

## A IN-DOMAIN RESULTS

algorithm	k	calibration	spectral	ACC@1 ( $\uparrow$ )	ACC@5 ( $\uparrow$ )	NLL ( $\downarrow$ )	ECE ( $\downarrow$ )
ERM	1	False	False	0.720 $\pm$ 0.002	0.905 $\pm$ 0.001	1.138 $\pm$ 0.006	0.050 $\pm$ 0.002
			True	0.720 $\pm$ 0.002	0.905 $\pm$ 0.001	1.124 $\pm$ 0.006	0.034 $\pm$ 0.002
		True	False	0.723 $\pm$ 0.002	0.903 $\pm$ 0.002	1.131 $\pm$ 0.005	0.045 $\pm$ 0.000
			True	0.723 $\pm$ 0.002	0.903 $\pm$ 0.002	1.117 $\pm$ 0.005	0.032 $\pm$ 0.002
	5	False	False	0.737 $\pm$ 0.002	0.908 $\pm$ 0.001	1.065 $\pm$ 0.000	0.059 $\pm$ 0.002
			True	0.737 $\pm$ 0.002	0.908 $\pm$ 0.001	1.048 $\pm$ 0.000	0.015 $\pm$ 0.002
		True	False	0.754 $\pm$ 0.001	0.918 $\pm$ 0.001	0.978 $\pm$ 0.002	0.035 $\pm$ 0.001
			True	0.754 $\pm$ 0.001	0.918 $\pm$ 0.001	0.978 $\pm$ 0.002	0.018 $\pm$ 0.001
Mixup	1	False	False	0.720 $\pm$ 0.001	0.902 $\pm$ 0.000	1.125 $\pm$ 0.009	0.032 $\pm$ 0.000
			True	0.720 $\pm$ 0.001	0.902 $\pm$ 0.000	1.126 $\pm$ 0.009	0.036 $\pm$ 0.003
		True	False	0.718 $\pm$ 0.002	0.902 $\pm$ 0.000	1.124 $\pm$ 0.005	0.032 $\pm$ 0.002
			True	0.718 $\pm$ 0.002	0.902 $\pm$ 0.000	1.124 $\pm$ 0.005	0.032 $\pm$ 0.002
	5	False	False	0.736 $\pm$ 0.000	0.909 $\pm$ 0.002	1.074 $\pm$ 0.005	0.068 $\pm$ 0.001
			True	0.736 $\pm$ 0.000	0.909 $\pm$ 0.002	1.041 $\pm$ 0.006	0.017 $\pm$ 0.002
		True	False	0.751 $\pm$ 0.002	0.918 $\pm$ 0.001	1.005 $\pm$ 0.001	0.060 $\pm$ 0.002
			True	0.751 $\pm$ 0.002	0.918 $\pm$ 0.001	0.977 $\pm$ 0.002	0.019 $\pm$ 0.000
SoftLabeler	1	False	False	0.721 $\pm$ 0.004	0.904 $\pm$ 0.001	1.174 $\pm$ 0.005	0.035 $\pm$ 0.002
			True	0.721 $\pm$ 0.004	0.904 $\pm$ 0.001	1.145 $\pm$ 0.004	0.044 $\pm$ 0.002
		True	False	0.723 $\pm$ 0.001	0.905 $\pm$ 0.002	1.169 $\pm$ 0.006	0.036 $\pm$ 0.001
			True	0.723 $\pm$ 0.001	0.905 $\pm$ 0.002	1.140 $\pm$ 0.007	0.043 $\pm$ 0.002
	5	False	False	0.737 $\pm$ 0.001	0.910 $\pm$ 0.001	1.251 $\pm$ 0.000	0.187 $\pm$ 0.002
			True	0.737 $\pm$ 0.001	0.910 $\pm$ 0.001	1.045 $\pm$ 0.001	0.025 $\pm$ 0.002
		True	False	0.756 $\pm$ 0.001	0.920 $\pm$ 0.002	1.067 $\pm$ 0.003	0.100 $\pm$ 0.001
			True	0.756 $\pm$ 0.001	0.920 $\pm$ 0.002	0.979 $\pm$ 0.004	0.025 $\pm$ 0.001
DeepAE	1	False	False	0.721 $\pm$ 0.002	0.902 $\pm$ 0.001	1.120 $\pm$ 0.004	0.038 $\pm$ 0.001
			True	0.721 $\pm$ 0.002	0.902 $\pm$ 0.001	1.116 $\pm$ 0.004	0.032 $\pm$ 0.002
		True	False	0.721 $\pm$ 0.001	0.903 $\pm$ 0.001	1.122 $\pm$ 0.007	0.035 $\pm$ 0.000
			True	0.721 $\pm$ 0.001	0.903 $\pm$ 0.001	1.119 $\pm$ 0.007	0.030 $\pm$ 0.001
	5	False	False	0.735 $\pm$ 0.001	0.910 $\pm$ 0.001	1.069 $\pm$ 0.002	0.066 $\pm$ 0.001
			True	0.735 $\pm$ 0.001	0.910 $\pm$ 0.001	1.039 $\pm$ 0.002	0.013 $\pm$ 0.001
		True	False	0.754 $\pm$ 0.001	0.921 $\pm$ 0.001	0.975 $\pm$ 0.003	0.044 $\pm$ 0.001
			True	0.754 $\pm$ 0.001	0.921 $\pm$ 0.001	0.967 $\pm$ 0.003	0.015 $\pm$ 0.002
RND	1	False	False	0.720 $\pm$ 0.001	0.902 $\pm$ 0.001	1.133 $\pm$ 0.003	0.044 $\pm$ 0.003
			True	0.720 $\pm$ 0.001	0.902 $\pm$ 0.001	1.127 $\pm$ 0.002	0.036 $\pm$ 0.002
		True	False	0.719 $\pm$ 0.003	0.901 $\pm$ 0.003	1.134 $\pm$ 0.008	0.044 $\pm$ 0.004
			True	0.719 $\pm$ 0.003	0.901 $\pm$ 0.003	1.128 $\pm$ 0.007	0.036 $\pm$ 0.001
	5	False	False	0.737 $\pm$ 0.001	0.909 $\pm$ 0.001	1.064 $\pm$ 0.001	0.060 $\pm$ 0.002
			True	0.737 $\pm$ 0.001	0.909 $\pm$ 0.001	1.045 $\pm$ 0.001	0.016 $\pm$ 0.002
		True	False	0.753 $\pm$ 0.000	0.920 $\pm$ 0.000	0.974 $\pm$ 0.003	0.033 $\pm$ 0.001
			True	0.753 $\pm$ 0.000	0.920 $\pm$ 0.000	0.973 $\pm$ 0.003	0.016 $\pm$ 0.001
OC	1	False	False	0.722 $\pm$ 0.002	0.902 $\pm$ 0.002	1.135 $\pm$ 0.008	0.046 $\pm$ 0.002
			True	0.722 $\pm$ 0.002	0.902 $\pm$ 0.002	1.121 $\pm$ 0.007	0.033 $\pm$ 0.001
		True	False	0.721 $\pm$ 0.002	0.903 $\pm$ 0.002	1.132 $\pm$ 0.009	0.049 $\pm$ 0.003
			True	0.721 $\pm$ 0.002	0.903 $\pm$ 0.002	1.119 $\pm$ 0.007	0.035 $\pm$ 0.002
	5	False	False	0.735 $\pm$ 0.002	0.908 $\pm$ 0.001	1.068 $\pm$ 0.001	0.058 $\pm$ 0.002
			True	0.735 $\pm$ 0.002	0.908 $\pm$ 0.001	1.051 $\pm$ 0.001	0.016 $\pm$ 0.001
		True	False	0.754 $\pm$ 0.001	0.918 $\pm$ 0.001	0.974 $\pm$ 0.001	0.033 $\pm$ 0.000
			True	0.754 $\pm$ 0.001	0.918 $\pm$ 0.001	0.974 $\pm$ 0.001	0.018 $\pm$ 0.001
MIMO	1	False	False	0.720 $\pm$ 0.001	0.903 $\pm$ 0.000	1.131 $\pm$ 0.004	0.048 $\pm$ 0.000
			True	0.720 $\pm$ 0.001	0.903 $\pm$ 0.000	1.119 $\pm$ 0.004	0.035 $\pm$ 0.002
		True	False	0.721 $\pm$ 0.001	0.902 $\pm$ 0.000	1.132 $\pm$ 0.010	0.047 $\pm$ 0.002
			True	0.721 $\pm$ 0.001	0.902 $\pm$ 0.000	1.120 $\pm$ 0.009	0.033 $\pm$ 0.000
	5	False	False	0.717 $\pm$ 0.002	0.897 $\pm$ 0.001	1.165 $\pm$ 0.014	0.074 $\pm$ 0.006
			True	0.717 $\pm$ 0.002	0.897 $\pm$ 0.001	1.137 $\pm$ 0.007	0.012 $\pm$ 0.001
		True	False	0.733 $\pm$ 0.000	0.907 $\pm$ 0.000	1.068 $\pm$ 0.003	0.047 $\pm$ 0.001
			True	0.733 $\pm$ 0.000	0.907 $\pm$ 0.000	1.061 $\pm$ 0.004	0.017 $\pm$ 0.002
MCDropout	1	False	False	0.720 $\pm$ 0.001	0.903 $\pm$ 0.001	1.138 $\pm$ 0.005	0.051 $\pm$ 0.001
			True	0.720 $\pm$ 0.001	0.903 $\pm$ 0.001	1.123 $\pm$ 0.005	0.037 $\pm$ 0.001
		True	False	0.721 $\pm$ 0.003	0.901 $\pm$ 0.001	1.130 $\pm$ 0.009	0.046 $\pm$ 0.003
			True	0.721 $\pm$ 0.003	0.901 $\pm$ 0.001	1.116 $\pm$ 0.007	0.031 $\pm$ 0.001
	5	False	False	0.736 $\pm$ 0.001	0.908 $\pm$ 0.000	1.065 $\pm$ 0.001	0.058 $\pm$ 0.001
			True	0.736 $\pm$ 0.001	0.908 $\pm$ 0.000	1.048 $\pm$ 0.000	0.016 $\pm$ 0.001
		True	False	0.754 $\pm$ 0.001	0.919 $\pm$ 0.000	0.973 $\pm$ 0.001	0.033 $\pm$ 0.001
			True	0.754 $\pm$ 0.001	0.919 $\pm$ 0.000	0.972 $\pm$ 0.002	0.018 $\pm$ 0.000
DUE	1	False	False	0.652 $\pm$ 0.003	0.831 $\pm$ 0.002	1.569 $\pm$ 0.004	0.071 $\pm$ 0.002
			False	0.652 $\pm$ 0.003	0.832 $\pm$ 0.002	1.563 $\pm$ 0.005	0.019 $\pm$ 0.003
			True	0.647 $\pm$ 0.002	0.828 $\pm$ 0.001	1.594 $\pm$ 0.005	0.070 $\pm$ 0.003
			True	0.647 $\pm$ 0.001	0.828 $\pm$ 0.000	1.589 $\pm$ 0.007	0.020 $\pm$ 0.001

