SPEECH ENHANCEMENT USING NEURAL AUDIO CODEC

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WHAT IS SPEECH ENHANCEMENT?

An algorithm suppresses sounds other than clean speech.
Currently, a machine learning model.

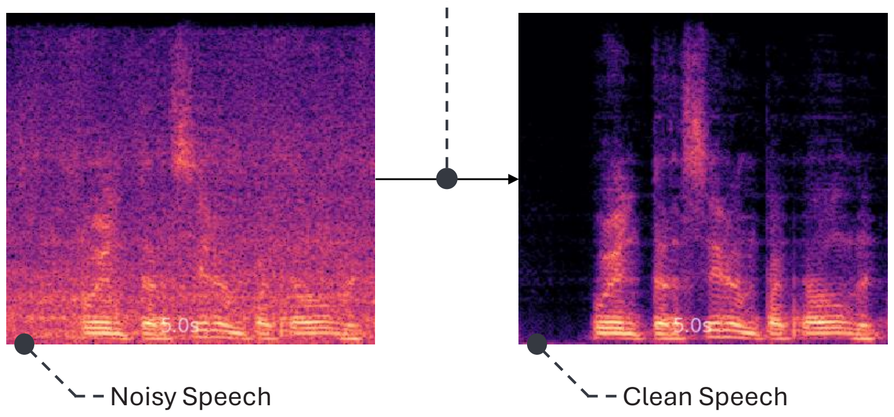
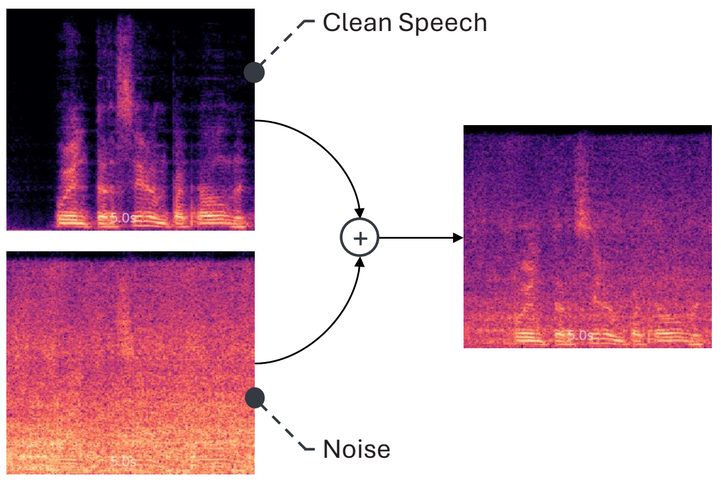


Figure 1: Spectrogram of noisy speech and its clean speech counterpart.

HOW IS IT USUALLY TRAINED?



- Noisy speech is created by summing a clean speech and a noise waveforms.
- A model is trained to map noisy speech to the original clean speech.
- This creates a discrepancy between training and inference, creating a possible generalization gap.

Figure 2: Example of simulated mixture creation process.

