Supplementary Material of "Adaptive manifold for imbalanced transductive few-shot learning"

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A. Robustness against imbalance

We investigate the effect of increasing the class imbalance in Q by decreasing the value of γ used in $\mathrm{Dir}(\gamma)$. In the 1-shot experiments, it can be seen from Figure 4 that the performance of α-AM and α-AM$_{\text{PLC}}$ is significantly better than α-TIM and α-TIM$_{\text{PLC}}$ even though the performance of both methods drops as the classes become more imbalanced. Interestingly in the 5-shot experiment, it can be seen from Figure 5 that the performance of α-TIM and α-TIM$_{\text{PLC}}$ is better than α-AM and α-AM$_{\text{PLC}}$ when imbalance is greater. Nevertheless, when imbalance decreases it can be seen that α-AM and α-AM$_{\text{PLC}}$ reaches or even surpasses the performance of α-TIM and α-TIM$_{\text{PLC}}$.

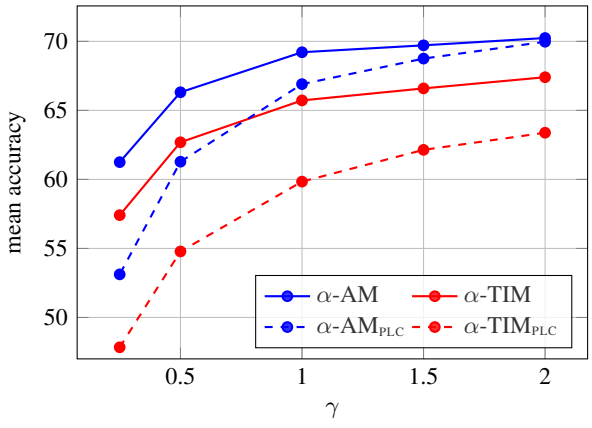

Figure 4. *Effect of class imbalance parameter* γ in $\mathrm{Dir}(\gamma)$ on α-AM and α-TIM, 1-shot *mini*ImageNet using ResNet-18. Class distributions are more imbalanced with lower γ.

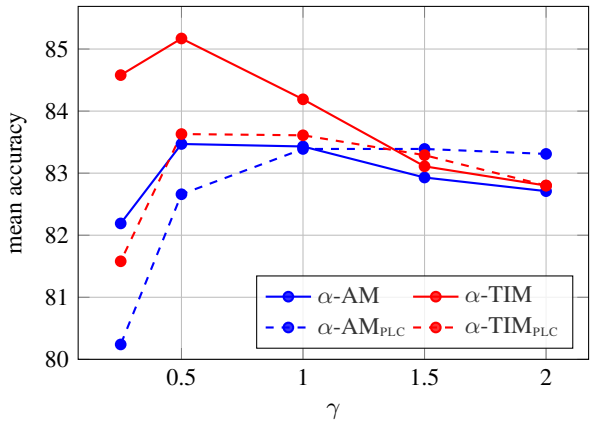

Figure 5. *Effect of class imbalance parameter* γ in $\mathrm{Dir}(\gamma)$ on α-AM and α-TIM, 5-shot *mini*ImageNet using ResNet-18. Class distributions are more imbalanced with lower γ.

B. Experiments with other backbones

Table 7 shows that by using the DenseNet-121 backbone, AM$_{\text{PLC}}$ outperforms α-TIM and α-TIM$_{\text{PLC}}$ in both 1-shot and 5-shot settings. As in the experiments using ResNet-18 and WRN-28-10, we observe a significant performance gap of roughly 3.5% in the 1-shot setting.

Table 7. *Imbalanced transductive inference* on *mini*ImageNet and *tiered*ImageNet using the DenseNet-121 backbone. All results were reproduced using the official code provided by [39].

METHOD	*mini*IMAGENET		*tiered*IMAGENET	
	1-shot	5-shot	1-shot	5-shot
DENSENET-121				
α-TIM [39]	70.41	85.58	76.55	88.33
α-TIM$_{\text{PLC}}$ [39]	67.56	86.26	74.56	88.68
α-AM	73.67	85.47	79.95	89.34
α-AM$_{\text{PLC}}$	**73.98**	**86.76**	**79.99**	**89.73**