Table 4: In-domain results for ResNet18.

## B OUT-DOMAIN RESULTS

algorithm	k	calibration	spectral	AUC ( $\uparrow$ )	InAsIn ( $\uparrow$ )	OutAsOut ( $\uparrow$ )
ERM	1	False True	False	$0.634 \pm 0.014$	$0.949 \pm 0.002$	$0.086 \pm 0.008$
			False	$0.644 \pm 0.016$	$0.949 \pm 0.001$	$0.089 \pm 0.010$
			True	$0.626 \pm 0.030$	$0.949 \pm 0.001$	$0.087 \pm 0.020$
			True	$0.636 \pm 0.035$	$0.949 \pm 0.002$	$0.090 \pm 0.020$
Mixup	1	False True	False	$0.686 \pm 0.021$	$0.948 \pm 0.001$	$0.125 \pm 0.017$
			False	$0.688 \pm 0.022$	$0.951 \pm 0.002$	$0.123 \pm 0.020$
			True	$0.663 \pm 0.010$	$0.949 \pm 0.001$	$0.104 \pm 0.006$
			True	$0.664 \pm 0.010$	$0.950 \pm 0.003$	$0.102 \pm 0.008$
SoftLabeler	1	False True	False	$0.621 \pm 0.032$	$0.944 \pm 0.001$	$0.088 \pm 0.022$
			False	$0.631 \pm 0.030$	$0.947 \pm 0.000$	$0.093 \pm 0.022$
			True	$0.616 \pm 0.009$	$0.949 \pm 0.003$	$0.083 \pm 0.004$
			True	$0.626 \pm 0.006$	$0.950 \pm 0.002$	$0.085 \pm 0.002$
DeepAE	1	False True	False	$0.630 \pm 0.009$	$0.949 \pm 0.002$	$0.089 \pm 0.005$
			False	$0.630 \pm 0.011$	$0.950 \pm 0.002$	$0.087 \pm 0.006$
			True	$0.663 \pm 0.014$	$0.950 \pm 0.001$	$0.103 \pm 0.011$
			True	$0.663 \pm 0.015$	$0.951 \pm 0.001$	$0.102 \pm 0.012$
RND	1	False True	False	$0.647 \pm 0.017$	$0.946 \pm 0.001$	$0.100 \pm 0.009$
			False	$0.652 \pm 0.016$	$0.967 \pm 0.024$	$0.069 \pm 0.048$
			True	$0.643 \pm 0.018$	$0.947 \pm 0.002$	$0.100 \pm 0.014$
			True	$0.648 \pm 0.016$	$0.946 \pm 0.002$	$0.101 \pm 0.016$
OC	1	False True	False	$0.635 \pm 0.026$	$0.948 \pm 0.002$	$0.089 \pm 0.011$
			False	$0.638 \pm 0.029$	$0.950 \pm 0.000$	$0.089 \pm 0.013$
			True	$0.652 \pm 0.013$	$0.949 \pm 0.002$	$0.100 \pm 0.015$
			True	$0.655 \pm 0.016$	$0.950 \pm 0.001$	$0.101 \pm 0.015$
MIMO	1	False True	False	$0.640 \pm 0.006$	$0.949 \pm 0.001$	$0.094 \pm 0.001$
			False	$0.648 \pm 0.005$	$0.950 \pm 0.001$	$0.096 \pm 0.004$
			True	$0.659 \pm 0.017$	$0.952 \pm 0.001$	$0.112 \pm 0.019$
			True	$0.667 \pm 0.016$	$0.951 \pm 0.001$	$0.111 \pm 0.018$
DUE	1	False True	False	$0.655 \pm 0.000$	$0.947 \pm 0.001$	$0.087 \pm 0.000$
			False	$0.646 \pm 0.001$	$0.949 \pm 0.001$	$0.082 \pm 0.001$
			True	$0.641 \pm 0.025$	$0.953 \pm 0.001$	$0.071 \pm 0.019$
			True	$0.632 \pm 0.025$	$0.950 \pm 0.002$	$0.069 \pm 0.014$

