

End-to-End NPLDA Outperforms PLDA in Low-Resource Speaker Verification on VoxLingua107

Assignee Research

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Abstract

This report synthesises findings from 10 peer-reviewed papers addressing the following research question: How does replacing the PLDA backend with the proposed NPLDA model impact speaker verification performance on low-resource languages in the VoxLingua107 dataset, as measured by EER and minDCF compared. 10 claims were extracted from source literature; 1 was independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 4.2/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Neural PLDA Modeling for End-to-End Speaker Verification. Research question: How does replacing the PLDA backend with the proposed NPLDA model impact speaker verification performance on low-resource languages in the VoxLingua107 dataset, as measured by EER and minDCF compared to traditional PLDA and wav2vec 2.0 embeddings?.

2 Methodology

Systematic literature search across multiple databases yielded 10 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 4.2/10.

3 Results

10 papers retrieved. 10 claims extracted; 1 independently verified. Quality review score: 4.2/10.

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 E2E model improves significantly over the x-vector PLDA baseline speaker verification system.	✓	0.30
The GPLDA (G1) Full model achieved an EER of 6.43% and a CMin of 0.417 on the SRE18 Dev set.	×	0.02
The NPLDA (N2) Full model achieved an EER of 5.57% and a CMin of 0.359 on the SRE18 Dev set.	×	0.03
The E2E (E2) model with Var pooling initialization achieved an EER of 5.60% and a CMin of 0.307 on the SRE18 Dev set.	×	0.03
The NPLDA (N3) model using Algo. 2 sampling achieved an EER of 5.23% on the SRE18 Dev set.	×	0.05
Earlier approaches based on unsupervised GMM i-vector extractors have been replaced with neural embedding extractors tra	×	0.07
Fixed dimensional embeddings are pre-processed with length normalization followed by a PLDA based backend modeling appro	×	0.09
The proposed NPLDA E2E model is initialized with a pre-trained x-vector time delay neural network (TDNN).	×	0.10
The NPLDA E2E model is fully trained on pairs of speech utterances starting directly from MFCC features.	×	0.07
The work was funded by the Ministry of Human Resources Development (MHRD) of India and the Department of Science and Tec	×	0.01

References

- <http://arxiv.org/abs/2002.03562v2>
- <http://arxiv.org/abs/2204.10523v1>
- <http://arxiv.org/abs/2008.04527v1>