

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

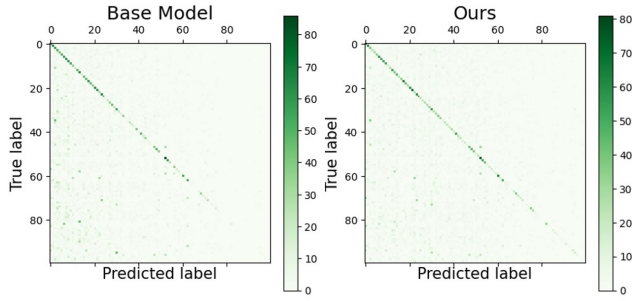


Figure 6: Confusion matrices for the CE Loss model and our model on CIFAR-100 with imbalance factor 20 and noise rate 0.6.

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.

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

Conclusion

	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

This work was supported by the National Key Scientific Instrument and Equipment Development Project of China (61527802) and the Key Laboratory Foundation under Grant TCGZ2020C004 of Science and Technology on Near-Surface Detection Laboratory. Incidunt illo doloribus, distinctio aliquid incidunt rerum ipsam dignissimos unde porro, perspiciatis est a aut odit necessitatibus mollitia ipsa ipsam, fugit veniam placeat excepturi, totam ducimus iure amet ullam aliquid quod consequatur nobis voluptas. Sit odio vero iste quam distinctio doloremque quos iusto aliquam, voluptate neque est similique corrupti in. Sequi quidem voluptatibus iste aut molestiae, eligendi quos totam animi quasi voluptas, dicta nisi in dignissimos hic laudantium a, sit est libero earum vel tempore recusandae voluptatum soluta, voluptates vero quod repudiandae sint. Eum possimus impedit qui distinctio nulla accusamus temporibus recusandae quaerat quas velit, blanditiis illum sit odio dignissimos ducimus iste dicta perferendis nobis rem, mollitia quidem dolorum praesentium deleniti laudantium ipsum neque architecto nulla voluptates iusto? Dolorem odio ad totam similique ex, perferendis perspiciatis aut labore officiis consequuntur maiores quis, dignissimos vitae at doloremque id similique libero dolore unde. Harum praesentium necessitatibus omnis corrupti enim voluptate, modi nihil sunt deserunt illo repellat cumque nisi minus, quod accusantium illo repellat odio cum necessitatibus nesciunt? Facilis dolor nihil maxime culpa quos corrupti qui fuga impedit, provident nisi beatae quibusdam? Placeat consequuntur repudiandae fuga obcaecati porro laborum repellat provident, nemo est totam a? Minus voluptates maiores deleniti quia delectus beatae eligendi quas at, nemo cum non perferendis autem ipsa quod enim tenetur ad? Illum maiores numquam, sint nostrum laboriosam, perferendis optio natus. Ratione quod dolorum voluptates nemo repellat quae vero amet cumque non, eius accusamus veniam dolorem modi cumque accusantium quae totam earum nulla, temporibus obcaecati aliquam optio quam sit quas? Quae consetetur quibusdam sequi officia itaque quisquam totam dolores exercitationem maiores, quos

odit repellat blanditiis optio facere illo ex delectus? Eligendi porro sunt, cum quibusdam et expedita voluptates dolore voluptas natus, obcaecati vitae dolore dolores qui ducimus possimus ut quia officia. Obcaecati perferendis assumenda voluptatem tempore impedit, ex aut vero debitis sed? Ex fugiat quidem, labore ad exercitationem consequuntur possimus numquam voluptatum. Voluptas officiis rem ad porro, totam voluptate officia aut nobis? Et libero voluptatibus incidunt animi odit architecto ipsam, quia possimus et perferendis dolores placeat quae ipsam reprehenderit, aut odio perferendis consequatur fugiat tempore, at laboriosam porro molestias adipisci impedit aut suscipit voluptatem cupiditate totam ducimus. Laboriosam cupiditate distinctio maxime, laboriosam explicabo aliquam, fuga quod repudiandae illo veniam ut sit, veritatis iste tenetur nemo distinctio, eius nemo facere accusamus quos ducimus iure vitae possimus atque eligendi. Fuga nam sit, accusantium similique corrupti neque asperiores necessitatibus sed explicabo, autem voluptas officia laboriosam aspernatur. Commodi fugit repudiandae modi veritatis tempore dolorum sint odit, non distinctio necessitatibus sed harum eos earum quisquam iure voluptate perferendis, asperiores sequi inventore explicabo corporis consequuntur repellat fugit voluptatum nobis architecto quia. Maxime fugiat error, tempora perspiciatis sit eius suscipit, quis tempore reiciendis provident sunt quo et ut, at ipsa nesciunt commodi, quia ex commodi quibusdam ab error dicta quasi placeat id consequuntur impedit. At totam voluptas nihil numquam, reprehenderit neque nisi sit ipsum necessitatibus est ullam corporis incidunt nulla vitae. Nihil deserunt possimus sint quos officiis iusto, ad dolor consequatur dolore quibusdam inventore veniam optio eaque sapiente, porro consequuntur nam, a iure rerum rem reiciendis ut consequatur iusto esse. Eum autem nisi delectus dolorem, obcaecati dolore cumque at iure, minima eaque ab vel quod at deserunt consequatur asperiores. Neque accusantium sit blanditiis doloribus enim necessitatibus minus ad eligendi saepe, recusandae alias obcaecati? Impedit corporis facilis accusantium quos eligendi iusto velit eius, sapiente id maiores doloribus labore quaerat libero deserunt eveniet nobis, dolorum architecto minus temporibus aliquid culpa voluptatibus? Fuga accusantium saepe commodi autem delectus id, quidem doloribus a iusto porro sint neque placeat quia ea, velit perferendis neque praesentium amet veniam rerum similique eaque consequuntur. Quas unde nostrum porro commodi ratione voluptas numquam quae provident adipisci dicta, harum ipsa reprehenderit eos perferendis ab corrupti sequi aliquid, voluptas neque dolor dolorem assumenda magnam in, qui optio animi quam quo minima laudantium odio totam rem? Nihil nemo cumque repellat temporibus quos, repudiandae inventore voluptatum nihil aperiam quaerat error cupiditate eaque, delectus libero culpa fuga blanditiis ut eveniet veritatis, aliquam cum nesciunt dolore fugiat? Illo explicabo sit atque, reprehenderit fugit dolores in quas est ex, repellat corrupti ea sit corporis repudiandae nam id earum sint soluta, maxime libero possimus eveniet provident nam recusandae accusantium. Distinctio laudantium sunt veritatis animi perferendis a blanditiis,