PROPOSED SOLUTION

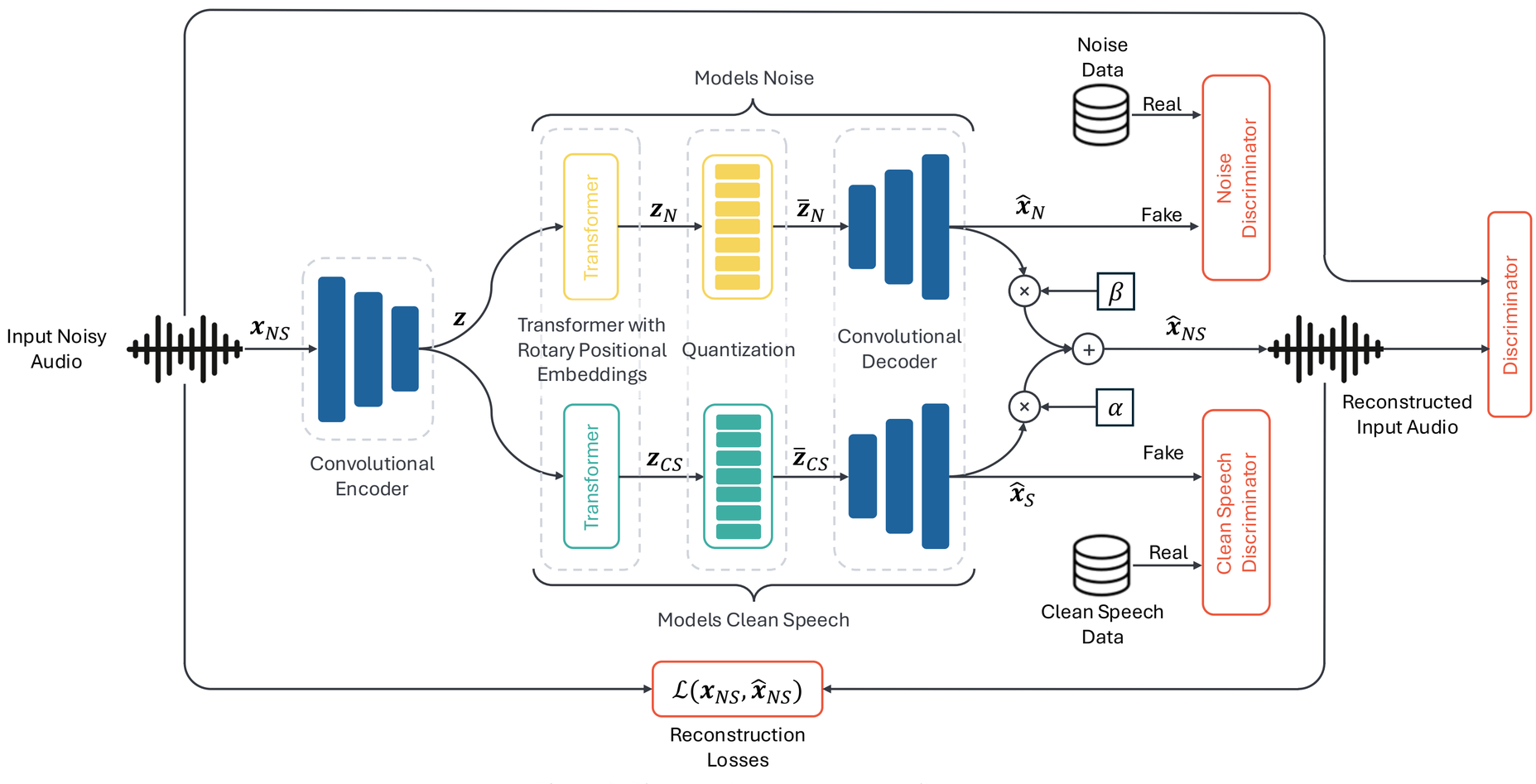


Figure 3: Diagram of the proposed architecture.

RESULTS

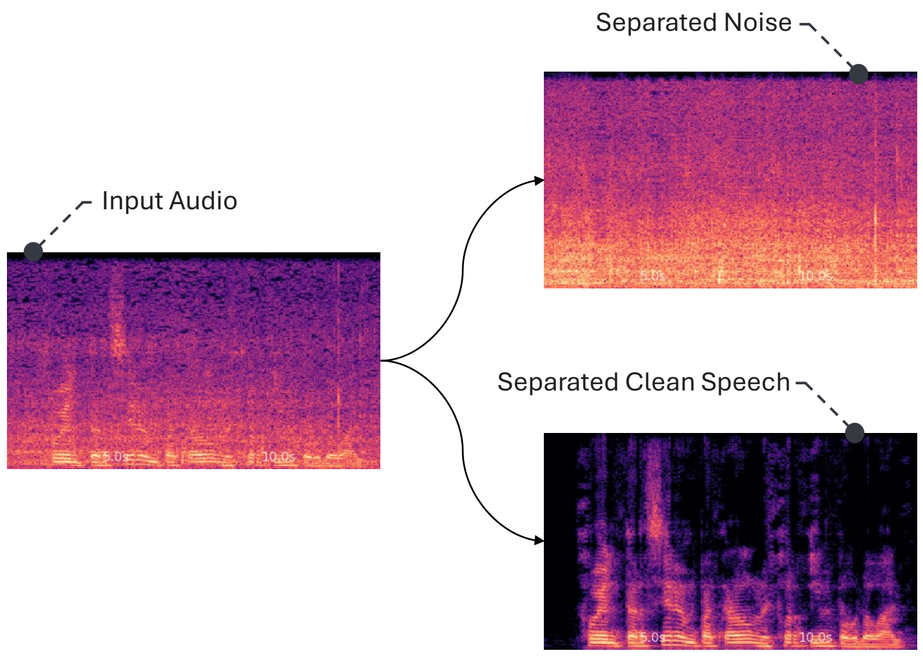


Figure 4: Example of separated audio by 2-branch model.

Table 1: Comparison of baselines and our approaches. All but the last row are trained in a supervised manner.

Method	DNS-MOS↑	UTMOS↑	PESQ↑	STOI↑	SI-SDR↑
Noisy Input	2.53	2.62	1.98	0.92	8.4
Ground Truth	3.22	4.07	-	-	-
MetricGAN+	2.95	3.62	**3.14**	0.93	8.6
HiFi-GAN-2	3.12	3.99	**3.14**	**0.95**	17.9
FINALLY	**3.22**	**4.32**	2.94	0.92	4.6
1-branch* (ours)	3.15	4.00	2.86	0.94	**19.3**
2-branch* (ours)	3.17	3.91	2.82	0.94	**19.3**
2-branch unsupervised	3.02	3.60	2.25	0.92	15.06

Table 2: Noisy speech reconstruction results for supervised and unsupervised 2-branch models.

Method	PESQ↑	STOI↑	SI-SDR↑
Supervised	4.17	0.98	22.7
Unsupervised	4.22	0.98	23.91