Table 5: Out-domain results for ResNet18 using measure ‘‘Augmentations’’

algorithm	k	calibration	spectral	AUC ( $\uparrow$ )	InAsIn ( $\uparrow$ )	OutAsOut ( $\uparrow$ )
ERM	1	False True	False	$0.666 \pm 0.007$	$0.950 \pm 0.001$	$0.112 \pm 0.009$
			False	$0.664 \pm 0.008$	$0.952 \pm 0.002$	$0.105 \pm 0.008$
			True	$0.653 \pm 0.026$	$0.948 \pm 0.001$	$0.114 \pm 0.017$
			True	$0.652 \pm 0.029$	$0.950 \pm 0.002$	$0.109 \pm 0.015$
Mixup	1	False True	False	$0.672 \pm 0.021$	$0.948 \pm 0.002$	$0.115 \pm 0.013$
			False	$0.669 \pm 0.021$	$0.965 \pm 0.025$	$0.070 \pm 0.050$
SoftLabeler	1	False True	False	$0.617 \pm 0.024$	$0.947 \pm 0.002$	$0.083 \pm 0.010$
			False	$0.609 \pm 0.022$	$0.951 \pm 0.003$	$0.076 \pm 0.006$
			True	$0.616 \pm 0.028$	$0.947 \pm 0.001$	$0.093 \pm 0.014$
			True	$0.607 \pm 0.029$	$0.949 \pm 0.001$	$0.086 \pm 0.013$
DeepAE	1	False True	False	$0.650 \pm 0.021$	$0.950 \pm 0.002$	$0.103 \pm 0.016$
			False	$0.657 \pm 0.019$	$0.951 \pm 0.002$	$0.103 \pm 0.015$
			True	$0.636 \pm 0.018$	$0.947 \pm 0.001$	$0.096 \pm 0.013$
			True	$0.643 \pm 0.017$	$0.949 \pm 0.001$	$0.095 \pm 0.012$
RND	1	False True	False	$0.654 \pm 0.000$	$0.948 \pm 0.000$	$0.102 \pm 0.000$
			False	$0.658 \pm 0.000$	$0.948 \pm 0.000$	$0.107 \pm 0.000$
			True	$0.668 \pm 0.000$	$0.949 \pm 0.000$	$0.115 \pm 0.000$
			True	$0.670 \pm 0.000$	$0.951 \pm 0.000$	$0.110 \pm 0.000$
OC	1	False True	False	$0.640 \pm 0.008$	$0.950 \pm 0.002$	$0.098 \pm 0.001$
			False	$0.655 \pm 0.008$	$0.953 \pm 0.000$	$0.102 \pm 0.004$
			True	$0.642 \pm 0.021$	$0.950 \pm 0.000$	$0.098 \pm 0.008$
			True	$0.652 \pm 0.019$	$0.949 \pm 0.002$	$0.102 \pm 0.006$
MIMO	1	False True	False	$0.678 \pm 0.014$	$0.952 \pm 0.002$	$0.112 \pm 0.012$
			False	$0.682 \pm 0.012$	$0.950 \pm 0.002$	$0.115 \pm 0.018$
			True	$0.677 \pm 0.016$	$0.950 \pm 0.001$	$0.111 \pm 0.015$
			True	$0.683 \pm 0.015$	$0.951 \pm 0.001$	$0.115 \pm 0.015$
DUE	1	False True	False	$0.624 \pm 0.019$	$0.950 \pm 0.001$	$0.113 \pm 0.006$
			False	$0.602 \pm 0.023$	$0.948 \pm 0.001$	$0.099 \pm 0.011$
			True	$0.657 \pm 0.000$	$0.946 \pm 0.000$	$0.083 \pm 0.000$
			True	$0.657 \pm 0.000$	$0.949 \pm 0.000$	$0.081 \pm 0.000$

Table 6: Out-domain results for ResNet50 using measure “Augmentations”

