence Laboratories; Kyoko Sudo, Toho University; and Kazuhiro Murasaki, NTT Media Intelligence Laboratories

**Date:** June 22, 2018

**Organization:** The Institute of Image Electronics Engineers of Japan (IEEEJ)

For “View-directional Consistency Constraints for Robust 3D Object Recognition.”

**Published as:** J. Shimamura, T. Yoshida, Y. Taniguchi, H. Yabushita, K. Sudo, and K. Murasaki, “View-directional Consistency Constraints for Robust 3D Object Recognition,” IEEEJ Trans. Image Electronics and Visual Computing, Vol. 3, No. 2, pp. 164–173, 2015 (in Japanese).

#### Excellent Paper Award

**Winner:** Atsushi Otsuka, Kyosuke Nishida, Itsumi Saito, Hisako Asano, and Junji Tomita, NTT Media Intelligence Laboratories

**Date:** June 22, 2018

**Organization:** The 10th Forum on Data Engineering and Information Management (DEIM2018)

For “Neural Network Based Question Generation Model for Identifying Question Intention” (in Japanese).

**Published as:** A. Otsuka, K. Nishida, I. Saito, H. Asano, and J. Tomita, “Neural Network Based Question Generation Model for Identifying Question Intention,” DEIM2018, F1-4, Fukui, Japan, Mar. 2018.

#### IEICE-ISS Distinguished Achievement and Contributions Award

**Winner:** Yukihiro Bandoh, NTT Media Intelligence Laboratories

**Date:** June 25, 2018

**Organization:** IEICE Information and Systems Society (ISS)

For his contributions as secretary of the IEICE Technical Committee on Image Engineering.

#### IE Award

**Winner:** Shota Orihashi, Shinobu Kudo, Masaki Kitahara, and Atsushi Shimizu, NTT Media Intelligence Laboratories

**Date:** July 9, 2018

**Organization:** IEICE Technical Committee on Image Engineering

For “Image Coding Based on Completion Using Generative Adversarial Networks.”

**Published as:** S. Orihashi, S. Kudo, M. Kitahara, and A. Shimizu, “Image Coding Based on Completion Using Generative Adversarial Networks,” IEICE Tech. Rep., Vol. 118, No. 113, IE2018-27, pp. 33–38, June 2018.

# Papers Published in Technical Journals and Conference Proceedings

## Analyzing Generation and Cognition of Emotional Congruence Using Empathizing-systemizing Quotient

L. C. Antaket, M. Matsuda, K. Otsuka, and S. Kumano

International Journal of Affective Engineering, Vol. 17, No. 3, pp. 183–192, July 2018.

Emotional congruence is a definition of emotional empathy. However, little is known about what types of people are more likely to be emotionally matched with others, and how they perceive emotional congruence. This paper proposes a cognitive model of emotional congruence assuming that people judge their emotional congruence with others based on interpersonal distance by putting the self and the other in emotional dimensions. We asked participants to engage in discussion with each other, and to rate their emotional congruence level in addition to their own emotional states in a valence-arousal space. We observed that i) participants with lower Empathizing Quotient scores exhibited a shorter emotional Euclidean distance from others, ii) when combined together, the overall results for all participants showed significant goodness of fit to the proposed model, and iii) those with higher Systemizing Quotient scores showed stronger goodness of fit.

## Reachability Analysis of Multi-hop D2D Communications at Disaster

N. Kamiyama, K. Ishibashi, and Y. Hoshiai

IEICE Transactions on Communications, Vol. E101-B, No. 8, pp. 1833–1844, August 2018.

During a disaster, users will not be able to communicate with their families and friends using mobile terminals, e.g., smartphones, in many cases due to failures of base stations and the backhaul of cellular networks. Even when cellular networks normally operate without failure, they will become seriously congested due to dramatically increased traffic demand. To solve these problems, device-to-device (D2D) communications, in which mobile terminals directly communicate without cellular networks, have been investigated. Multi-hop D2D communication using multiple mobile terminals as relay nodes will be effective in maintaining connectivity during a disaster. It is

preferable to estimate the success probability of multi-hop D2D communication by using a simple method that offers optimal parameter control, e.g., the ratio of mobile terminals using D2D communications and the maximum hop length. Moreover, when evaluating the reachability of multi-hop D2D communication, we need to consider the evacuation behavior during a disaster because success probability depends on the geographical distribution of mobile terminals. Therefore, in this paper, we derive a formula for estimating the success probability of multi-hop D2D communication in a simple manner and analyze its reachability using a multi-agent simulation that reproduces the evacuation behavior expected during an earthquake in Tokyo's Shinjuku Ward.

## Neural Mechanisms Underlying the Impact of Speech Sound Naturalness during Transformed Auditory Feedback

S. Hiroya and T. Mochida

Proc. of the 10th Annual Meeting of the Society for the Neurobiology of Language, p. 146, Quebec City, Canada, August 2018.

Articulatory compensations in response to formant perturbation in vowels have shown that auditory feedback plays an important role in speech production. Although most conventional perturbation studies have used linear predictive coding (LPC) for estimating formants, LPC would result in degradation of sound naturalness of transformed speech due to misestimating of formants. To improve sound quality, we have developed a real-time robust formant tracking system using the phase equalization-based autoregressive exogenous (PEAR) model. In this study, to investigate the neural mechanisms underlying the impact of speech sound naturalness, we performed fMRI (functional magnetic resonance imaging) scans during transformed auditory feedback in which formant frequencies estimated by LPC or PEAR were perturbed. Results showed that the impact of speech sound naturalness in transformed auditory feedback emerged in the bilateral superior temporal gyrus.