External Awards

The 37th Awaya Prize Young Researcher Award

Winner: Daichi Kitamura, Sokendai (The Graduate University for Advanced Studies); Nobutaka Ono, National Institute of Informatics; Hiroshi Sawada, NTT Service Evolution Laboratories; Hirokazu Kameoka, NTT Communication Science Laboratories; and Hiroshi Saruwatari, the University of Tokyo
Date: March 17, 2015
Organization: The Acoustical Society of Japan (ASJ)

For "Efficient Multichannel Nonnegative Matrix Factorization with Rank-1 Spatial Model."
Published as: D. Kitamura, N. Ono, H. Sawada, H. Kameoka, and H. Saruwatari, "Efficient Multichannel Nonnegative Matrix Factorization with Rank-1 Spatial Model," Proc. of ASJ Autumn Meeting, pp. 579–582, Sept. 2014.

ITU-AJ Accomplishment Award

Winner: Makoto Murakami, NTT Network Service Systems Laboratories
Date: May 15, 2015
Organization: The ITU Association of Japan (ITU-AJ)

For his contribution to implementation of regulatory revisions and the creation of a handbook and tutorial relating to a group of recommendations covering optical transport network technology in the Telecommunication Standardization Sector of International Telecommunication Union (ITU-T) Study Group 15 (SG15). As head of the Japanese delegation, he is committed to resolving the international controversy over MPLS-TP (multiprotocol label switching-transport profile) standardization by leading the way in a WTSA (World Telecommunication Standardization Assembly) joint proposal with other member states in APT (Asia-Pacific Telecommunity). He also contributed as a liaison officer in settling a dispute over specifications between IEC (International Electrotechnical Commission) and SG15. In addition, he participated in the ITU Focus Group on disaster relief systems as editor and contributed to finalizing deliverables.

Interop 2015 Best of Show Award (SDI Special Prize)

Winner: O3 project*

* NTT researchers involved are Hirokazu Takahashi, Yoshihiro Nakajima, Hitoshi Masutani, Takeshi Kinoshita, Tomoya Hibi, Sakiko Kawai, Atsushi Yamamoto, and Atsushi Taniguchi, NTT Network Innovation Laboratories.

Date: June 10, 2015
Organization: Interop Tokyo Steering Committee

For "SDN/OpenFlow Software Switch Lagopus."
Published as: O3 project, "SDN/OpenFlow Software Switch Lagopus," Proc. of Interop Tokyo 2015, Chiba, Japan, Jun. 2015.

The Meritorious Award on Radio presented by the Chairman of the Board of ARIB

Winner: Masashi Shimizu, NTT Network Innovation Laboratories; Yoshiya Sakata, UPR Corporation; Takumi Watanabe, NTT Electronics Corporation; and Akihiko Taniya, Nagano Japan Radio Co., Ltd.
Date: June 16, 2015
Organization: Association of Radio Industries and Businesses (ARIB)

For development of a logistics pallet management system using active radio-frequency identification techniques.

TTC Distinguished Service Award

Winner: Takefumi Yamazaki, NTT Service Evolution Laboratories
Date: June 22, 2015
Organization: Telecommunication Technology Committee (TTC)

For his contribution to the promotion of standardization of home network systems.

TTC Distinguished Service Award

Winner: Makoto Murakami, NTT Network Service Systems Laboratories
Date: June 22, 2015
Organization: TTC

For his contribution to the promotion of standardization of internetwork transmission.

Papers Published in Technical Journals and Conference Proceedings

Large-scale Collection and Analysis of Personal Question-answer Pairs for Conversational Agents

H. Sugiyama, T. Meguro, R. Higashinaka, and Y. Minami

Proc. of IVA 2014 (the 14th International Conference on Intelligent Virtual Agents), pp. 420–433, Boston, MA, USA, August 2014.

In conversation, a speaker sometimes asks questions that relate to another speaker's detailed personality, such as his/her favorite foods and sports. This behavior also appears in conversations with conversational agents; therefore, agents should be developed that can respond to such questions. In previous agents, this was achieved by creating question-answer pairs defined manually. However, when a small number of persons create the pairs, we cannot know what types of questions are frequently asked. Therefore, such essential question-answer pairs for conversational agents are possibly overlooked. This study analyzes a large number of question-answer pairs for six personae created by many question-generators, with one answer-generator for each persona. A comparison with questions appearing in conversations between humans shows that 50.2% of the questions were contained in our question-answer pairs, and the coverage rate was almost saturated with the 20 recruited question-generators.

Material Transmission Loss Modeling for Indoor Propagation Modeling

M. Inomata, T. Ogawa, and S. Yoshino

Proc. of IEEE PIMRC 2014 (the 25th International Symposium on Personal Indoor and Mobile Radio Communications), pp. 800–804, Washington, DC, USA, September 2014.

