External Awards

IPSJ Computer Science Research Award for Young Scientists

Winner: Toshiyuki Kurabayashi, NTT Software Innovation Center
Date: July 31, 2017
Organization: Information Processing Society of Japan (IPSJ)

For "Automatic High Coverage Test Data Generation for Integration Testing by Dynamic Symbol Execution and Search-based Software Testing."
Published as: T. Kurabayashi, X. Zhang, and H. Tanno, "Automatic High Coverage Test Data Generation for Integration Testing by Dynamic Symbol Execution and Search-based Software Testing," Proc. of IPSJ/SIGSE Software Engineering Symposium 2016, pp. 147–152, Aug./Sept. 2016 (in Japanese).

Best industry paper award

Winner: Shinobu Saito and Yukako Iimura, NTT Software Innovation Center; Aaron Massey, University of Maryland, Baltimore; Annie Antón, Georgia Institute of Technology
Date: September 6, 2017
Organization: The Institute of Electrical and Electronics Engineers (IEEE)

For "How Much Undocumented Knowledge is there in Agile Software Development?"
Published as: S. Saito, Y. Iimura, A. Massey, and A. Antón, "How Much Undocumented Knowledge is there in Agile Software Development?," The 25th IEEE International Requirements Engineering Conference, Lisbon, Portugal, Sept. 2017.

Papers Published in Technical Journals and Conference Proceedings

Understanding Semantic Structure of Tables with a Hybrid Deep Neural Network Architecture

K. Nishida, K. Sadamitsu, R. Higashinaka, and Y. Matsuo

Proc. of AAAI-17 (Thirty-First Association for the Advancement of Artificial Intelligence Conference on Artificial Intelligence), pp. 168–174, San Francisco, CA, USA, February 2017.

We propose a new deep neural network architecture, TabNet, for table type classification. Table type is essential information for exploring the power of Web tables, and it is important to understand the semantic structures of tables in order to classify them correctly. A table is a matrix of texts, analogous to an image, which is a matrix of pixels, and each text consists of a sequence of tokens. Our hybrid architecture mirrors the structure of tables; its recurrent neural network (RNN) encodes a sequence of tokens for each cell to create a 3d table volume like image data, and its convolutional neural network (CNN) captures semantic features, e.g., the existence of rows describing properties, to classify tables. Experiments using Web tables with various structures and topics demonstrated that TabNet achieved considerable improvements over state-of-the-art methods specialized for table classification and other deep neural network architectures.

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200 Gbit/s 16QAM WDM Transmission over a Fully Integrated Cladding Pumped 7-Core MCF System

C. Castro, S. Jain, Y. Jung, E. De Man, S. Calabrò, K. Pulverer, M. Bohn, J. Hayes, S.-ul Alam, D. J. Richardson, K. Takenaga, T. Mizuno, Y. Miyamoto, T. Morioka, and W. Rosenkranz

Proc. of the Optical Fiber Communication Conference and Exhibition (OFC) 2017, Th1C. 2, Los Angeles, CA, USA, March 2017.

A complete, realistic integrated system is investigated, consisting of directly spliced 7-core multi-core fiber, cladding-pumped 7-core amplifiers, isolators, and couplers. The system is demonstrated in a 16QAM (quadrature amplitude modulation) C-band wavelength division multiplexing scenario over 720 km.

In-service Crosstalk Monitoring for Dense Space Division Multiplexed Multi-core Fiber Transmission Systems

T. Mizuno, A. Isoda, K. Shibahara, Y. Miyamoto, S. Jain, S. U. Alam, D. J. Richardson, C. Castro, K. Pulverer, Y. Sasaki, Y. Amma, K. Takenaga, K. Aikawa, and T. Morioka

Proc. of OFC 2017, M3J. 2, Los Angeles, CA, USA, March 2017.

We present in-service inter-core crosstalk monitoring for multi-core fiber transmission systems. We transmit 54-WDM (wavelength division multiplexing) PDM-16QAM (polarization-division multiplexed 16 quadrature amplitude modulation) signals over 111.6-km 32-core dense space division multiplexed transmission line incorporating cladding-pumped 32-core MC-EYDFA (multi-core erbium/ytterbium-doped fiber amplifier), and demonstrate –30 dB crosstalk monitoring without affecting transmission performance.

High-capacity Dense Space-division Multiplexed Transmission Systems Using Single-mode Heterogeneous Multicore Fibre

T. Mizuno

Proc. of ISUPT 2017 (8th International Symposium on Ultrafast Photonic Technologies), Invited talk, Session 4, p. 32, Winchester, UK, July 2017.

Space-division multiplexing (SDM) is one of the most promising technologies for future ultra-high capacity optical transport networks. This invited talk will focus on dense space-division multiplexing (DSDM) transmission technology using a single-mode heterogeneous multicore fibre (MCF) with more than 30 spatial channels. We review our crosstalk-managed 32-core DSDM transmission line employing heterogeneous design with a square lattice arrangement. We also review our recent demonstration of high-capacity and long-distance transmission including the 32-core DSDM unidirectional transmission over 1600 km, the inline amplified DSDM transmission with a 32-core cladding-pumped multi-core Er/Yb doped fibre amplifier, and the 1 Petabit/s inline-amplified DSDM transmission over 200 km. Part of this research utilized results from the EU-Japan coordinated R&D project on "Scalable And Flexible optical Architecture for Reconfigurable Infrastructure (SAFARI)" commissioned by the Ministry of Internal Affairs and Communications (MIC) of Japan and EC Horizon 2020.

High-capacity Dense Space Division Multiplexed Multicore Fiber Transmission

T. Mizuno, K. Shibahara, T. Kobayashi, and Y. Miyamoto

Proc. of OSA Advanced Photonics Congress 2017, NeTu2B.3, New Orleans, LA, USA, July 2017.

We present dense space-division multiplexed transmission technology based on a single-mode multicore transmission line. Long-distance 1600-km transmission and 1-Pb/s high-capacity 205.6-km transmission over a crosstalk-managed heterogeneous 32-core fiber are reviewed.

Self-propelled Ion Gel at Air-water Interfaces

K. Furukawa, T. Teshima, and Y. Ueno

Scientific Reports, Vol. 7, pp. 9323-1–8, August 2017.

We report on a self-propelled gel using ionic liquid as a new type of self-propellant that generates a powerful and durable motion at an air-water interface. The gel is composed of 1-ethyl-3-methylimidazolium-bis(trifluoromethylsulfonyl)imide (EMIM-TFSI) and poly(vinylidene fluoride-co-hexafluoropropylene) (P(VDF-co-HFP)). A long rectangular ion gel piece placed on the interface shows rapid rotation motion with a maximum frequency close to 10 Hz, corresponding to a velocity over 300 mms^{-1} at the outmost end of the piece. The rotation continues for ca. 10^2 s, followed by a reciprocating motion ($<\sim10^3$ s) and a nonlinear motion in long-time observations ($>\sim10^3$ s). The behaviours can be explained by the model considering elution of EMIM-TFSI to the air-water interface, rapid dissolution into water, and slow diffusion in an inhomogeneous polymer gel network. Because the self-propellants are promptly removed from the interface by dissolution, durable self-propelled motions are observed also at limited interface areas close in size to the gel pieces. A variety of motions are induced in such systems where the degree of freedom in motion is limited. As the ion gel possesses formability and processability, it is also advantageous for practical applications. We demonstrate that the gel does work as an engine.
