

先端科学技術研究科 修士論文要旨

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論文題目	Parameter Reduction in Diffusion-Based Text-to-speech Synthesis Using Time-Frequency Kernel Module		
要旨			
<p>In recent years, text-to-speech (TTS) synthesis has improved dramatically in quality of synthesized speech with the implementation of deep learning, approaching a level comparable to natural speech. However, these advancements have come at the cost of significantly larger TTS models, extensive datasets, and increased computational resource requirements. This escalation presents a substantial barrier for deployment in resource-constrained environments.</p> <p>Speech synthesis on edge devices, a prime example of a resource-constrained environment, plays an important role in personalized real-time speech interfaces and in scenarios where privacy protection is required.</p> <p>However, the strict constraints on computational resources and power consumption in these environments make it essential to reduce the weight of the TTS model.</p> <p>To solve this issue, the architecture of the TTS model needs to be reviewed and devised to achieve efficient operations.</p> <p>This study focuses on diffusion model-based neural speech synthesis and aims to lighten its internal structure.</p> <p>This research proposes the Time-Frequency Kernel Module (TFKM) which has a kernel structure along the time-frequency axis of acoustic features.</p> <p>The proposed method is based on recent knowledge of image recognition and generation and the data structure of acoustic features, It was designed to maintain speech quality as much as possible while reducing computational cost.</p> <p>In the experiments, the TTS model with the proposed method was evaluated, and the number of parameters of the model was reduced and the generation speed was improved compared to the standard convolutional module.</p> <p>The effect of kernel shape and size in the convolution operation on the quality of speech synthesis was also observed.</p>			