Supplementary: Can We Characterize Tasks Without Labels or Features?

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Spearman Correlation	Task2Vec (ImageNet)	PseudoTask (ImageNet)	Task2Vec (Random)	Task Tangent Kernel
(r, p)	0.35,0.10	0.47,0.05	0.06,0.45	0.20,0.20

Table 1. Averaged (per-target-task) Spearman correlation coefficients and p-values of embedding distance vs. task error.

1. Correlations Between Embedding Distance and Transfer Accuracy

Correlations between task embedding distance and downstream accuracy are shown in Table 1.

2. Effect of α

In the original Task2Vec work, the choice of α in the asymmetric embedding is given, but not explored. This parameter is architecture-dependent: the optimal values for ResNets of different depths are not necessarily equal. We introduce an α of our own, set equal to 10^{-7}. Asymmetric methods are sensitive to this parameter, as seen in Figure 1. Task2Vec has smoother curves with longer length-scales, but PseudoTask is consistent across initializations, which is highly desirable. For the total number of experts selected, the trend holds of PseudoTask having qualitatively similar curves between initializations while Task2Vec's differ.

Curiously, Task2Vec-Places365 yields the best symmetric performance at 10.2%. This error improves as α decreases to negative, with optimal performance of 8.0% being reached at $\alpha = -0.3$, in fact the additive inverse of the optimal α for T2V-ImageNet. This performance is superior to almost all methods in the original paper with the exception of the meta-learning algorithm Model2Vec.
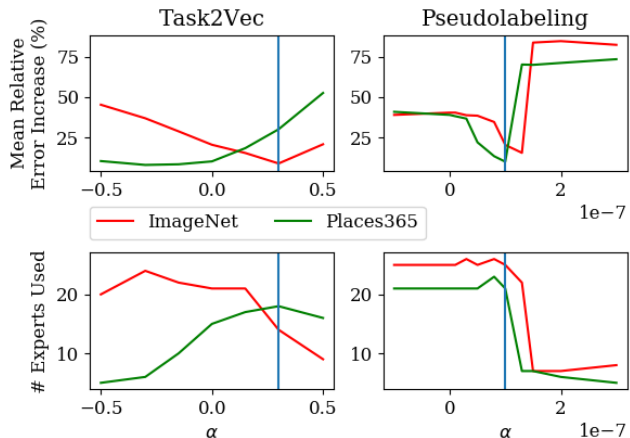

Figure 1. Effect of the asymmetric embedding parameter α on performance (top) and how many experts are selected (bottom). The behavior of the original Task2Vec algorithm is more symmetric around α_{opt} than that of PseudoTask, but PseudoTask demonstrates superior consistency across intializations. Vertical lines indicate the default value used in experiments.