

External Awards

Research Encouragement Award

Winner: Shingo Omata, NTT Network Service Systems Laboratories

Date: January 22, 2021

Organization: The Institute of Electronics, Information and Communication Engineers (IEICE) Steering Committee on Network Software

For “A Study on Automatic Mapping of eTOM – OpenAPI Using COS Similarity Method.”

Published as: S. Omata, “A Study on Automatic Mapping of eTOM – OpenAPI Using COS Similarity Method,” 22nd Steering Committee on Network Software, NWS-22-3, June 2020.

Best Poster Award

Winners: Arinobu Nijjima, Toki Takeda, Ryosuke Aoki, and Yukio Koike, NTT Service Evolution Laboratories

Date: February 25, 2021

Organization: The Augmented Humans International Conference 2021 (AHs 2021), Association for Computing Machinery (ACM)

For “Reducing Muscle Activity When Playing Tremolo by Using Electrical Muscle Stimulation.”

Published as: A. Nijjima, T. Takeda, R. Aoki, and Y. Koike, “Reducing Muscle Activity When Playing Tremolo by Using Electrical Muscle Stimulation,” AHs 2021, Feb. 2021.

American Physical Society Outstanding Referee

Winner: Kenta Takata, NTT Basic Research Laboratories

Date: February 25, 2021

Organization: American Physical Society

For his outstanding refereeing to keep the standards of the journals of the American Physical Society at a high level and help authors improve the quality and readability of their articles.

American Physical Society Outstanding Referee

Winner: William John Munro, NTT Basic Research Laboratories

Date: February 25, 2021

Organization: American Physical Society

For his outstanding refereeing to keep the standards of the journals of the American Physical Society at a high level and help authors improve the quality and readability of their articles.

Best Technical Paper Award

Winners: Takashi Matsui, Yuto Sagae, Taiji Sakamoto, and Kazuhide Nakajima, NTT Access Network Service Systems Laboratories

Date: March 7, 2021

Organization: SPIE Photonics West 2021

For “Applicability of Standard 125 μm -cladding Multi-core Fiber for Wide-band and Long-haul Transmission.”

Published as: T. Matsui, Y. Sagae, T. Sakamoto, and K. Nakajima, “Applicability of Standard 125 μm -cladding Multi-core Fiber for Wide-band and Long-haul Transmission,” SPIE Photonics West 2021, 11713-2, Mar. 2021.

Young Researcher’s Award

Winner: Takamitsu Tochino, NTT Access Network Service Systems

Laboratories

Date: March 11, 2021

Organization: IEICE

For “Dynamic Bandwidth Allocation for Bandwidth Efficiency Improvement by Skipping Report Sequence.”

Published as: T. Tochino, H. Ujikawa, Y. Sakai, and J. Terada, “Dynamic Bandwidth Allocation for Bandwidth Efficiency Improvement by Skipping Report Sequence,” Proc. of the 2020 IEICE Society Conference, B-8-4, Online conference, Sept. 2020.

Young Researcher’s Award

Winner: Keita Kuriyama, NTT Access Network Service Systems Laboratories

Date: March 11, 2021

Organization: IEICE

For “Experimental Study on Wide-band Single-carrier MU-MIMO System Using FIR-type Transmit Beamforming.”

Published as: K. Kuriyama, H. Fukuzono, M. Yoshioka, and T. Hayashi, “Experimental Study on Wide-band Single-carrier MU-MIMO System Using FIR-type Transmit Beamforming,” Proc. of the 2020 IEICE General Conference, B-5-164, Hiroshima, Japan, Mar. 2020.

Young Researcher’s Award

Winner: Tatsuhiko Iwakuni, NTT Access Network Service Systems Laboratories

Date: March 11, 2021

Organization: IEICE

For “Interference Evaluation of Large-scale High-density Antenna Environments.”

Published as: T. Iwakuni, D. Uchida, H. Kazui, S. Wai, C. Huan, N. Kita, and T. Onizawa, “Interference Evaluation of Large-scale High-density Antenna Environments,” Proc. of the 2020 IEICE General Conference, B-5-88, Hiroshima, Japan, Mar. 2020.

Young Researcher’s Award

Winner: Tomokazu Oda, NTT Access Network Service Systems Laboratories

Date: March 11, 2021

Organization: IEICE

For “Study on Measurement Accuracy of Splice Loss Measurement in FMF Based on BOTDA” and “Fundamental Study on Electric Field Distribution and BGS of LP11 Mode in FMF.”

Published as: T. Oda, A. Nakamura, D. Iida, and H. Oshida, “Study on Measurement Accuracy of Splice Loss Measurement in FMF Based on BOTDA,” Proc. of the 2020 IEICE General Conference, B-13-19, Hiroshima, Japan, Mar. 2020.

T. Oda, A. Nakamura, D. Iida, and H. Oshida, “Fundamental Study on Electric Field Distribution and BGS of LP11 Mode in FMF,” Proc. of the 2020 IEICE Society Conference, B-13-15, Online conference, Sept. 2020.

Young Researcher’s Award

Winner: Mizuto Nakamura, NTT Network Service Systems Laboratories

Date: March 11, 2021

Organization: IEICE

For “ACT Device Identification Method Using Time Fluctuation of Traffic Data” and “Time Correction Method of Time-series Data Using Waveform Similarity.”

Published as: M. Nakamura, N. Hayashi, N. Tanji, A. Takada, T. Seki, and K. Yamagoe, “ACT Device Identification Method Using Time Fluctuation of Traffic Data,” Proc. of the 2020 IEICE General Conference, B-14-6, Hiroshima, Japan, Mar. 2020.