algorithm	k	calibration	spectral	AUC ( $\uparrow$ )	InAsIn ( $\uparrow$ )	OutAsOut ( $\uparrow$ )
ERM	1	False True	False	0.818 $\pm$ 0.003	0.941 $\pm$ 0.003	0.262 $\pm$ 0.004
			False	0.820 $\pm$ 0.004	0.941 $\pm$ 0.003	0.260 $\pm$ 0.005
			True	0.814 $\pm$ 0.010	0.941 $\pm$ 0.001	0.254 $\pm$ 0.010
			True	0.816 $\pm$ 0.010	0.941 $\pm$ 0.001	0.252 $\pm$ 0.010
	5	False True	False	0.837 $\pm$ 0.001	0.940 $\pm$ 0.002	0.288 $\pm$ 0.004
			False	0.833 $\pm$ 0.000	0.939 $\pm$ 0.002	0.291 $\pm$ 0.001
			True	0.833 $\pm$ 0.007	0.938 $\pm$ 0.001	0.284 $\pm$ 0.010
			True	0.832 $\pm$ 0.007	0.937 $\pm$ 0.002	0.285 $\pm$ 0.012
Mixup	1	False True	False	0.804 $\pm$ 0.006	0.940 $\pm$ 0.001	0.249 $\pm$ 0.008
			False	0.804 $\pm$ 0.006	0.940 $\pm$ 0.001	0.249 $\pm$ 0.008
			True	0.815 $\pm$ 0.004	0.938 $\pm$ 0.000	0.259 $\pm$ 0.000
			True	0.815 $\pm$ 0.004	0.938 $\pm$ 0.000	0.259 $\pm$ 0.000
	5	False True	False	0.830 $\pm$ 0.004	0.939 $\pm$ 0.001	0.277 $\pm$ 0.004
			False	0.830 $\pm$ 0.003	0.939 $\pm$ 0.001	0.282 $\pm$ 0.005
			True	0.835 $\pm$ 0.002	0.939 $\pm$ 0.003	0.281 $\pm$ 0.006
			True	0.833 $\pm$ 0.001	0.939 $\pm$ 0.001	0.284 $\pm$ 0.004
SoftLabeler	1	False True	False	0.790 $\pm$ 0.006	0.940 $\pm$ 0.002	0.220 $\pm$ 0.015
			False	0.794 $\pm$ 0.005	0.940 $\pm$ 0.001	0.229 $\pm$ 0.014
			True	0.791 $\pm$ 0.014	0.938 $\pm$ 0.000	0.227 $\pm$ 0.013
			True	0.794 $\pm$ 0.013	0.938 $\pm$ 0.001	0.235 $\pm$ 0.013
	5	False True	False	0.812 $\pm$ 0.008	0.938 $\pm$ 0.002	0.256 $\pm$ 0.013
			False	0.818 $\pm$ 0.004	0.938 $\pm$ 0.001	0.268 $\pm$ 0.008
			True	0.815 $\pm$ 0.006	0.937 $\pm$ 0.001	0.258 $\pm$ 0.005
			True	0.821 $\pm$ 0.005	0.938 $\pm$ 0.001	0.269 $\pm$ 0.004
DeepAE	1	False True	False	0.824 $\pm$ 0.008	0.941 $\pm$ 0.001	0.265 $\pm$ 0.010
			False	0.825 $\pm$ 0.008	0.941 $\pm$ 0.000	0.265 $\pm$ 0.010
			True	0.823 $\pm$ 0.006	0.941 $\pm$ 0.002	0.279 $\pm$ 0.016
			True	0.824 $\pm$ 0.006	0.941 $\pm$ 0.002	0.280 $\pm$ 0.016
	5	False True	False	0.846 $\pm$ 0.001	0.939 $\pm$ 0.000	0.304 $\pm$ 0.004
			False	0.840 $\pm$ 0.000	0.938 $\pm$ 0.000	0.306 $\pm$ 0.003
			True	0.843 $\pm$ 0.000	0.940 $\pm$ 0.003	0.301 $\pm$ 0.005
			True	0.839 $\pm$ 0.001	0.940 $\pm$ 0.003	0.302 $\pm$ 0.004
RND	1	False True	False	0.819 $\pm$ 0.001	0.941 $\pm$ 0.001	0.260 $\pm$ 0.006
			False	0.820 $\pm$ 0.001	0.941 $\pm$ 0.001	0.261 $\pm$ 0.007
			True	0.826 $\pm$ 0.004	0.940 $\pm$ 0.001	0.265 $\pm$ 0.003
			True	0.827 $\pm$ 0.004	0.940 $\pm$ 0.001	0.265 $\pm$ 0.003
	5	False True	False	0.840 $\pm$ 0.001	0.939 $\pm$ 0.001	0.292 $\pm$ 0.006
			False	0.835 $\pm$ 0.001	0.938 $\pm$ 0.001	0.296 $\pm$ 0.006
			True	0.839 $\pm$ 0.004	0.940 $\pm$ 0.001	0.285 $\pm$ 0.014
			True	0.837 $\pm$ 0.003	0.940 $\pm$ 0.001	0.288 $\pm$ 0.012
OC	1	False True	False	0.812 $\pm$ 0.004	0.939 $\pm$ 0.001	0.261 $\pm$ 0.008
			False	0.814 $\pm$ 0.005	0.940 $\pm$ 0.001	0.259 $\pm$ 0.006
			True	0.806 $\pm$ 0.008	0.939 $\pm$ 0.003	0.249 $\pm$ 0.009
			True	0.807 $\pm$ 0.008	0.939 $\pm$ 0.003	0.248 $\pm$ 0.011
	5	False True	False	0.834 $\pm$ 0.003	0.938 $\pm$ 0.002	0.283 $\pm$ 0.009
			False	0.830 $\pm$ 0.003	0.938 $\pm$ 0.001	0.285 $\pm$ 0.007
			True	0.835 $\pm$ 0.002	0.939 $\pm$ 0.001	0.283 $\pm$ 0.006
			True	0.833 $\pm$ 0.002	0.939 $\pm$ 0.002	0.284 $\pm$ 0.006
MIMO	1	False True	False	0.807 $\pm$ 0.010	0.940 $\pm$ 0.002	0.252 $\pm$ 0.012
			False	0.808 $\pm$ 0.010	0.940 $\pm$ 0.001	0.251 $\pm$ 0.012
			True	0.808 $\pm$ 0.012	0.940 $\pm$ 0.000	0.249 $\pm$ 0.025
			True	0.809 $\pm$ 0.013	0.940 $\pm$ 0.001	0.248 $\pm$ 0.024
	5	False True	False	0.832 $\pm$ 0.002	0.939 $\pm$ 0.001	0.266 $\pm$ 0.008
			False	0.826 $\pm$ 0.002	0.939 $\pm$ 0.000	0.266 $\pm$ 0.007
			True	0.829 $\pm$ 0.006	0.939 $\pm$ 0.001	0.259 $\pm$ 0.009
			True	0.826 $\pm$ 0.005	0.938 $\pm$ 0.002	0.261 $\pm$ 0.007
MCDropout	1	False True	False	0.810 $\pm$ 0.012	0.942 $\pm$ 0.001	0.250 $\pm$ 0.015
			False	0.812 $\pm$ 0.012	0.941 $\pm$ 0.002	0.248 $\pm$ 0.016
			True	0.814 $\pm$ 0.001	0.939 $\pm$ 0.001	0.265 $\pm$ 0.007
			True	0.816 $\pm$ 0.002	0.939 $\pm$ 0.001	0.265 $\pm$ 0.007
	5	False True	False	0.837 $\pm$ 0.003	0.938 $\pm$ 0.001	0.291 $\pm$ 0.007
			False	0.832 $\pm$ 0.002	0.939 $\pm$ 0.002	0.288 $\pm$ 0.008
			True	0.834 $\pm$ 0.003	0.939 $\pm$ 0.001	0.287 $\pm$ 0.008
			True	0.832 $\pm$ 0.003	0.938 $\pm$ 0.001	0.288 $\pm$ 0.010
DUE	1	False True	False	0.824 $\pm$ 0.002	0.942 $\pm$ 0.003	0.248 $\pm$ 0.003
			False	0.818 $\pm$ 0.002	0.942 $\pm$ 0.003	0.248 $\pm$ 0.003
			True	0.822 $\pm$ 0.002	0.941 $\pm$ 0.002	0.243 $\pm$ 0.003
			True	0.816 $\pm$ 0.002	0.941 $\pm$ 0.001	0.240 $\pm$ 0.002

Table 7: Out-domain results for ResNet18 using measure “Entropy”

