

External Awards

DICOMO 2011 Paper Awards

Winners: Takamitsu Narumi, Yasuhiko Yoshimura, Takeshi Miyasaka, and Kouichi Genda, NTT Network Service Systems Laboratories

Date: Aug. 28, 2011

Organization: Multimedia, Distributed, Cooperative, and Mobile Symposium

For “Adapting Dynamic Load Balancing Method for Video Streaming Services”.

Although various load balancing methods have been proposed, they cannot deal with the rapid spread of information and the unanticipated surge in request rates. In this paper, we propose a method of dynamically balancing the load of video streaming services depending on the resources in the network and then analyze the effects of this method by simulation.

Published as: T. Narumi, Y. Yoshimura, T. Miyasaka, and K. Genda, “Adapting Dynamic Load Balancing Method for Video Streaming Services,” Proc. of Multimedia, Distributed, Cooperative, and Mobile Symposium 2011 (DICOMO 2011), p. 509 (3F-1), Kyoto, Japan (in

Japanese).

APNOMS Best Paper Award

Winner: Hiroshi Matsuura, NTT Service Integration Laboratories

Date: Sep. 23, 2011

Organization: Asia-Pacific Network Operations and Management Symposium 2011

For “Multipath Creation Algorithm Optimizing Traffic Dispersion on Networks”.

A new heuristic k shortest simple path algorithm called k -shortest paths first (k -SPF) is proposed. It creates k shortest simple paths faster than the conventional Yen’s algorithm does. In addition, its parameters can be changed effectively to achieve appropriate traffic dispersion without making any bottleneck links.

Published as: H. Matsuura, “Multipath Creation Algorithm Optimizing Traffic Dispersion on Networks,” Proc. of the 13th Asia-Pacific Network Operations and Management Symposium (APNOMS2011), Taipei, Taiwan, 2011.

Papers Published in Technical Journals and Conference Proceedings

An SoC Demonstration of ONU Discovery and Dynamic Bandwidth Allocation for 10G/1G Dual-rate 10G-EPON

M. Nakanishi, K. Kawai, J. Kato, N. Miura, A. Miyazaki, H. Kamitsuna, H. Katsurai, N. Tanaka, Y. Ohtomo, M. Urano, and T. Shibata

Proc. of the National Fiber Optic Engineers Conference (NFOEC), Los Angeles, CA, USA, 2011.

Newly developed dual-rate optical line terminal (OLT) and optical network unit (ONU) system-on-a-chip devices (SoCs) combined with our latest transceivers demonstrate highly efficient 10G/1G (G: Gbit/s) ONU simultaneous discovery processing and hardware-accelerated dynamic bandwidth allocation of the transmission time according to the requirements.

A Heuristic Algorithm for Reducing System-level Test Vectors with High Branch Coverage

K. Yamazaki, Y. Sekihara, T. Aoki, E. Hosoya, and A. Onozawa
Proc. of the IEEE International Symposium on Circuits and Systems (ISCAS), pp. 1475–1478, Rio de Janeiro, Brazil, 2011.

We introduce a heuristic that generates as few test vectors as possible with high branch coverage for the functional verification of

digital design. The challenge is how to save time and effort while achieving sufficient verification at the system level. We focus on generating test vectors from a circuit specification written in C. We reuse them in a SystemC description by removing their redundancies while maintaining the branch coverage as is. Experimental results for our practical design show that over 90% on average of the redundant test vectors were reduced with 100% branch coverage maintained. The reused test vectors for SystemC Bus Cycle Accurate models scored 80% on average for branch coverage. These results are significant for saving verification cost and beneficial for simplifying debugging work.

Stack Queue Mixed Layout of Bipartite Graph Subdivisions

M. Miyauchi and H. Enomoto

Proc. of the 14th Korea-Japan Joint Workshop on Algorithms and Computation (WAAC2011), pp. 153–158, Busan, Korea, 2011.

