

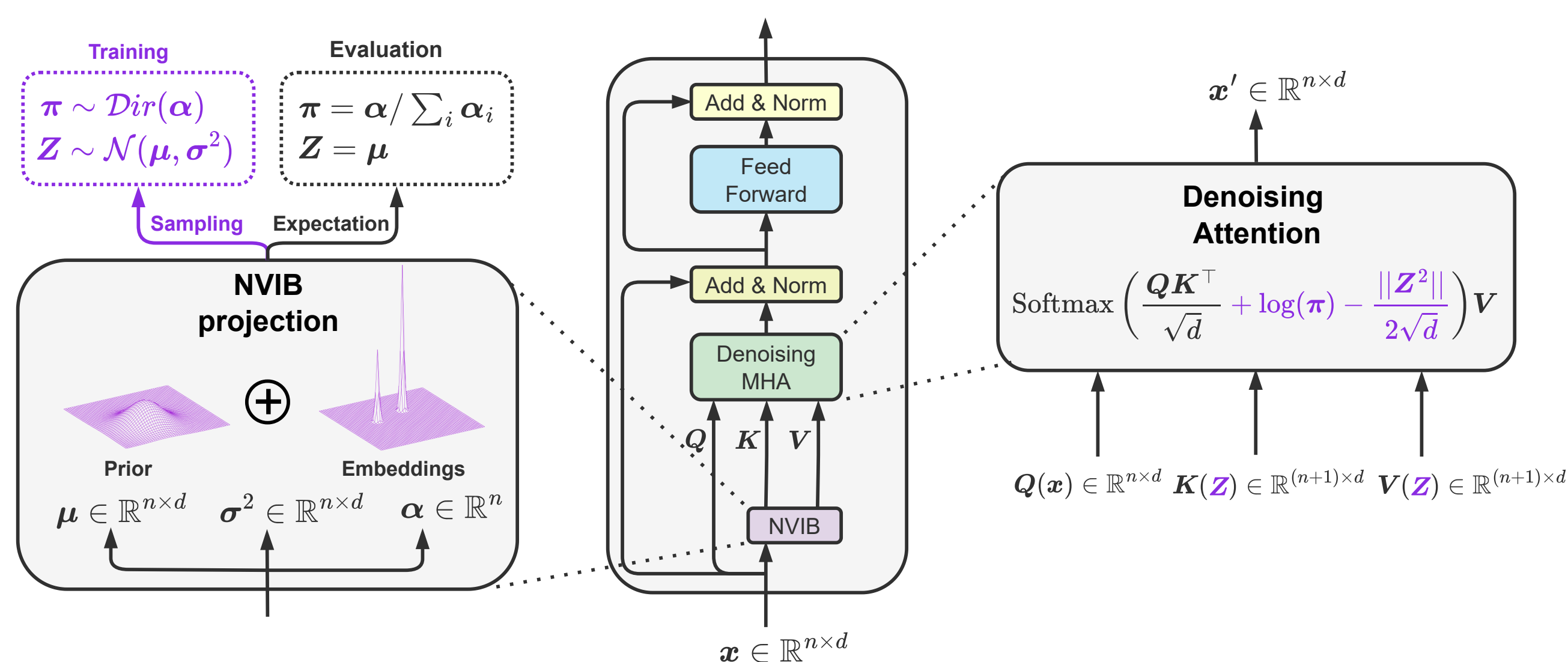
Improve Generalisation?

Fine-tune with NVIB!

Fine-tuning Pretrained Models with NVIB for Improved Generalisation

Fabio J. Fehr, Alina Elena Baia*, Xiaoguang Chang*, Andrei C. Coman*, Karl El Hajal*, Dina El Zein*, Shashi Kumar*, Juan Zuluaga-Gomez*, Andrea Cavallaro, Damien Teney, James Henderson

What is Nonparametric Variational Information Bottleneck (NVIB) ?