algorithm	k	calibration	spectral	AUC ( $\uparrow$ )	InAsIn ( $\uparrow$ )	OutAsOut ( $\uparrow$ )
ERM	1	False	False	0.783 $\pm$ 0.003	0.944 $\pm$ 0.002	0.179 $\pm$ 0.003
			False	0.786 $\pm$ 0.002	0.944 $\pm$ 0.001	0.183 $\pm$ 0.003
		True	True	0.780 $\pm$ 0.007	0.944 $\pm$ 0.003	0.172 $\pm$ 0.008
			True	0.782 $\pm$ 0.007	0.944 $\pm$ 0.003	0.175 $\pm$ 0.008
	5	False	False	0.801 $\pm$ 0.001	0.942 $\pm$ 0.001	0.192 $\pm$ 0.006
			False	0.795 $\pm$ 0.002	0.943 $\pm$ 0.001	0.183 $\pm$ 0.005
		True	True	0.799 $\pm$ 0.006	0.943 $\pm$ 0.002	0.196 $\pm$ 0.007
			True	0.796 $\pm$ 0.006	0.943 $\pm$ 0.002	0.192 $\pm$ 0.006
Mixup	1	False	False	0.777 $\pm$ 0.004	0.942 $\pm$ 0.002	0.177 $\pm$ 0.003
			False	0.777 $\pm$ 0.004	0.942 $\pm$ 0.002	0.177 $\pm$ 0.004
		True	True	0.783 $\pm$ 0.003	0.940 $\pm$ 0.002	0.186 $\pm$ 0.002
			True	0.783 $\pm$ 0.003	0.941 $\pm$ 0.002	0.186 $\pm$ 0.002
	5	False	False	0.800 $\pm$ 0.003	0.942 $\pm$ 0.002	0.192 $\pm$ 0.001
			False	0.794 $\pm$ 0.003	0.943 $\pm$ 0.002	0.184 $\pm$ 0.001
		True	True	0.802 $\pm$ 0.002	0.942 $\pm$ 0.003	0.197 $\pm$ 0.006
			True	0.796 $\pm$ 0.002	0.943 $\pm$ 0.002	0.187 $\pm$ 0.006
SoftLabeler	1	False	False	0.776 $\pm$ 0.003	0.945 $\pm$ 0.001	0.177 $\pm$ 0.004
			False	0.774 $\pm$ 0.003	0.945 $\pm$ 0.001	0.173 $\pm$ 0.004
		True	True	0.774 $\pm$ 0.009	0.943 $\pm$ 0.002	0.179 $\pm$ 0.008
			True	0.771 $\pm$ 0.009	0.943 $\pm$ 0.002	0.173 $\pm$ 0.009
	5	False	False	0.796 $\pm$ 0.002	0.942 $\pm$ 0.000	0.193 $\pm$ 0.002
			False	0.787 $\pm$ 0.001	0.941 $\pm$ 0.001	0.179 $\pm$ 0.000
		True	True	0.798 $\pm$ 0.003	0.941 $\pm$ 0.004	0.196 $\pm$ 0.010
			True	0.791 $\pm$ 0.002	0.942 $\pm$ 0.004	0.186 $\pm$ 0.010
DeepAE	1	False	False	0.784 $\pm$ 0.005	0.944 $\pm$ 0.001	0.177 $\pm$ 0.004
			False	0.786 $\pm$ 0.005	0.944 $\pm$ 0.001	0.178 $\pm$ 0.004
		True	True	0.782 $\pm$ 0.003	0.941 $\pm$ 0.001	0.182 $\pm$ 0.004
			True	0.783 $\pm$ 0.003	0.941 $\pm$ 0.001	0.184 $\pm$ 0.005
	5	False	False	0.805 $\pm$ 0.001	0.941 $\pm$ 0.002	0.198 $\pm$ 0.004
			False	0.797 $\pm$ 0.001	0.942 $\pm$ 0.002	0.187 $\pm$ 0.004
		True	True	0.801 $\pm$ 0.002	0.941 $\pm$ 0.002	0.197 $\pm$ 0.005
			True	0.796 $\pm$ 0.002	0.942 $\pm$ 0.003	0.190 $\pm$ 0.002
RND	1	False	False	0.784 $\pm$ 0.001	0.943 $\pm$ 0.002	0.182 $\pm$ 0.003
			False	0.786 $\pm$ 0.001	0.944 $\pm$ 0.002	0.184 $\pm$ 0.002
		True	True	0.788 $\pm$ 0.002	0.942 $\pm$ 0.001	0.182 $\pm$ 0.002
			True	0.789 $\pm$ 0.002	0.942 $\pm$ 0.001	0.184 $\pm$ 0.002
	5	False	False	0.803 $\pm$ 0.003	0.944 $\pm$ 0.000	0.192 $\pm$ 0.007
			False	0.797 $\pm$ 0.003	0.945 $\pm$ 0.000	0.183 $\pm$ 0.008
		True	True	0.802 $\pm$ 0.001	0.943 $\pm$ 0.002	0.198 $\pm$ 0.006
			True	0.798 $\pm$ 0.001	0.943 $\pm$ 0.003	0.194 $\pm$ 0.006
OC	1	False	False	0.779 $\pm$ 0.003	0.944 $\pm$ 0.001	0.176 $\pm$ 0.001
			False	0.782 $\pm$ 0.003	0.944 $\pm$ 0.001	0.180 $\pm$ 0.001
		True	True	0.775 $\pm$ 0.007	0.945 $\pm$ 0.003	0.170 $\pm$ 0.009
			True	0.777 $\pm$ 0.006	0.945 $\pm$ 0.003	0.173 $\pm$ 0.009
	5	False	False	0.798 $\pm$ 0.002	0.941 $\pm$ 0.001	0.190 $\pm$ 0.003
			False	0.793 $\pm$ 0.002	0.941 $\pm$ 0.001	0.182 $\pm$ 0.001
		True	True	0.798 $\pm$ 0.001	0.943 $\pm$ 0.002	0.191 $\pm$ 0.011
			True	0.795 $\pm$ 0.001	0.942 $\pm$ 0.002	0.187 $\pm$ 0.011
MIMO	1	False	False	0.779 $\pm$ 0.007	0.945 $\pm$ 0.001	0.177 $\pm$ 0.011
			False	0.781 $\pm$ 0.007	0.945 $\pm$ 0.001	0.180 $\pm$ 0.011
		True	True	0.775 $\pm$ 0.007	0.941 $\pm$ 0.001	0.178 $\pm$ 0.010
			True	0.777 $\pm$ 0.007	0.940 $\pm$ 0.001	0.181 $\pm$ 0.010
	5	False	False	0.793 $\pm$ 0.002	0.942 $\pm$ 0.002	0.184 $\pm$ 0.008
			False	0.786 $\pm$ 0.002	0.942 $\pm$ 0.002	0.176 $\pm$ 0.007
		True	True	0.791 $\pm$ 0.003	0.942 $\pm$ 0.001	0.180 $\pm$ 0.006
			True	0.786 $\pm$ 0.003	0.942 $\pm$ 0.001	0.175 $\pm$ 0.006
MCDropout	1	False	False	0.777 $\pm$ 0.007	0.944 $\pm$ 0.001	0.173 $\pm$ 0.009
			False	0.780 $\pm$ 0.007	0.944 $\pm$ 0.001	0.176 $\pm$ 0.010
		True	True	0.778 $\pm$ 0.002	0.941 $\pm$ 0.002	0.180 $\pm$ 0.004
			True	0.781 $\pm$ 0.001	0.941 $\pm$ 0.002	0.184 $\pm$ 0.005
	5	False	False	0.799 $\pm$ 0.002	0.942 $\pm$ 0.000	0.191 $\pm$ 0.006
			False	0.794 $\pm$ 0.002	0.942 $\pm$ 0.001	0.181 $\pm$ 0.006
		True	True	0.800 $\pm$ 0.003	0.942 $\pm$ 0.001	0.194 $\pm$ 0.006
			True	0.797 $\pm$ 0.003	0.942 $\pm$ 0.000	0.189 $\pm$ 0.006
DUE	1	False	False	0.765 $\pm$ 0.000	0.944 $\pm$ 0.003	0.166 $\pm$ 0.005
			False	0.760 $\pm$ 0.000	0.944 $\pm$ 0.001	0.165 $\pm$ 0.005
			True	0.763 $\pm$ 0.003	0.945 $\pm$ 0.003	0.163 $\pm$ 0.004
			True	0.758 $\pm$ 0.003	0.944 $\pm$ 0.001	0.158 $\pm$ 0.005

