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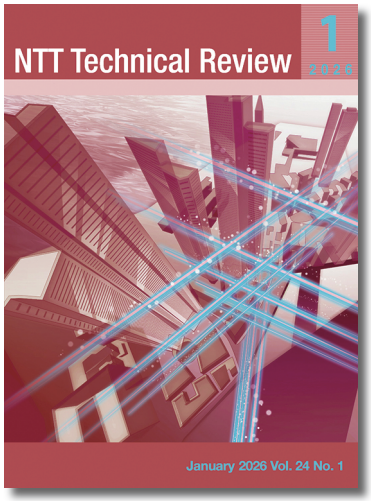


Front-line Researchers

Hirokazu Kameoka, Senior Distinguished Researcher, Communication Science Laboratories, NTT, Inc.

▼Abstract

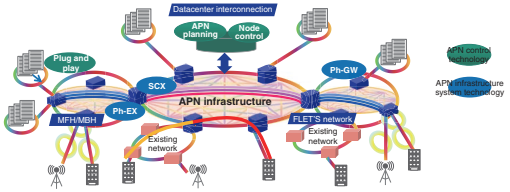
Communication is subject to a variety of constraints arising from physical and psychological conditions and ability as determined by, for example, disabilities, age-related decline, and the challenges of speaking an unfamiliar language. To address these limitations, increasing attention is being directed toward communication-function augmentation technologies, which convert a speaker's voice in real time to one better suited to the situation, thus removing barriers to effective interaction. Dr. Hirokazu Kameoka, a senior distinguished researcher at NTT Communication Science Laboratories, has long been engaged in research not only on transforming voice quality but also on enabling prosodic modifications such as accent conversion, whisper-to-speech conversion, and electrolaryngeal-to-speech conversion. To meet emerging demands such as creating a "cute" or "tough" voice, he has also begun exploring technologies that enable the subjective impression of speech to be freely manipulated. We asked Dr. Kameoka to look back on his past research achievements, share the current status and concrete outcomes of his latest original projects, and discuss his broader approach to research.

Feature Articles
Toward Commercial Deployment of IOWN APN step3

Efforts toward Deployment and Dissemination of IOWN APN step3

▼Abstract

NTT proposed the IOWN (Innovative Optical and Wireless Network) concept in May 2019 and has been driving the research, development, and practical implementation of the All-Photonics Network (APN). The APN is a novel optical network infrastructure that features ultra-high capacity, ultra-low latency, and ultra-high energy efficiency. In March 2023, the NTT Group started offering APN services, and since then service menus have been expanded. This article introduces initiatives aimed at deploying and promoting "APN step3," the next evolutionary form of the APN targeted for around 2028.



Regular Articles

Preventing Sensitive Data Generation with Positive-unlabeled Diffusion Models

▼Abstract

Diffusion models often generate sensitive data that are unwanted by users, mainly because the unlabeled training data frequently contain such sensitive data. However, labeling all sensitive data in the large-scale unlabeled training data is impractical. To solve this, my research colleagues and I propose positive-unlabeled diffusion models, which prevent the generation of sensitive data using a small amount of labeled sensitive data in addition to unlabeled training data. If we have access to clean normal data, then we can prevent the generation of sensitive data since such sensitive data are excluded from the training data. Our key idea is to approximate the training objective function of normal (negative) data using only unlabeled and sensitive (positive) data. Therefore, even without labeled normal data, we can maximize the training objective function for normal data and minimize it for labeled sensitive data, ensuring the generation of only normal data.

(a) Unlabeled training data (b) Sensitive training data (c) Unsupervised samples (d) Proposed samples