NVIB is an information-theoretic regulariser for attention

Applicable to pretrained models:
Text, Graphs, Speech & Vision

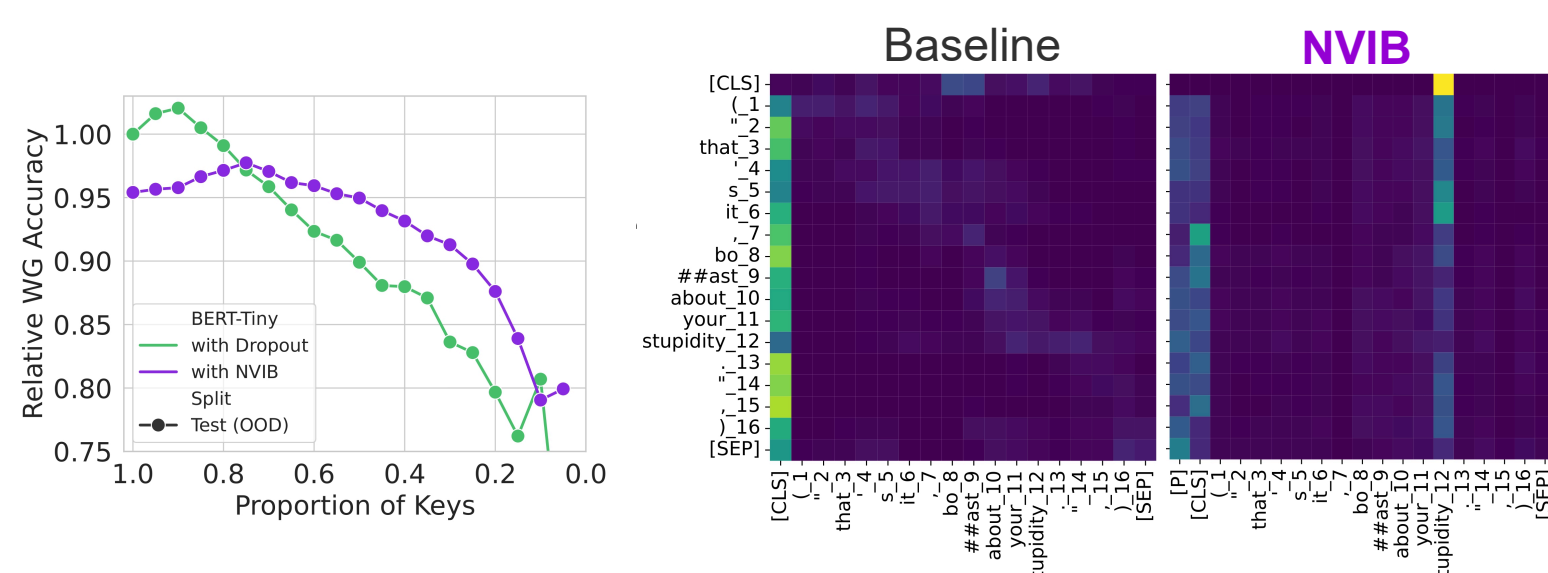


Improves out-of-distribution generalisation

Now Fine-Tunable!



Sparse & interpretable attention



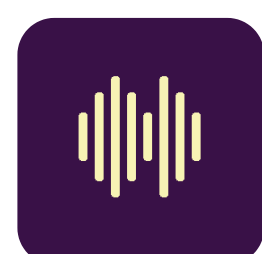
Task: Text toxicity classification
Model: BERT-Tiny
Data: CivilComments (OOD)



Generalise to unseen graphs

	MRR ↑	H@1 ↑	H@5 ↑	H@10 ↑
BLPBERT-Tiny	0.164	0.100	0.175	0.288
with Dropout	0.162	0.097	0.172	0.288
with NVIB	0.167	0.103	0.180	0.294

Task: Graph link prediction
Model: BERT-Tiny
Data: FB15k-237



Generalise to noise & language

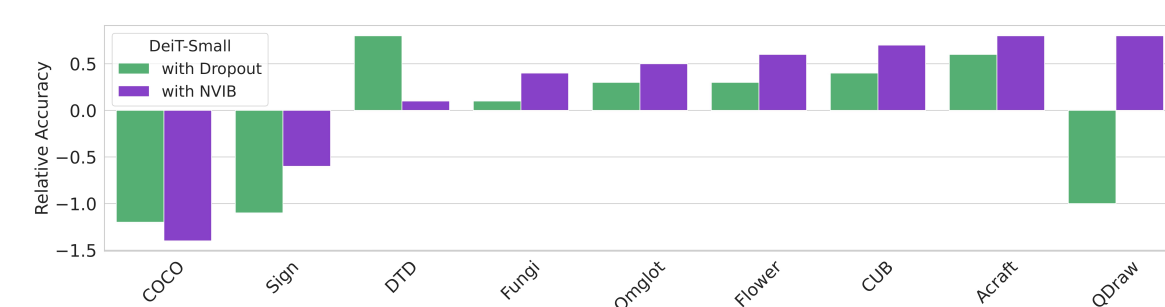
	PCC ↑	F1 ↑
W2V2-base	0.80 (0.01)	0.90 (0.02)
with Dropout	0.83 (0.03)	0.90 (0.01)
with NVIB	0.83 (0.02)	0.91 (0.02)

Task: Speech quality prediction
Model: W2V2-base
Data: Tencent (OOD)

Task: Speech Language identification
Model: W2V2-large
Data: FLEURS (OOD)



Data efficiency & robustness



Task: Image meta few-shot classification
Model: DeiT-Small
Data: Meta-Dataset (OOD)

Task: Image robustness to attacks
Model: DeiT-Tiny
Data: PrivacyAlert