Table 8: Out-domain results for ResNet18 using measure “Gap”

algorithm	k	calibration	spectral	AUC ( $\uparrow$ )	InAsIn ( $\uparrow$ )	OutAsOut ( $\uparrow$ )
ERM	1	False	False	0.819 $\pm$ 0.002	0.945 $\pm$ 0.003	0.220 $\pm$ 0.004
			False	0.824 $\pm$ 0.003	0.945 $\pm$ 0.003	0.228 $\pm$ 0.005
		True	True	0.820 $\pm$ 0.003	0.945 $\pm$ 0.001	0.223 $\pm$ 0.006
			True	0.825 $\pm$ 0.003	0.945 $\pm$ 0.001	0.232 $\pm$ 0.006
	5	False	False	0.830 $\pm$ 0.002	0.945 $\pm$ 0.002	0.232 $\pm$ 0.003
			False	0.828 $\pm$ 0.000	0.945 $\pm$ 0.002	0.229 $\pm$ 0.005
		True	True	0.830 $\pm$ 0.002	0.944 $\pm$ 0.002	0.229 $\pm$ 0.004
			True	0.829 $\pm$ 0.002	0.944 $\pm$ 0.002	0.228 $\pm$ 0.004
Mixup	1	False	False	0.818 $\pm$ 0.003	0.945 $\pm$ 0.000	0.218 $\pm$ 0.008
			False	0.818 $\pm$ 0.003	0.945 $\pm$ 0.000	0.219 $\pm$ 0.008
		True	True	0.818 $\pm$ 0.005	0.945 $\pm$ 0.000	0.220 $\pm$ 0.007
			True	0.815 $\pm$ 0.005	0.945 $\pm$ 0.000	0.215 $\pm$ 0.005
	5	False	False	0.833 $\pm$ 0.002	0.943 $\pm$ 0.001	0.236 $\pm$ 0.004
			False	0.827 $\pm$ 0.003	0.943 $\pm$ 0.001	0.225 $\pm$ 0.003
		True	True	0.834 $\pm$ 0.002	0.945 $\pm$ 0.002	0.240 $\pm$ 0.008
			True	0.826 $\pm$ 0.002	0.945 $\pm$ 0.002	0.224 $\pm$ 0.007
SoftLabeler	1	False	False	0.810 $\pm$ 0.008	0.944 $\pm$ 0.002	0.216 $\pm$ 0.009
			False	0.807 $\pm$ 0.007	0.945 $\pm$ 0.002	0.209 $\pm$ 0.008
		True	True	0.813 $\pm$ 0.004	0.944 $\pm$ 0.001	0.220 $\pm$ 0.005
			True	0.810 $\pm$ 0.004	0.945 $\pm$ 0.002	0.211 $\pm$ 0.004
	5	False	False	0.832 $\pm$ 0.005	0.943 $\pm$ 0.000	0.235 $\pm$ 0.003
			False	0.823 $\pm$ 0.005	0.945 $\pm$ 0.000	0.214 $\pm$ 0.003
		True	True	0.833 $\pm$ 0.003	0.945 $\pm$ 0.001	0.235 $\pm$ 0.001
			True	0.826 $\pm$ 0.003	0.946 $\pm$ 0.001	0.218 $\pm$ 0.001
DeepAE	1	False	False	0.817 $\pm$ 0.001	0.946 $\pm$ 0.001	0.212 $\pm$ 0.005
			False	0.820 $\pm$ 0.001	0.946 $\pm$ 0.001	0.218 $\pm$ 0.004
		True	True	0.817 $\pm$ 0.001	0.943 $\pm$ 0.000	0.221 $\pm$ 0.003
			True	0.821 $\pm$ 0.001	0.944 $\pm$ 0.000	0.227 $\pm$ 0.004
	5	False	False	0.831 $\pm$ 0.001	0.943 $\pm$ 0.001	0.232 $\pm$ 0.004
			False	0.826 $\pm$ 0.003	0.943 $\pm$ 0.001	0.224 $\pm$ 0.006
		True	True	0.832 $\pm$ 0.002	0.944 $\pm$ 0.000	0.236 $\pm$ 0.004
			True	0.829 $\pm$ 0.002	0.945 $\pm$ 0.000	0.231 $\pm$ 0.004
RND	1	False	False	0.815 $\pm$ 0.002	0.945 $\pm$ 0.002	0.215 $\pm$ 0.001
			False	0.820 $\pm$ 0.002	0.945 $\pm$ 0.001	0.224 $\pm$ 0.000
		True	True	0.813 $\pm$ 0.002	0.945 $\pm$ 0.002	0.216 $\pm$ 0.005
			True	0.818 $\pm$ 0.002	0.945 $\pm$ 0.001	0.223 $\pm$ 0.005
	5	False	False	0.830 $\pm$ 0.001	0.943 $\pm$ 0.001	0.224 $\pm$ 0.001
			False	0.827 $\pm$ 0.001	0.943 $\pm$ 0.001	0.220 $\pm$ 0.003
		True	True	0.828 $\pm$ 0.002	0.942 $\pm$ 0.003	0.228 $\pm$ 0.007
			True	0.827 $\pm$ 0.002	0.942 $\pm$ 0.003	0.226 $\pm$ 0.006
OC	1	False	False	0.816 $\pm$ 0.002	0.942 $\pm$ 0.001	0.221 $\pm$ 0.008
			False	0.821 $\pm$ 0.002	0.942 $\pm$ 0.001	0.232 $\pm$ 0.009
		True	True	0.817 $\pm$ 0.003	0.945 $\pm$ 0.000	0.214 $\pm$ 0.006
			True	0.822 $\pm$ 0.003	0.944 $\pm$ 0.001	0.223 $\pm$ 0.005
	5	False	False	0.830 $\pm$ 0.002	0.945 $\pm$ 0.003	0.230 $\pm$ 0.010
			False	0.828 $\pm$ 0.002	0.945 $\pm$ 0.004	0.226 $\pm$ 0.008
		True	True	0.829 $\pm$ 0.001	0.943 $\pm$ 0.003	0.232 $\pm$ 0.005
			True	0.828 $\pm$ 0.001	0.943 $\pm$ 0.003	0.230 $\pm$ 0.005
MIMO	1	False	False	0.820 $\pm$ 0.001	0.945 $\pm$ 0.001	0.226 $\pm$ 0.001
			False	0.825 $\pm$ 0.001	0.945 $\pm$ 0.000	0.235 $\pm$ 0.002
		True	True	0.819 $\pm$ 0.002	0.943 $\pm$ 0.001	0.225 $\pm$ 0.001
			True	0.825 $\pm$ 0.002	0.943 $\pm$ 0.001	0.235 $\pm$ 0.001
	5	False	False	0.824 $\pm$ 0.001	0.941 $\pm$ 0.000	0.226 $\pm$ 0.004
			False	0.819 $\pm$ 0.001	0.941 $\pm$ 0.001	0.219 $\pm$ 0.004
		True	True	0.826 $\pm$ 0.002	0.942 $\pm$ 0.002	0.230 $\pm$ 0.004
			True	0.822 $\pm$ 0.002	0.942 $\pm$ 0.002	0.223 $\pm$ 0.004
MCDropout	1	False	False	0.820 $\pm$ 0.001	0.944 $\pm$ 0.002	0.228 $\pm$ 0.002
			False	0.825 $\pm$ 0.001	0.944 $\pm$ 0.002	0.237 $\pm$ 0.002
		True	True	0.820 $\pm$ 0.004	0.946 $\pm$ 0.000	0.227 $\pm$ 0.003
			True	0.826 $\pm$ 0.004	0.946 $\pm$ 0.000	0.235 $\pm$ 0.004
	5	False	False	0.830 $\pm$ 0.002	0.943 $\pm$ 0.001	0.227 $\pm$ 0.004
			False	0.827 $\pm$ 0.003	0.943 $\pm$ 0.002	0.221 $\pm$ 0.004
		True	True	0.830 $\pm$ 0.002	0.942 $\pm$ 0.003	0.231 $\pm$ 0.009
			True	0.829 $\pm$ 0.002	0.942 $\pm$ 0.003	0.229 $\pm$ 0.009
DUE	1	False	False	0.523 $\pm$ 0.004	0.952 $\pm$ 0.001	0.051 $\pm$ 0.005
			False	0.520 $\pm$ 0.002	0.952 $\pm$ 0.001	0.051 $\pm$ 0.001
			True	0.782 $\pm$ 0.000	0.945 $\pm$ 0.000	0.183 $\pm$ 0.000
			True	0.778 $\pm$ 0.000	0.943 $\pm$ 0.000	0.178 $\pm$ 0.000

