Figure 5: The weight of clean and noisy samples of all classes on CIFAR-10 with imbalance factor 20 and noise rate 0.4.
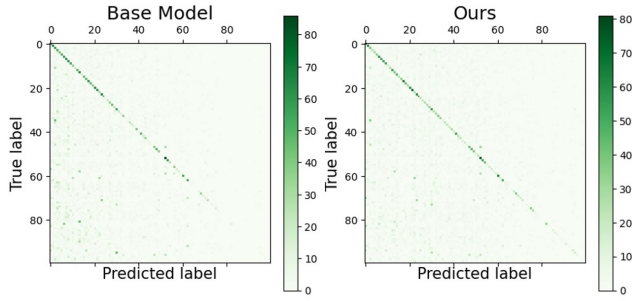

Figure 6: Confusion matrices for the CE Loss model and our model on CIFAR-100 with imbalance factor 20 and noise rate 0.6.

Imbalance ratio	10			20		
Noise rate	0.2	0.4	0.6	0.2	0.4	0.6
CE Loss	78.81	66.11	57.11	73.46	64.68	45.17
MW-Net (noise)	75.66	70.57	58.71	78.26	60.95	46.09
Ours	85.94	80.51	73.55	**83.84**	76.95	65.77
Ours+DRW	**86.52**	**81.24**	**74.92**	83.74	**77.28**	**66.78**

Table 6: Test accuracy of our model with WRN-16-8 and DRW on CIFAR-10.

improvement becomes larger as the used unbiased images increase. Besides, we also try a new strategy to construct meta dataset without using extra unbiased data. Theoretically, training samples with lower loss in the probing stage are more likely to be clean data. By selecting 10 low-loss samples (per category) as unbiased meta dataset in the allocating stage, our approach still brings 1.13% improvement, suggesting its strong robustness to varying amount and quality of unbiased data.

Effects of Skip-Layer. Table 8 analyzes the impact of the number of skip-layer on the CIFAR10 data set with various noise rates and imbalance factors. As shown in the table, the training time decreases significantly with the increase of

Method	CE	Ours						MWNet
Num.	100	0	10	20	50	80	100	100
Acc.(%)	77.89	**_79.02_**	79.13	79.21	79.51	80.46	**81.61**	78.81

Table 7: Test accuracy of our model with different sacles of meta data on CIFAR-10.

skip-layer yet the accuracy is slightly reduced. For example, compared with SL=0, the speed boosts by 5.71 times and the MA only decreases by 0.93% when SL=3.

	SL=0	SL=1	SL=2	SL=3
MA (%)	**82.46**	81.99	81.81	81.53
time(ms)	239.94	222.45	65.44	41.98

Table 8: Test accuracy and training time of our method with different skip layers on CIFAR-10.

Effects of Embedding Dimension. We test our model with different embedding dimension P on the synthetic Cifar10, and the results are putted in Table 9. It can be seen that the MA has a slight increase as P increases. Considering the training time and the performance, we prefer to set P equal to 64.

	CE Loss	P=32	P=64	P=96
MA (%)	79.43	82.42	**82.46**	82.49

Table 9: Test accuracy of our model with different embedding dimension P on CIFAR-10.

Effects of Removed Loss Values. Ablations of S removed loss values are reported in Table 10. One can find the MA has a slight decrease as P increases. Considering the different requirements for the complete loss value information in different situations, we choose to provide as more loss value information as possible. We thus set the S equal to 5.

Conclusion

This paper introduces a novel probe-and-allocate training strategy to alleviate class imbalance and corrupted labels in

	CE Loss	S=5	S=30	S=60
MA (%)	79.43	**82.46**	82.43	82.42

Table 10: Test accuracy of our model with different S removed loss values on CIFAR-10.

piratically collected data. Different from prior methods designed to solve either class imbalance or corrupted labels, our method is capable of handling both data biases simultaneously by exploiting informative training loss curve to generate proper sample weights. Extensive experiments conducted on synthetic and real-world datasets with various imbalance factors and noise rates well demonstrate the superiority of our method. In this paper, however, we only verify our method on classification task, while the proposed approach is generic and could be flexibly applied to training models with biased data on other tasks, which will be put in future work.

Acknowledgments

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