VINP [Submitted to IEEE/ACM Trans. on TASLP]

Introduction

This repo is the official PyTorch implementation of **'VINP: Variational Bayesian Inference with Neural Speech Prior for Joint ASR-Effective Speech Dereverberation and Blind RIR Identification'**, which has been submitted to IEEE/ACM Trans. on TASLP.

Results

Speech Dereverberation Results on REVERB

TABLE II: Dereverberation results on REVERB (1-ch)

Method	SimData							RealData				
	PESQ	ESTOI	DNSMOS		WER (%)			DNSMOS		WER (%)		
			P.835	P.808	tiny	small	medium	P.835	P.808	tiny	small	medium
Unprocessed	1.48	0.70	2.37	3.20	12.7	5.6	4.7	1.31	2.82	21.1	7.7	5.6
Oracle	-	-	3.76	3.90	7.4	4.5	4.1	-	-	-	-	-
GWPE [4]	1.57	0.72	2.41	3.22	11.9	5.4	4.7	1.43	2.83	17.7	7.0	5.5
SkipConvNet [58]	2.12	0.81	3.20	3.60	12.9	6.4	5.3	2.74	3.32	26.1	9.3	7.4
CMGAN [23]	**2.85**	**0.90**	**3.82**	3.81	9.2	5.1	4.5	**3.86**	**4.00**	12.5	5.8	5.2
StoRM [25]	2.34	0.86	**3.73**	**3.96**	11.4	6.0	5.1	**3.72**	**4.01**	16.8	9.9	9.7
TCN+SA+S [15]	2.59	0.86	3.50	3.73	11.8	6.5	5.0	3.37	3.73	23.0	12.9	6.7
oSpatialNet* [54]	**2.87**	**0.92**	3.54	**3.88**	8.7	**4.8**	**4.3**	3.39	3.86	**10.3**	**5.3**	**4.5**
VINP-TCN+SA+S (prop.)	2.51	0.87	3.47	**3.88**	8.8	5.1	4.4	3.17	3.77	11.5	6.2	5.1
VINP-oSpatialNet (prop.)	2.82	**0.90**	3.48	3.86	**8.1**	**4.8**	**4.3**	3.32	3.80	**9.1**	**5.0**	**4.3**

Bline RIR Identification Results on SimACE

TABLE III: Blind RT60 and DRR estimation results on SimACE

Method	RT60 (s)		DRR (dB)	
	MAE	RMSE	MAE	RMSE
Ratnam's [61]	0.151	0.182	-	-
Jeub's [62]	-	-	7.14	8.69
BUDDy [35]	0.089	0.132	3.93	4.57
VINP-TCN+SA+S (prop.)	**0.079**	**0.094**	**3.83**	**4.27**
VINP-oSpatialNet (prop.)	**0.079**	**0.098**	**3.87**	**4.32**

DEMO

Please open `README.html` with Microsoft Edge browser or IE borwser to play the recordings.

Method	**SimData**		**RealData**	
Unprocessed	demo1	demo2	demo3	demo4
Oracle	demo1	demo2		
GWPE	demo1	demo2	demo3	demo4
SkipConvNet	demo1	demo2	demo3	demo4

CMGAN	demo1	demo2	demo3	demo4
StoRM	demo1	demo2	demo3	demo4
TCN+SA+S	demo1	demo2	demo3	demo4
oSpatialNet*	demo1	demo2	demo3	demo4
VINP-TCN+SA+S (prop.)	demo1	demo2	demo3	demo4
VINP-oSpatialNet (prop.)	demo1	demo2	demo3	demo4