

External Awards

MEF 2020 Top Contributor Award

Winner: Hiroki Baba, NTT Network Technology Laboratories

Date: July 27, 2020

Organization: MEF (Metro Ethernet Forum)

For his contribution to MEF work, including MEF 3.0 Proofs of Concept and a white paper “Slicing for Shared 5G Fronthaul and Backhaul.”

Outstanding Research Award

Winners: Shinobu Saito and Yukako Iimura, NTT Software Innovation Center; Emad Aghayi and Thomas D. LaToza, George Mason University

Date: September 3, 2020

Organization: Information Processing Society of Japan (IPSJ) Spe-

cial Interest Group on Software Engineering

For “Can Microtask Programming Work in Industry?”.

Published as: S. Saito, Y. Iimura, E. Aghayi, and T. D. LaToza, “Can Microtask Programming Work in Industry?”, arXiv:2009.05207, Sept. 2020.

JSAP Fellow

Winner: Akira Fujiwara, NTT Basic Research Laboratories

Date: September 8, 2020

Organization: The Japan Society of Applied Physics (JSAP)

For his study on ultimate control of electrons using silicon nanodevices.

Papers Published in Technical Journals and Conference Proceedings

Influence of Condensation Due to Temperature Difference on Corrosion Process of Exposed Reinforcement Structure

H. Kasahara, N. Fujimoto, and Y. Okamura

Journal of the Society of Materials Science (Zairyo), Vol. 69, No. 7, pp. 539–546, July 2020.

The environment in a reinforced concrete communications manhole is always very humid, and the exposed steel bars can easily become corroded. However, since the depth below ground of these manholes is relatively shallow and the annual temperature change is modest compared to that for above-ground structures, it is assumed that the factors controlling the progress of steel bar corrosion are different than those for other structures. Moreover, manholes basically represent an isolated environment, and there are no additional substances such as sea salt present compared to the outside air. In this relatively static environment, it is thought that the amount of water vapor is the main cause of change in corrosion rate. Therefore, in this study, in order to clarify the supply mechanism of water that promotes steel bar corrosion in manholes, the relationship among the actual manhole temperature, humidity, and the corrosion rate was investigated. The results show that in winter, the temperature of the manhole ceiling is lower than the dew point temperature, so condensation occurs and steel bar corrosion progresses. Based on repeated temporal experiments, we found that the increase in condensation due to the difference between the dew point temperature and the temperature of the ceiling must be considered in order to explain the steel bar corrosion rate in manholes.

Luminance Distribution and Monocular Depth Perception by Smooth Motion Parallax in Visually Equivalent Light Field 3D Display Using Linear Blending Technology

R. Kamada, H. Mizushima, M. Date, S. Shimizu, and S. Suyama

IMID (International Meeting on Information Display) 2020 DIGEST, Vol. 9, p. 1598, August 2020.

To obtain a realistic three-dimensional (3D) display with a high degree of realism without the need for 3D glasses, it is necessary to represent continuous motion parallax caused by changes in the viewing position. However, to present continuous motion parallax by using a multi-view display, a sufficiently narrow viewpoint interval and large amount of parallax image data are required. To solve this problem, the visually equivalent light field 3D (VELF3D) display with linear blending technology has been proposed. We estimated the precise luminance distribution of the VELF3D display and evaluated monocular depth perception by motion parallax.

Vocal-tract Spectrum Estimation Method Affects the Articulatory Compensation in Formant Transformed Auditory Feedback

Y. Uezu, S. Hiroya, and T. Mochida

Acoustical Science and Technology, Vol. 41, No. 5, pp. 720–728, September 2020.

Auditory feedback has a crucial role in stably controlling speaking

and singing. Formant transformed auditory feedback (TAF) is used to investigate the relationship between perturbation to the formant frequency and the compensatory response to clarify the mechanism of auditory-speech motor control. Although previous studies on formant TAF applied linear predictive coding (LPC) to estimate formant frequencies, LPC estimates false formants for high-pitch voice. In this paper, we investigated how different vocal-tract spectrum-estimation methods in real-time formant TAFs affect the compensatory response of formant frequencies to perturbations. A phase-equalization-based autoregressive exogenous model (PEAR) is applied to the TAF system as a formant estimation method that can estimate the formant frequency more accurately and robustly than LPC. Fifteen Japanese native speakers were asked to repeat the Japanese syllables /he/ or /hi/ while receiving feedback sounds whose formants F1 and F2 were transformed. From the results for the /he/ condition, the F1 compensatory response for PEAR was significantly larger than that of LPC, and the compensation error in the F1–F2 plane for PEAR was less than that for LPC. Our results suggest that PEAR can increase both the accuracy of formant frequency estimation and the naturalness of the transformed speech sound.

Classification of Formant Estimation Methods in Transformed Auditory Feedback Experiments Using Convolutional Neural Networks

F. Taguchi¹, S. Hiroya, Y. Uezu, and T. Mochida

Acoustical Science and Technology, Vol. 41, No. 5, pp. 800–803, September 2020.

We classified formant transformed auditory feedback experimental data directly comparing phase-equalization-based autoregressive exogenous model and linear predictive coding by using a convolutional neural network. We found that the average identification rate was significantly high in the case of two-channel input of Utter (the speech signals from the microphone) and Trans (the transformed speech signals). This suggests that speech prediction is important in determining the naturalness of feedback speech.
