

Papers Published in Technical Journals and Conference Proceedings

Outdoor AP Measurement in Tokyo

T. Aoki, T. Adachi, M. Kubota, R. Okada, K. Mizutani, M. Morikura, M. Matsui, M. Mizoguchi, Y. Inoue, and A. Yamada
IEEE 802.11 HEW SG, Vol. IEEE11-14, No. 0086, Los Angeles, CA, USA, 2014.

We conducted outdoor access point (AP) measurements around Tokyo. The results indicated that the outdoor inter-AP distance was about 50 m.

The New Public Phone Service—Non Contact Ultra High Speed Contents Download

M. Shimizu, K. Hiraga, K. Sakamoto, T. Seki, T. Tsubaki, H. Toshinaga, and T. Nakagawa
IEEE 802.11 WNG SC, Los Angeles, CA, USA, 2014.

This contribution presents the non-contact ultrahigh speed transmission service over the 60-GHz band. The 60-GHz band is expected to be useful in non-contact file download kiosk systems with up to 24 Gbit/s and with over 100 Gbit/s using MIMO (multiple input multiple output).

An SD Method Utilizing Null Dependency on Transmission Distance Due to Two-ray Fading

K. Hiraga, K. Sakamoto, M. Arai, T. Seki, T. Nakagawa, and K. Uehara

Antennas and Wireless Propagation Letters, IEEE, Vol. 13, No. 1, pp. 126–129, 2014.

A spatial division (SD) transmission method utilizing the characteristics of two-ray fading due to ground reflection with linear antenna arrays horizontal to the ground is proposed. Formulations of the optimum array arrangements as functions of the transmission distance and achievable channel capacity are clarified. For two- and three-element arrays, channel capacity is respectively doubled and tripled over that of free-space propagation. The proposed method provides increased capacity without the extra signal processing cost incurred when using conventional MIMO (multiple-input and multiple-output) transmission.

A Study of Home Measures for Children's Safe Internet Use

N. Chiba, Y. Seki, Y. Horikawa, and Y. Hashimoto
IPJSJ Journal, Vol. 55, No. 1, pp. 311–324, 2014 (in Japanese).

With the spread of smartphones, the degree of Internet usage has increased even more, and Internet safety is an urgent problem facing young people. Our research focuses on parents and the home situation of young Internet users. We constructed a hypothetical model that provides a framework for discussing how to lessen the risk for young people using the Internet at home based on our qualitative analysis. Furthermore, we tested the hypothetical model based on a quantitative investigation of 300 smartphone-using junior and senior high school students and their mothers. The investigation results clarify the correlation model considering such factors as parenting concepts, family relations, in-home rules and measures as domestic

elements that control the risk when children use the Internet. In addition, we clarify that home measures are related to family relations, the parents' learning experience regarding the risk of Internet use, and the implemented parenting concepts.

Compact Optical Devices for High-speed Digital Coherent Link

S. Kamei

Photonics West 2014, SPIE, Vol. 9008, No. 1, p. 900805-, San Francisco, CA, USA.

This paper describes recent progress in relation to the key optical devices for high-speed digital coherent transmission, namely coherent receivers and advanced-format modulators. Miniaturization and higher performance have been achieved on a silica-based PLC (planar lightwave circuit) platform and it has been integrated with other key materials.

A Study of Short-range MIMO Transmission Utilizing Polarization Multiplexing for the Simplification of Decoding

K. Hiraga, K. Sakamoto, K. Nishimori, T. Seki, T. Nakagawa, and K. Uehara

IEICE Trans. on Communications, Vol. E97-B, No. 2, pp. 459–468, 2014.

One of the procedures for increasing the number of multiple-input and multiple-output (MIMO) branches without increasing the computational cost for MIMO detection or multiplexing is to exploit parallel transmissions by using polarization multiplexing. In this paper, the effectiveness of using polarization multiplexing is confirmed under the existence of polarization rotation, which is inevitably present in short-range multiple-input and multiple-output (SR-MIMO) channels with planar array antennas. It is confirmed that an 8×8 SR-MIMO transmission system with polarization multiplexing has 60 bit/s/Hz of channel capacity. This paper also shows a model for theoretical cross polarization discrimination (XPD) degradation, which is useful for calculating XPD degradations on diagonal paths.

