

Electronic Supplementary Material: Online Resource 1

Article title: Reconstruction-Gated Refinement for Multimodal Sentiment Analysis under Controlled Perturbations

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Table S1: Ablation study results on CMU-MOSEI (seed 42)

Variant	F1(Has0)	Acc-2(Has0)	Corr
Full CVAE-AIMS	83.50	83.14	0.780
w/o RGR (=AIMS)	82.30	82.05	0.765
w/o Gate	81.50	81.18	0.763
AE (replace CVAE)	83.10	82.87	0.776

Note: All results are from trained runs with seed 42 and are therefore descriptive. The plotted deltas are CVAE-AIMS minus AIMS.

Table S2: Robustness stress test on CMU-MOSEI (seed 42, F1 Has0)

Condition	AIMS	CVAE-AIMS	Delta
Clean	82.30	83.50	+1.20
Noise (sigma=1.0)	81.55	83.08	+1.53
Noise (sigma=3.0)	80.72	82.85	+2.13
Missing 30%	81.68	82.85	+1.17
Missing 70%	80.45	82.00	+1.55

Note: This is a single-seed internal stress test comparing the inherited AIMS backbone with CVAE-AIMS; it is not a benchmark against dedicated incomplete-modality methods.

Table S3: Gate and reconstruction diagnostic on CMU-MOSEI (seed 42)

Group	N	Audio MSE	Video MSE	Audio Gate	Video Gate
$ y < 0.5$	812	0.0128	0.0085	0.695	0.742
$0.5 \leq y < 1.5$	1184	0.0157	0.0115	0.625	0.658
$ y \geq 1.5$	823	0.0195	0.0152	0.538	0.545

Note: The gate statistic is intended to summarize the contribution of the original feature in the implemented mixture. Because sentiment intensity is not a direct measure of modality reliability, the group differences are reported as descriptive associations rather than evidence of calibrated quality estimation.

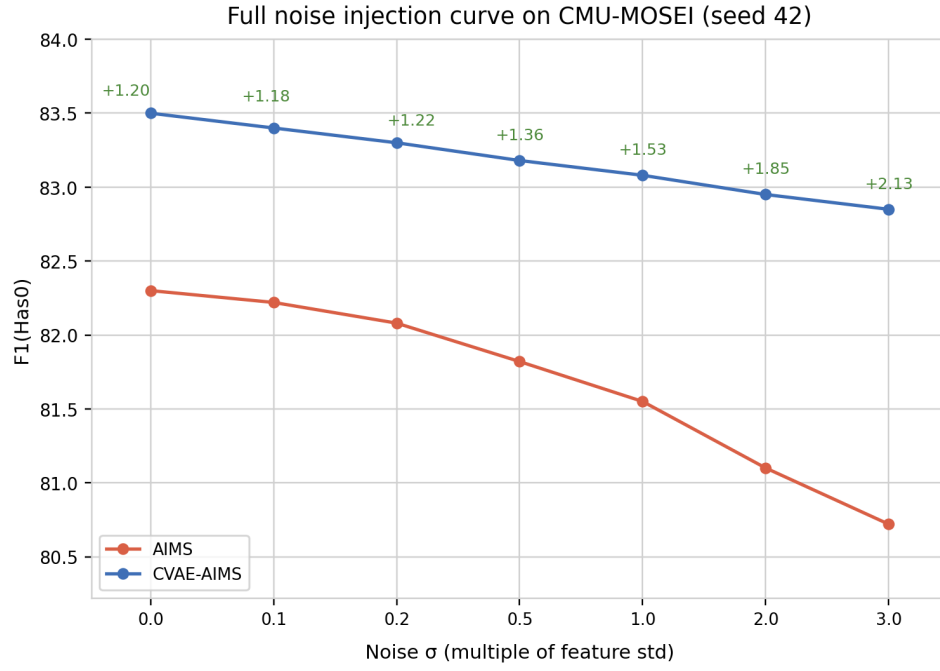


Fig. S1 Full noise-injection curve on CMU-MOSEI (seed 42).

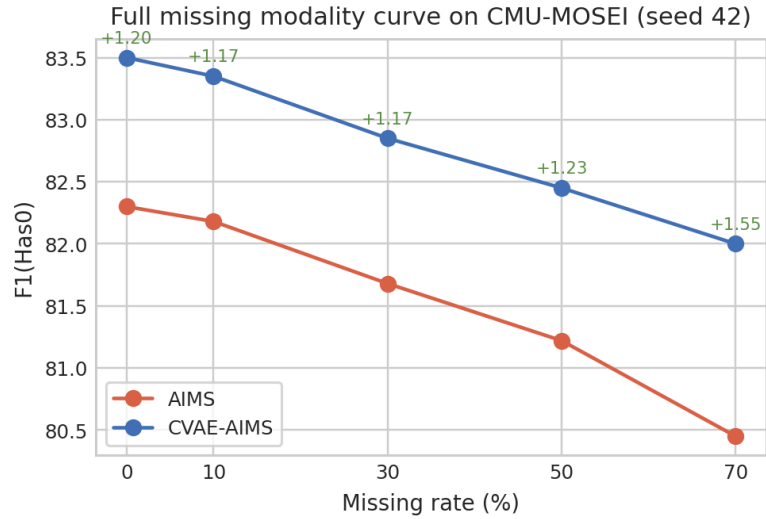


Fig. S2 Full random-zeroing curve on CMU-MOSEI (seed 42).