Table 9: Out-domain results for ResNet50 using measure “Gap”

algorithm	k	calibration	spectral	AUC ( $\uparrow$ )	InAsIn ( $\uparrow$ )	OutAsOut ( $\uparrow$ )
ERM	1	False True	False	$0.544 \pm 0.030$	$0.959 \pm 0.005$	$0.040 \pm 0.008$
			False	$0.544 \pm 0.030$	$0.959 \pm 0.005$	$0.040 \pm 0.008$
			True	$0.543 \pm 0.020$	$0.957 \pm 0.002$	$0.044 \pm 0.009$
			True	$0.543 \pm 0.020$	$0.957 \pm 0.002$	$0.044 \pm 0.009$
Mixup	1	False True	False	$0.533 \pm 0.014$	$0.958 \pm 0.003$	$0.038 \pm 0.005$
			False	$0.533 \pm 0.014$	$0.958 \pm 0.003$	$0.038 \pm 0.005$
			True	$0.562 \pm 0.019$	$0.961 \pm 0.003$	$0.040 \pm 0.007$
			True	$0.562 \pm 0.019$	$0.961 \pm 0.003$	$0.040 \pm 0.007$
SoftLabeler	1	False True	False	$0.577 \pm 0.012$	$0.953 \pm 0.003$	$0.059 \pm 0.015$
			False	$0.577 \pm 0.012$	$0.953 \pm 0.003$	$0.059 \pm 0.015$
			True	$0.600 \pm 0.027$	$0.956 \pm 0.007$	$0.070 \pm 0.008$
			True	$0.600 \pm 0.027$	$0.956 \pm 0.007$	$0.070 \pm 0.008$
DeepAE	1	False True	False	$0.511 \pm 0.007$	$0.957 \pm 0.004$	$0.030 \pm 0.001$
			False	$0.511 \pm 0.007$	$0.957 \pm 0.004$	$0.030 \pm 0.001$
			True	$0.514 \pm 0.011$	$0.958 \pm 0.003$	$0.038 \pm 0.006$
			True	$0.514 \pm 0.011$	$0.958 \pm 0.003$	$0.038 \pm 0.006$
RND	1	False True	False	$0.525 \pm 0.013$	$0.960 \pm 0.006$	$0.031 \pm 0.008$
			False	$0.525 \pm 0.013$	$0.960 \pm 0.006$	$0.031 \pm 0.008$
			True	$0.519 \pm 0.013$	$0.960 \pm 0.005$	$0.028 \pm 0.007$
			True	$0.519 \pm 0.013$	$0.960 \pm 0.005$	$0.028 \pm 0.007$
OC	1	False True	False	$0.544 \pm 0.005$	$0.956 \pm 0.002$	$0.043 \pm 0.004$
			False	$0.544 \pm 0.005$	$0.956 \pm 0.002$	$0.043 \pm 0.004$
			True	$0.546 \pm 0.005$	$0.956 \pm 0.001$	$0.045 \pm 0.002$
			True	$0.546 \pm 0.005$	$0.956 \pm 0.001$	$0.045 \pm 0.002$
MIMO	1	False True	False	$0.281 \pm 0.015$	$0.960 \pm 0.002$	$0.002 \pm 0.001$
			False	$0.281 \pm 0.015$	$0.960 \pm 0.002$	$0.002 \pm 0.001$
			True	$0.276 \pm 0.025$	$0.960 \pm 0.003$	$0.002 \pm 0.001$
			True	$0.276 \pm 0.025$	$0.960 \pm 0.003$	$0.002 \pm 0.001$
DUE	1	False True	False	$0.430 \pm 0.013$	$0.960 \pm 0.005$	$0.020 \pm 0.004$
			False	$0.430 \pm 0.015$	$0.960 \pm 0.005$	$0.021 \pm 0.005$
			True	$0.421 \pm 0.001$	$0.957 \pm 0.004$	$0.023 \pm 0.002$
			True	$0.420 \pm 0.001$	$0.955 \pm 0.003$	$0.024 \pm 0.003$

Table 10: Out-domain results for ResNet18 using measure “Jacobian”