M. Nakamura, N. Hayashi, A. Takada, T. Seki, and K. Yamagoe, “Time Correction Method of Time-series Data Using Waveform Similarity,” Proc. of the 2020 IEICE Society Conference, B-14-5, Online conference, Sept. 2020.

Young Researcher’s Award

Winner: Hiroki Ikeuchi, NTT Network Technology Laboratories

Date: March 11, 2021

Organization: IEICE

For “Root Cause Analysis Based on Massive Data Generated by Fault Injection.”

Published as: H. Ikeuchi, G. E. Jiawen, Y. Matsuo, and K. Watanabe, “Root Cause Analysis Based on Massive Data Generated by Fault Injection,” Proc. of the 2020 IEICE General Conference, B-7-32, Hiroshima, Japan, Mar. 2020.

MEF 3.0 Proof of Concept Showcase Innovation Award

Winners: Hiroki Baba, Shiku Hirai, Minoru Matsumoto, NTT Network Technology Laboratories; Mitsuo Amasaka, Kazuma Kamienoo, Takuya Satou, Ken Takahashi, Takayuki Nakamura, Takamitsu Narumi, Aki Fukuda, NTT Network Service Systems Laboratories

Date: March 11, 2021

Organization: MEF 3.0 Proof of Concept Showcase, MEF Forum

For “E2E Slicing for Extreme Services.”

English Session Encouragement Award of Information and Communication Management

Winners: Shiku Hirai, Hiroki Baba, NTT Network Technology Laboratories; Saburo Seto, NTT Network Service Systems Laboratories

Date: March 18, 2021

Organization: IEICE Technical Committee on Information and Communication Management

For “Optimal Provisioning of Cloud-native Network Functions based on Performance Prediction.”

Published as: S. Hirai, H. Baba, and S. Seto, “Optimal Provisioning of Cloud-native Network Functions based on Performance Prediction,” Proc. of the 2020 IEICE Society Conference, BS-8-13, Online conference, Sept. 2020.

Papers Published in Technical Journals and Conference Proceedings

Digital to Natural - Innovation for Smart World

S. Yamamoto, A. Nakayama, and K. Kawazoe

International Journal of Informatics Society, Vol. 12, pp. 95–101, November 2020.

With the development of information and communication technologies, it is hoped that a world in which all people can live bountiful and happy lives can be achieved using innovative technologies. In other words, a Smart World. “Digital to Natural” is a transformation that is crucial to turning the concept of a Smart World into reality. It means not only pursuing the ultimate digital vision of high-speed, high-capacity, high-definition performance but also creating new value that can be achieved by naturally capturing and making the best use of a variety of information that previously could not be captured by humans. This will allow people to naturally and unconsciously benefit from technology. This paper describes what should be considered in order for technology to evolve into a more natural form and shows technologies that support it such as artificial intelligence, visual media, and information and communication technology infrastructures—IOWN (Innovative Optical and Wireless Network). This paper also presents concepts for several services that this technology can enable.

2D Position Estimation for Wireless LAN Terminals by the Access Point Using Distributed Antenna System

M. Hosoda, H. Sakamoto, T. Murakami, T. Mouri, A. Nakayama, T. Ogawa, and M. Miyamoto

IPSJ Journal, Vol. 62, No. 3, pp. 946–958, March 2021.

In this paper, we propose a two-dimensional (2D) positioning method for operators of MaaS (mobility as a service), events, facilities, etc. to obtain information on massive people flow by the positioning the terminals owned by the visitors. We have previously proposed a 1D positioning method for positioning widely used wireless local area network (LAN) terminals without needing to install any application in the terminals but by just connecting the terminal with an access point that uses a distributed antenna system. We extended this method to 2D positioning and introduce a method of calculating position estimation by integrating more antennas and multiple measurements. We conducted experiments to confirm the effectiveness of the proposed method and present the results in this paper. We also demonstrated the proposed method at an exhibition where many visitors gathered.

Riccati Equation as Topology-based Model of Computer Worms and Discrete SIR Model with Constant Infectious Period

D. Satoh and M. Uchida

Physica A: Statistical Mechanics and its Applications, Vol. 566, 125606, March 2021.

We propose discrete and continuous infection models of computer worms via e-mail or social networking site messengers that were previously classified as worms spreading through topological neighbors. The discrete model is made on the basis of a new classification of worms as *permanently* or *temporarily* infectious. A temporary infection means that only the most recently infected nodes are infectious according to a difference equation. The discrete model is reduced to a Riccati differential equation (the continuous model) at the limit of a zero difference interval for the difference equation. The discrete and continuous models well describe actual data and are superior to a linear model in terms of the Akaike information criterion. Both models overcome the overestimation that is generated by applying a scan-based model to topology-based infection, especially in the early stages. The discrete model gives a condition in which all nodes are infected because the vulnerable nodes of the Riccati difference equation are finite and the solution of the Riccati difference equation plots discrete values on the exact solution of the Riccati differential equation. Also, the discrete model can also be understood

as a model for the spread of infections of an epidemic virus with a constant infectious period and is described with a discrete susceptible-infected-recovered (SIR) model. The discrete SIR model has an exact solution. A control to reduce the infection is considered through the discrete SIR model.

Hardness of Efficiently Generating Ground States in Post-selected Quantum Computation

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

Physical Review Research, Vol. 3, 013213, March 2021.

Generating ground states of any local Hamiltonian seems to be impossible in quantum polynomial time. In this paper, we give evidence for the impossibility by applying an argument used in the quantum-computational-supremacy approach. More precisely, we show that if ground states of any 3-local Hamiltonian 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. We also discuss what makes efficiently generating the ground states hard for postselected quantum computation.