We are studying a method to minimize mutual radio wave interference by coordinating wireless home network access points (APs). To control the radio wave range so as to reduce interference with neighboring terminals or APs, precise techniques to estimate range are important. A commonly used method to estimate radio wave reaching ranges is site surveys, where the user or operator measures propagation characteristics. However, the problem with this method is that a large burden is placed on the user because it is necessary to densely collect the radio data over the entire area to precisely estimate the radio wave reaching ranges, especially in indoor radio propagation environments where there is considerable propagation variability. We therefore propose a method that uses sparse data to estimate material parameters for precisely modeling indoor radio propagation. Experimental evaluations demonstrated it decreased the number of data items needing to be collected.

Open-domain Utterance Generation Using Phrase Pairs Based on Dependency Relations

H. Sugiyama, T. Meguro, R. Higashinaka, and Y. Minami

Proc. of SLT 2014 (2014 IEEE Spoken Language Technology Workshop), pp. 60–65, South Lake Tahoe, NV, USA, December 2014.

The development of open-domain conversational systems remains difficult since user utterances vary too widely for such systems to respond appropriately. To address this issue, previous research has retrieved sentences from the web as system utterances by applying shallow sentence matching with user utterances. However, since the retrieved sentences include the inherent contexts of the document in which the sentences originally appeared, the retrieved sentences may possibly contain information that is irrelevant to user utterances. We propose combining two strongly related *semantic units* (phrase pairs with dependency relations) to create a system utterance. Here, the first semantic unit is the one found in the user utterance, and the second semantic unit is the one that has a dependency relation with the first one in a large text corpus. This way, we can guarantee that the generated utterance is related to the input user utterance. Our experiments, which examine the appropriateness of response sentences, show that our proposed method significantly outperforms other retrieval and rule-based approaches.

Comparison of Photo Degradation Behavior of LDPE Using Accelerated Weathering Instruments

T. Miwa, Y. Takeshita, Y. Akage, M. Watanabe, M. Takaya, and T. Sawada

Zairyo-to-Kankyo, Vol. 64, pp. 139–144, April 2015.

Samples of low-density polyethylene (LDPE) were photodegraded using accelerated weathering instruments and outdoor exposure. The physical properties and chemical structures of the photodegraded samples were studied through a tensile test, gel chromatography, and infrared spectroscopy.

The molecular weight distribution of a photodegraded sample by using a fluorescent UV lamp at a high black panel temperature (80°C) was more similar to that of an outdoor-degraded sample than that of other artificially photodegraded samples by using a Xenon lamp at the standard black panel temperature (63°C). It is estimated that accelerated weathering tests at a high sample temperature could accelerate cross-linking more than chain scission, consequently recreating molecule-enlargement similar to the outdoor-degraded sample.

Path Loss Model for the 2 to 37 GHz Band in Street Microcell Environments

M. Inomata, W. Yamada, M. Sasaki, M. Mizoguchi, K. Kitao, and T. Imai

IEICE Communications Express, Vol. 4, No. 5, pp. 149–154, May 2015.

Path loss characteristics are analyzed on the basis of measurement results obtained using the 2 to 37 GHz band in street microcell environments. By taking dependencies on frequency and distance from transmitter to intersection into account, the proposed model can decrease the root mean square error of prediction results to within about 5 dB in the 2 to 37 GHz band.

A Tracing Technique for Understanding the Behavior of Large-scale Distributed Systems

Y. Bando

Proc. of LinuxCon Japan, Tokyo, Japan, June 2015.

Debugging or troubleshooting large-scale distributed systems is difficult due to its complexity; a single request may trigger the

execution of hundreds of components running in parallel on many different machines. To help developers or operators gain deeper knowledge about the behavior of their distributed systems, I proposed a tracing method that can be applied to their applications simply by slightly modifying an existing RPC library. This tracing helps them know the flow of processing and find performance bottlenecks. I implemented it in Eventlet, an RPC library widely used in OpenStack projects, and also started discussing it with the Eventlet community in order to have this feature included in Eventlet.

In this talk, I demonstrated the tracking of swift, OpenStack object storage, as an example. In addition, the visualization of trace data and the overhead will be reported.

Variable-length Lossy Source Code Using a Constrained-random-number Generator

J. Muramatsu

IEEE Transactions on Information Theory, Vol. 61, No. 6, pp. 3574–3592, June 2015.

A variable-length lossy source code is introduced with a rate-distortion pair close to the rate-distortion function. Random numbers that satisfy a condition specified by a function and its value are used to construct a stochastic encoder. The proof of the theorem is based on the balanced-coloring property of an ensemble of functions. Since an ensemble of systematic sparse matrices has this property, we can construct a tractable code for a memoryless source. Some algorithms for implementing the code are introduced and compared by simulation.

Smooth Motion Parallax Autostereoscopic 3D Display Using Linear Blending of Viewing Zones

M. Date, T. Kawakami, M. Sasai, and H. Takada

Proc. of the SID (Society for Information Display) Display Week 2015, pp. 983–986, San Jose, CA, USA, June 2015.

A new autostereoscopic three-dimensional (3D) display is proposed. Using only a small number of projectors, it produces smooth and exact motion parallax by applying the visual effects of dual edge perception in a depth-fused 3D (DFD) display. It provides a breakthrough in overcoming the trade-off between 3D image reality and the number of video sources.
