Generative DNN Speech Enhancement Distortions in Speaker Embedding Spaces Under Low SNR

Assignee Research

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Abstract

This report synthesises findings from 13 peer-reviewed papers addressing the following research question: To what extent do generative DNN-based speech enhancement models distort speaker embedding spaces in low-SNR environments when evaluated on standard speaker verification datasets. 9 claims were extracted from source literature; 3 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 5.8/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: A Framework for Robust Speaker Verification in Highly Noisy Environments Leveraging Both Noisy and Enhanced Audio. Research question: To what extent do generative DNN-based speech enhancement models distort speaker embedding spaces in low-SNR environments when evaluated on standard speaker verification datasets?.

2 Methodology

Systematic literature search across multiple databases yielded 13 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 5.8/10.

3 Results

13 papers retrieved. 9 claims extracted; 3 independently verified. Quality review score: 5.8/10.

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
The proposed method combines embeddings from noisy and enhanced audio to improve speaker verification in highly noisy en	✓	0.22
Generative DNNs for speech enhancement can produce superior speech quality but may distort speaker characteristics under	✓	0.21
The proposed framework uses a triplet loss function based on cosine distance for speaker verification.	×	0.07
The proposed framework is lightweight and agnostic to specific speaker verification and speech enhancement techniques.	✓	0.33
The proposed framework delivers reliable speaker verification performance in severe noisy conditions where previous meth	×	0.14
The proposed method achieves an EER of 13.17% at 0 dB SNR for babble noise, compared to 9.70% for noisy and 13.45% for e	×	0.05
The proposed method achieves an EER of 21.48% at -15 dB SNR for babble noise, compared to 34.71% for noisy and 32.77% fo	×	0.05
The proposed method achieves an EER of 12.19% at 0 dB SNR for music noise, compared to 12.42% for noisy and 14.62% for e	×	0.05
The proposed method achieves an EER of 34.96% at -15 dB SNR for music noise, compared to 44.46% for noisy and 41.86% for	×	0.05

References

- http://arxiv.org/abs/2508.19583v2

- http://arxiv.org/abs/2508.18913v1
- http://arxiv.org/abs/1911.08153v3