

Supplementary Material: Taming the Tail: Leveraging Asymmetric Loss and Padé Approximation to Overcome Medical Image Long-Tailed Class Imbalance

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In this supplementary document, we present the experimental results obtained using LDAM loss and BCE loss. Additionally, we include several visual representations of the proprietary dataset utilized in this study.

Figure 1 displays images from several classes within the Oraiclebio dataset. The green boxes highlight the regions containing lesions.

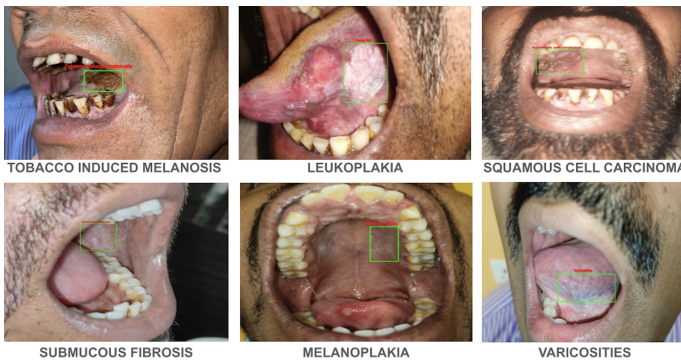


Figure 1: Images from a few classes of Oraiclebio dataset

Tables 1 and 2 present a comparison of classification accuracies using LDAM loss and BCE loss, respectively, across different classes from the public medical datasets analyzed in this study.

Table 1: Results of LDAM loss function across different datasets

Dataset	Classes	Training Samples	Acc	f1-score
APTOS2019	No DR	1454	13.39	0.15
	Mild	786	36.76	0.10
	Moderate	302	0.00	0.00
	Severe	230	0.00	0.00
	Proliferative DR	157	0.00	0.00
DermaMNIST	akiec	256	100.00	0.07
	bcc	406	4.63	0.07
	bkl	882	0.00	0.00
	df	88	0.00	0.00
	mel	885	0.00	0.00
	nv	5375	0.00	0.00
	vasc	120	0.00	0.00
Bone Marrow	BAS	348	1.08	0.01
	BLA	9569	99.96	0.15
	EBO	21883	0.00	0.00
	EOS	4719	0.00	0.00
	FGC	41	0.00	0.00
	HAC	339	0.00	0.00
	KSC	38	0.00	0.00
	LYI	54	0.00	0.00
	LYT	20911	0.00	0.00
	MMZ	2479	0.00	0.00
	MON	3230	0.00	0.00
	MYB	5238	0.00	0.00
	NGB	7967	0.00	0.00
	NGS	23628	0.00	0.00
	PEB	2196	0.00	0.00
	PLM	6137	0.00	0.00
PMO	9546	0.00	0.00	

Table 2: Results of BCE loss function across different datasets

Dataset	Classes	Training Samples	Acc	f1-score
APTOS2019	No DR	1454	99.43	0.91
	Mild	786	11.76	0.17
	Moderate	302	84.04	0.75
	Severe	230	13.89	0.23
	Proliferative DR	157	16.92	0.28
DermaMNIST	akiec	256	4.23	0.08
	bcc	406	7.86	0.18
	bkl	882	22.04	0.43
	df	88	26.76	0.35
	mel	885	6.19	0.10
	nv	5375	93.16	0.89
	vasc	120	70.00	0.28
Bone Marrow	BAS	348	51.61	0.65
	BLA	9569	89.39	0.88
	EBO	21883	96.06	0.96
	EOS	4719	97.34	0.97
	FGC	41	66.67	0.73
	HAC	339	64.29	0.76
	KSC	38	25.00	0.40
	LYI	54	9.09	0.15
	LYT	20911	93.90	0.94
	MMZ	2479	55.21	0.54
	MON	3230	76.30	0.78
	MYB	5238	77.03	0.74
	NGB	7967	72.31	0.74
	NGS	23628	93.03	0.92
	PEB	2196	76.84	0.77
PLM	6137	91.22	0.93	
PMO	9546	83.37	0.86	