

Long-Tail Learning with Context-Aware Re-sampling

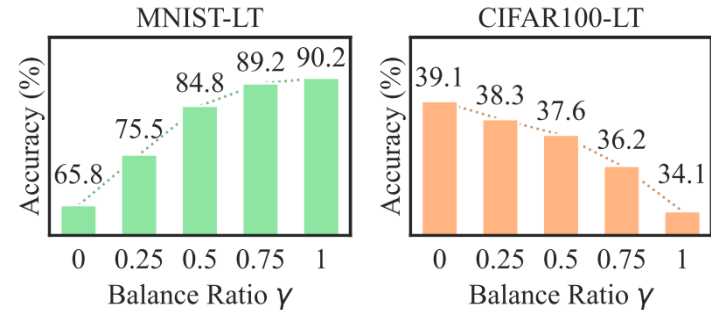
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Frontiers of Computer Science, DOI: [10.1007/s11704-025-50835-w](https://doi.org/10.1007/s11704-025-50835-w)

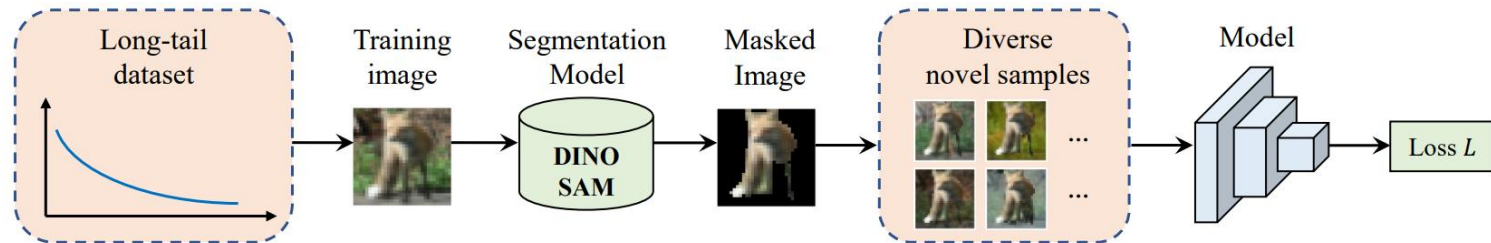
Problems & Ideas

- Re-sampling does not necessarily work or fail on long-tail datasets

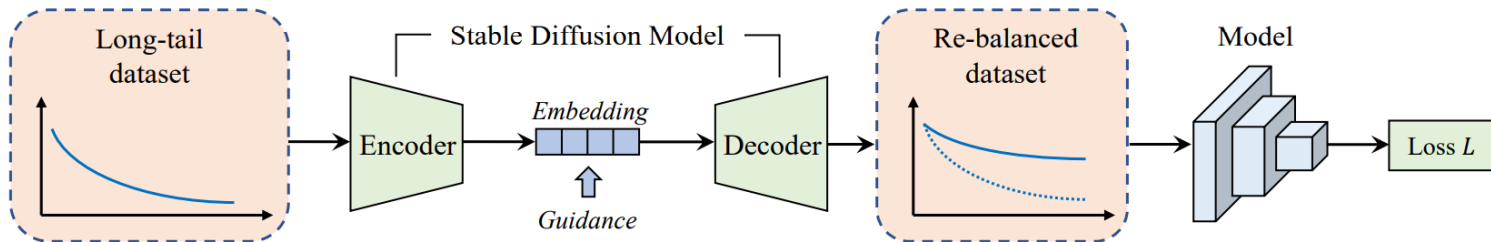
- Re-sampling leads to contrasting effects on different datasets
- Re-sampling is sensitive to the irrelevant contexts in training data.



- Ideas: leverage large pre-trained models to suppress irrelevant contexts and enrich the diversity of the training data



An overview of Context-Aware Re-sampling with DINO and SAM (CARE-DS).



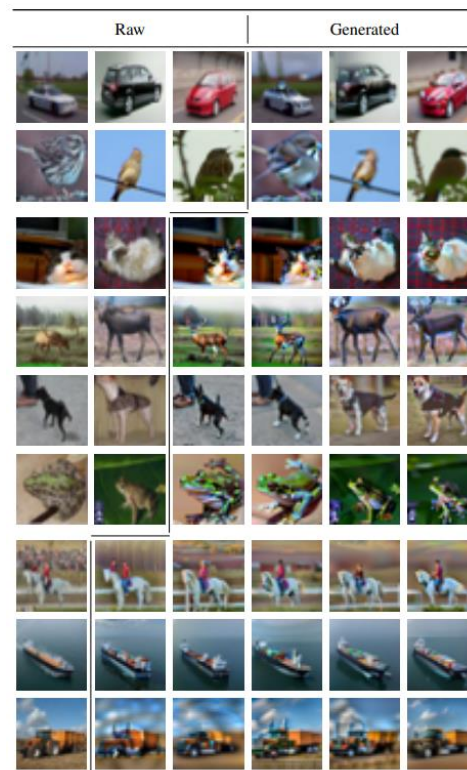
An overview of Context-Aware Re-sampling with Diffusion Model (CARE-DM).

Main Contributions

- Contributions:
 - We highlight the necessity of context-aware re-sampling strategies.
 - We propose CARE-DS and CARE-DM, the first framework to explicitly suppress irrelevant contexts in re-sampling using pre-trained models.
 - Experiments verify the effectiveness of the proposed module, which achieves an average performance gain of more than 2% in accuracy.

Dataset	CIFAR100-LT			CIFAR10-LT		
	100	50	10	100	50	10
CE	38.3	43.9	55.7	70.4	74.8	86.4
Focal Loss [44]	38.4	44.3	55.8	70.4	76.7	86.7
CB-Focal [7]	39.6	45.2	58.0	74.6	79.3	87.1
CE-DRS [15]	41.6	45.5	58.1	75.6	79.8	87.4
CE-DRW [15]	41.5	45.3	58.1	76.3	80.0	87.6
LDAM-DRW [15]	42.0	46.6	58.7	77.0	81.0	88.2
cRT [6]	42.3	46.8	58.1	75.7	80.4	88.3
LWS [6]	42.3	46.4	58.1	73.0	78.5	87.7
BBN [14]	42.6	47.0	59.1	79.8	82.2	88.3
mixup [26]	39.5	45.0	58.0	73.1	77.8	87.1
Remix [27]	41.9	-	59.4	75.4	-	88.2
M2m [28]	43.5	-	57.6	79.1	-	87.5
CAM-BS [13]	41.7	46.0	-	75.4	81.4	-
CMO [29]	43.9	48.3	59.5	-	-	-
CSA [16]	45.8	49.6	61.3	80.6	84.3	90.8
CARE-DS (Ours)	46.2	51.1	61.2	79.4	83.7	89.0
CARE-DM (Ours)	49.7	52.5	63.7	82.0	84.7	93.6

Test accuracy (%) on CIFAR datasets.



Visualization of images generated by CARE-DM