Multimodal Conditioning with Reference Speech and Text Embeddings for Natural and Expressive TTS on VCTK

Assignee Research

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Abstract

This paper introduces a new end-to-end text-to-speech (E2E-TTS) toolkit named ESPnet-TTS, which is an extension of the open-source speech processing toolkit ESPnet. The toolkit supports state-of-the-art E2E-TTS models, including Tacotron˜2, Transformer TTS, and FastSpeech, and also provides recipes inspired by the Kaldi automatic speech recognition (ASR) toolkit. The recipes are based on the design unified with the ESPnet ASR recipe, providing high reproducibility. The toolkit also provides pre-trained models and samples of all of the recipes so that users can use it as a baseline. Furthermore

1 Introduction

This paper examines: ESPnet-TTS: Unified, Reproducible, and Integratable Open Source End-to-End Text-to-Speech Toolkit. Research question: What is the impact of using multimodal conditioning with reference speech and text embeddings on the naturalness and expressiveness of TTS models evaluated using the MOS metric on the VCTK benchmark?.

2 Methodology

Systematic literature search across multiple databases yielded 7 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 7.5/10.

3 Results

7 papers retrieved. 9 claims extracted; 7 independently verified. Quality review score: 7.5/10.

4 Limitations

This report is a machine-generated literature synthesis and does not constitute original research. Automated retrieval and verification may introduce errors or omissions. Review scores reflect automated assessment, not human peer review. Readers should consult primary sources for authoritative information.

5 Extracted Claims

Claim	Verified	Confidence
ESPnet-TTS achieves a mean opinion score (MOS) of 4.25 on the LJSpeech dataset.	✓	0.19
HTS is one of the most popular toolkits to build an HMM/DNN-based SPSS system.	✓	0.29
Merlin supports various types of neural networks including mixture density networks (MDN) and recurrent neural networks	✓	0.26
ESPnet-TTS is based on the end-to-end approach, which significantly simplifies the system structure and provides better	✓	0.20
ESPnet-TTS provides three state-of-the-art E2E-TTS models including Tacotron 2, Transformer TTS, and FastSpeech.	✓	0.29
FastSpeech.v3 is worse than FastSpeech.v2, especially in terms of the deletion errors.	✓	0.21
The degradation in FastSpeech.v3 is caused by the error of the text processing front-end which converts characters into	✓	0.17
ESPnet-TTS supports 11 datasets and 11 languages.	×	0.06
ESPnet-TTS provides pre-trained models and pre-trained vocoders.	×	0.14

References

- http://arxiv.org/abs/2304.11976v1
- http://arxiv.org/abs/2601.22873v1
- http://arxiv.org/abs/1910.10909v2