This paper studies the problem of stack queue mixed layout of bipartite graph subdivisions. Dujmovic and Wood showed that for all integers $s, q > 0$, every graph G has an s -stack q -queue mixed subdivision layout with at most either $4\lceil \log_{(s+q)q} sn(G) \rceil$ division vertices per edge, where $sn(G)$ is the number of stacks of G , or $2 + 4\lceil \log_{(s+q)q} qn(G) \rceil$

division vertices per edge, where $qn(G)$ is the number of queues of G . This paper improves upon their result for complete bipartite graphs $K_{m,n}$ ($m \geq n$) with m and n partite sets and shows an algorithm for constructing an s -stack q -queue mixed subdivision layout with at most $2\lceil \log_{(s+q)} n \rceil - 1$ division vertices per edge.

S³: Smart Shadow System for Real World Service and Its Evaluation with Users

K. Umakoshi, T. Kambayashi, M. Yoshida, M. Takemoto, and M. Matsuo

Proc. of the 2011 IEEE/IPSJ International Symposium on Applications and the Internet, Vol. 1, No. 1, pp. 394–401, Munich, Bavaria, Germany.

Many studies have been focusing on building smart environments, which provide useful real world services (RWSs). With RWSs, however, feature interactions (FIs), device conflicts, and service conflicts occur more often because many devices run automatically. For this FI problem, we have been developing a Smart Shadow System (S3), which provides RWSs and can dynamically detect and resolve FIs. We describe an experiment in which general users tried RWSs provided by S3 in two scenarios. The purpose of one of the scenarios was to clarify the convenience of RWSs and that of the other was to determine the acceptability of FI resolution approaches. We obtained results from three viewpoints and analyzed them according to the two purposes mentioned above. We conclude that RWSs are convenient for general users and that an approach for resolving FIs through user interaction is the most acceptable for general users. Finally, we discuss issues that need to be addressed.

Efficient Data Selection for Speech Recognition Based on Prior Confidence Estimation

S. Kobashikawa, T. Asami, Y. Yamaguchi, H. Masataki, and S. Takahashi

Acoustical Science and Technology, Vol. 32, No. 4, pp. 151–153, 2011.

This paper proposes a technique that selects data to be recognized before speech recognition on the basis of rapid prior confidence esti-

mation by using context independent and speech models. Experimental results show that this technique achieves the equivalent data selection performance at 30 times the speed of the conventional posterior confidence measure after speech recognition.

Cheat-sensitive Commitment of a Classical Bit Coded in a block of $m \times n$ Round-trip Qubits

K. Shimizu, H. Fukasaka, K. Tamaki, and N. Imoto

Phys. Rev. A, Vol. 84, No. 2, p. 022308, 2011.

This paper proposes a quantum protocol for a cheat-sensitive commitment of a classical bit. The receiver of the bit (Alice) can determine that the bit sender (Bob) is being dishonest if he changes or postpones his choice. Moreover, Bob can identify a dishonest Alice who violates concealment. For each round-trip case, Alice sends one of two spin states $|S_{\pm}\rangle$ by choosing basis S at random from two conjugate bases X and Y . Bob chooses basis $C \in \{X, Y\}$ to perform a measurement and returns the resultant state $|C_{\pm}\rangle$. Alice then performs a measurement with the other basis $R (\neq S)$ and obtains the outcome $|R_{\pm}\rangle$. In the opening phase, she can discover dishonest Bob who unveils a wrong basis with a faked spin state, or Bob can discover a dishonest Alice who infers basis C but destroys $|C_{\pm}\rangle$ by setting R to be identical to S in the commitment phase. If a classical bit is coded in a block of $m \times n$ qubit particles, impartial examinations and probabilistic security criteria can be achieved.

Ultrasonic Earphone System Combined with Bone-conduction Vibration for Low Sound Leakage

M. Okamoto

Journal of INCE, Institute of Noise Control Engineering of Japan (INCE/J), Vol. 35, No. 4, pp. 323–325, 2011 (in Japanese).

This paper describes an open-air type earphone system with flat frequency characteristics and little sound leakage. This earphone is a hybrid ultrasonic earphone system combined with an audible-band bone-conduction earphone.