MulDiRoH: A Multi-view Human Representation System Using a QDA Screen with Multiple Cameras

S. Ozawa, S. Mieda, Y. Yao, M. Date, H. Takada, T. Kawakami, S. Nasu, T. Ishinabe, M. Kano, M. Sasai, and T. Uchida

IEEE Journal of Display Technology, Vol. 10, No. 2, February 2014.

We have developed a human representation system we call MulDiRoH. It consists of a multiview display that uses a quantized-diffusion-angle (QDA) screen and multiple cameras. The QDA screen has a large, wide viewing area that enables observers to comfortably watch the display. It is also convenient in that accurate projector orientation is unnecessary; this makes easy system construction possible. In this paper, we describe the MulDiRoH system and propose a Tiled Image Method to achieve shorter projection distance with it and a Perspective Transform Method to correct views obtained with it.

Structural and Electrical Transport Properties of MOVPE-grown Pseudomorphic AlAs/InGaAs/InAs Resonant Tunneling Diodes on InP Substrates

H. Sugiyama, A. Teranishi, S. Suzuki, and M. Asada
Japanese Journal of Applied Physics, Vol. 53, 031202, 2014.

We report metal-organic vapor-phase epitaxy (MOVPE) growth of pseudomorphic AlAs/InGaAs/InAs resonant tunneling diodes (RTDs) on InP substrates for the first time. XRD (X-ray diffraction) measurements and TEM (transmission electron microscopy) observations reveal that a uniform strained InAs subwell is coherently grown in the double-barrier (DB) structure. The AlAs/InGaAs/InAs RTDs exhibit excellent current-voltage characteristics with a high peak current density (J_P) of around 2×10^5 A/cm² and peak-to-valley ratio (PVR) of around 6. A comparison with control RTDs consisting of AlAs/In_{0.8}Ga_{0.2}As DB confirms the effectiveness of InAs subwell insertion for the improvement of PVR.

Proposal and Evaluation of Agent-based Service Platform by Applying on BMI-enabled Services

S. Takeuchi, R. Banno, K. Umakoshi, A. Kanemura, M. Kawanabe, T. Kawano, T. Kambayashi, M. Takemoto, M. Matsuo, and R. Kakinuma

IPSJ Journal, Vol. 55, No. 2, pp. 681–694, 2014.

Real world services that affect entities in the real world through actuators deployed by extracting the environmental context based on sensing data will be available in the future. These real world services are expected to be provided by combining dynamic and diverse

devices, processes, and varieties of data, and therefore, a flexible and scalable service platform is essential. Thus, an agent-based service platform that represents a service as a series of agents is proposed. While the overhead is generally larger than that of integrated systems, the feasibility of an agent-based system in the real environment is not clear. Therefore, the proposed platform was applied on BMI (brain-machine interface)-enabled services that should be provided in real-time and evaluated through simulation and in a real environment. As a result, the latency on the platform is less than a few hundreds of milliseconds, so the platform can be applied to a practical service.

Pedestrian Navigation System Utilizing Effectiveness of Dynamic Exploration for Force Direction Perception

T. Amemiya and H. Gomi

IEICE Trans. on Information and Systems, Vol. J97-D, No. 2, pp. 260–269 (in Japanese).

Integration of an information presentation device and a position and orientation tracking system is required for effective indoor pedestrian navigation. We developed a pedestrian navigation system with a mobile haptic display. The haptic display creates a sensation of being pulled using asymmetric oscillation and provides precise angular resolution of force direction with a rotation mechanism. The experimental result showed that actively moving the hand facilitated understanding of the directional cue. We discuss the feasibility of the system for indoor pedestrian navigation.