

Table 1: Dataset Summary

Dataset	Research Area	Modalities	Sample Size	Tasks
MIMIC-III	Healthcare	Time-Series, Text	36,212	Mortality, length-of-stay, phenotyping
MIMIC-IV	Healthcare	Time-Series, Text, Images, ECG Waveform	73,173	Mortality, length-of-stay, phenotyping
CMU-MOSI	Affective Computing	Text, Video, Audio	2,199	Sentiment
CMU-MOSEI	Affective Computing	Text, Video, Audio	22,777	Sentiment, emotions
PAM	Healthcare	Time-Series	5,333	Activity recognition
CIFAR-10	Multimedia	Images	60,000	Image classification

Figure 1: ImageNet Result

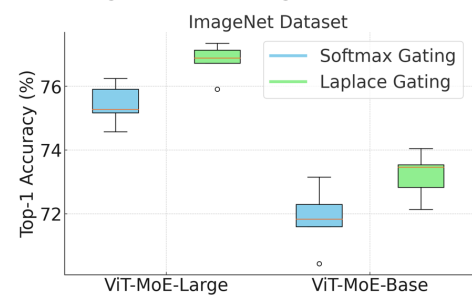


Figure 2: Modality Weight

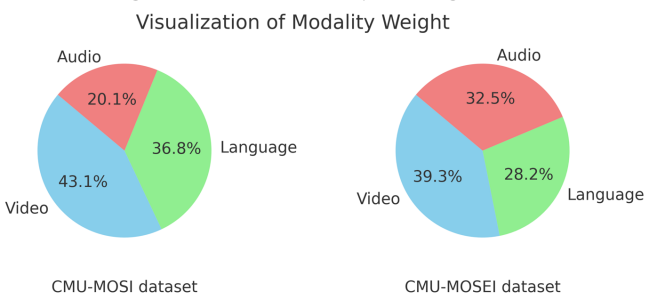


Table 2: Comparing Irregularity Encoder & Gating Function

Task\Method		Imputation-only	mTAND-only	SeFT	RAINDROP	FuseMoE
48-IHM	Laplace	76.16 (0.33)	78.83 (0.82)	52.19 (1.39)	75.76 (0.69)	81.03 (0.25)
	Softmax	74.69 (0.24)	77.79 (0.58)	52.14 (1.23)	74.51 (0.91)	79.49 (0.83)
LOS	Laplace	77.19 (0.96)	80.43 (0.62)	62.39 (1.71)	78.61 (1.25)	82.91 (1.02)
	Softmax	74.39 (0.45)	78.26 (0.67)	58.43 (0.21)	76.09 (0.26)	82.11 (0.39)
25-PHE	Laplace	67.36 (0.42)	68.65 (0.49)	59.83 (2.37)	65.96 (1.72)	71.23 (0.53)
	Softmax	68.56 (0.34)	67.79 (0.23)	59.41 (0.77)	66.12 (0.88)	70.54 (0.47)

Table 3: Comparing Time-Series Encoder & Gating Function

Task\Method		CNN	LSTM	Transformer
48-IHM	Laplace	79.87 (1.29)	80.16 (1.83)	81.03 (0.25)
	Softmax	77.89 (0.95)	80.32 (0.21)	79.49 (0.83)
LOS	Laplace	78.54 (1.42)	76.29 (1.71)	82.91 (1.02)
	Softmax	76.29 (0.37)	77.35 (0.57)	82.11 (0.39)
25-PHE	Laplace	65.76 (0.76)	66.93 (0.55)	71.23 (0.53)
	Softmax	64.18 (0.34)	63.45 (0.40)	70.54 (0.47)

Table 4: Comparing Image Encoder & Gating Function

Task\Method		DenseNet-121	ViT-B
48-IHM	Laplace	81.03 (0.25)	83.02 (0.15)
	Softmax	79.49 (0.83)	81.60 (0.05)
LOS	Laplace	82.91 (1.02)	81.45 (0.76)
	Softmax	82.11 (0.39)	81.06 (0.53)
25-PHE	Laplace	71.23 (0.53)	75.63 (1.12)
	Softmax	70.54 (0.47)	76.96 (0.77)

Table 5: Comparing Text Encoder & Gating Function

Task\Method		GRU-D	FT-LSTM	HierTrans	Clinical-Longformer
48-IHM	Laplace	80.22 (1.21)	78.36 (0.89)	77.96 (1.14)	81.03 (0.25)
	Softmax	79.14 (1.13)	76.28 (0.55)	77.19 (0.60)	79.49 (0.83)
LOS	Laplace	81.42 (1.43)	79.98 (1.59)	80.57 (1.18)	82.91 (1.02)
	Softmax	80.27 (0.78)	78.82 (0.56)	81.14 (0.35)	82.11 (0.39)
25-PHE	Laplace	69.87 (1.38)	68.43 (0.86)	70.59 (0.79)	71.23 (0.53)
	Softmax	67.82 (0.23)	68.04 (0.57)	70.64 (0.25)	70.54 (0.47)