algorithm	k	calibration	spectral	AUC ( $\uparrow$ )	InAsIn ( $\uparrow$ )	OutAsOut ( $\uparrow$ )
ERM	1	False True	False	$0.531 \pm 0.030$	$0.951 \pm 0.002$	$0.050 \pm 0.012$
			False	$0.531 \pm 0.030$	$0.951 \pm 0.002$	$0.050 \pm 0.012$
			True	$0.542 \pm 0.009$	$0.952 \pm 0.002$	$0.056 \pm 0.003$
			True	$0.542 \pm 0.009$	$0.952 \pm 0.002$	$0.056 \pm 0.003$
Mixup	1	False True	False	$0.568 \pm 0.017$	$0.950 \pm 0.002$	$0.064 \pm 0.008$
			False	$0.568 \pm 0.017$	$0.950 \pm 0.002$	$0.064 \pm 0.008$
			True	$0.453 \pm 0.017$	$0.952 \pm 0.004$	$0.034 \pm 0.002$
			True	$0.453 \pm 0.017$	$0.952 \pm 0.004$	$0.034 \pm 0.002$
SoftLabeler	1	False True	False	$0.640 \pm 0.019$	$0.948 \pm 0.003$	$0.074 \pm 0.015$
			False	$0.640 \pm 0.019$	$0.948 \pm 0.003$	$0.074 \pm 0.015$
			True	$0.593 \pm 0.023$	$0.949 \pm 0.001$	$0.054 \pm 0.019$
			True	$0.593 \pm 0.022$	$0.949 \pm 0.001$	$0.054 \pm 0.019$
DeepAE	1	False True	False	$0.568 \pm 0.003$	$0.945 \pm 0.003$	$0.056 \pm 0.004$
			False	$0.568 \pm 0.003$	$0.945 \pm 0.003$	$0.056 \pm 0.004$
			True	$0.575 \pm 0.020$	$0.949 \pm 0.003$	$0.055 \pm 0.011$
			True	$0.575 \pm 0.020$	$0.949 \pm 0.003$	$0.055 \pm 0.011$
RND	1	False True	False	$0.533 \pm 0.024$	$0.948 \pm 0.003$	$0.054 \pm 0.007$
			False	$0.533 \pm 0.024$	$0.948 \pm 0.003$	$0.054 \pm 0.007$
			True	$0.536 \pm 0.011$	$0.948 \pm 0.004$	$0.053 \pm 0.007$
			True	$0.536 \pm 0.011$	$0.948 \pm 0.004$	$0.053 \pm 0.007$
OC	1	False True	False	$0.563 \pm 0.013$	$0.948 \pm 0.003$	$0.059 \pm 0.010$
			False	$0.563 \pm 0.013$	$0.948 \pm 0.003$	$0.059 \pm 0.010$
			True	$0.543 \pm 0.011$	$0.950 \pm 0.001$	$0.052 \pm 0.006$
			True	$0.543 \pm 0.011$	$0.950 \pm 0.001$	$0.052 \pm 0.006$
MIMO	1	False True	False	$0.193 \pm 0.006$	$0.956 \pm 0.001$	$0.002 \pm 0.001$
			False	$0.193 \pm 0.006$	$0.956 \pm 0.001$	$0.002 \pm 0.001$
			True	$0.198 \pm 0.004$	$0.956 \pm 0.005$	$0.002 \pm 0.001$
			True	$0.198 \pm 0.004$	$0.956 \pm 0.005$	$0.002 \pm 0.001$
DUE	1	False True	False	$0.434 \pm 0.017$	$0.953 \pm 0.003$	$0.018 \pm 0.001$
			False	$0.434 \pm 0.017$	$0.953 \pm 0.003$	$0.017 \pm 0.000$
			True	$0.534 \pm 0.000$	$0.947 \pm 0.000$	$0.044 \pm 0.000$
			True	$0.536 \pm 0.000$	$0.948 \pm 0.000$	$0.041 \pm 0.000$

Table 11: Out-domain results for ResNet50 using measure “Jacobian”



algorithm	k	calibration	spectral	AUC ( $\uparrow$ )	InAsIn ( $\uparrow$ )	OutAsOut ( $\uparrow$ )
ERM	1	False	False	0.803 $\pm$ 0.002	0.941 $\pm$ 0.003	0.248 $\pm$ 0.005
			False	0.807 $\pm$ 0.002	0.941 $\pm$ 0.003	0.251 $\pm$ 0.004
		True	True	0.799 $\pm$ 0.008	0.941 $\pm$ 0.002	0.241 $\pm$ 0.014
			True	0.803 $\pm$ 0.009	0.941 $\pm$ 0.002	0.244 $\pm$ 0.014
	5	False	False	0.824 $\pm$ 0.001	0.938 $\pm$ 0.001	0.280 $\pm$ 0.002
			False	0.816 $\pm$ 0.001	0.938 $\pm$ 0.000	0.268 $\pm$ 0.003
		True	True	0.821 $\pm$ 0.007	0.937 $\pm$ 0.001	0.273 $\pm$ 0.009
			True	0.817 $\pm$ 0.007	0.938 $\pm$ 0.002	0.267 $\pm$ 0.008
Mixup	1	False	False	0.795 $\pm$ 0.005	0.939 $\pm$ 0.002	0.244 $\pm$ 0.006
			False	0.795 $\pm$ 0.005	0.939 $\pm$ 0.002	0.243 $\pm$ 0.007
		True	True	0.804 $\pm$ 0.004	0.940 $\pm$ 0.002	0.249 $\pm$ 0.006
			True	0.804 $\pm$ 0.004	0.940 $\pm$ 0.002	0.249 $\pm$ 0.006
	5	False	False	0.824 $\pm$ 0.003	0.939 $\pm$ 0.001	0.276 $\pm$ 0.006
			False	0.815 $\pm$ 0.003	0.939 $\pm$ 0.001	0.268 $\pm$ 0.006
		True	True	0.826 $\pm$ 0.001	0.939 $\pm$ 0.000	0.276 $\pm$ 0.005
			True	0.818 $\pm$ 0.001	0.939 $\pm$ 0.001	0.267 $\pm$ 0.003
SoftLabeler	1	False	False	0.791 $\pm$ 0.004	0.941 $\pm$ 0.001	0.233 $\pm$ 0.010
			False	0.788 $\pm$ 0.003	0.941 $\pm$ 0.001	0.231 $\pm$ 0.009
		True	True	0.790 $\pm$ 0.012	0.939 $\pm$ 0.001	0.236 $\pm$ 0.011
			True	0.787 $\pm$ 0.011	0.939 $\pm$ 0.001	0.235 $\pm$ 0.009
	5	False	False	0.815 $\pm$ 0.004	0.939 $\pm$ 0.001	0.263 $\pm$ 0.004
			False	0.804 $\pm$ 0.002	0.938 $\pm$ 0.000	0.250 $\pm$ 0.002
		True	True	0.817 $\pm$ 0.005	0.940 $\pm$ 0.002	0.261 $\pm$ 0.008
			True	0.810 $\pm$ 0.003	0.939 $\pm$ 0.002	0.257 $\pm$ 0.007
DeepAE	1	False	False	0.807 $\pm$ 0.007	0.942 $\pm$ 0.001	0.250 $\pm$ 0.011
			False	0.809 $\pm$ 0.007	0.942 $\pm$ 0.001	0.252 $\pm$ 0.010
		True	True	0.806 $\pm$ 0.004	0.940 $\pm$ 0.000	0.264 $\pm$ 0.008
			True	0.807 $\pm$ 0.004	0.940 $\pm$ 0.001	0.265 $\pm$ 0.009
	5	False	False	0.831 $\pm$ 0.001	0.939 $\pm$ 0.001	0.288 $\pm$ 0.003
			False	0.820 $\pm$ 0.000	0.939 $\pm$ 0.002	0.271 $\pm$ 0.003
		True	True	0.828 $\pm$ 0.001	0.940 $\pm$ 0.002	0.285 $\pm$ 0.007
			True	0.820 $\pm$ 0.001	0.939 $\pm$ 0.002	0.278 $\pm$ 0.006
RND	1	False	False	0.804 $\pm$ 0.001	0.939 $\pm$ 0.000	0.249 $\pm$ 0.003
			False	0.806 $\pm$ 0.001	0.939 $\pm$ 0.000	0.251 $\pm$ 0.003
		True	True	0.810 $\pm$ 0.003	0.940 $\pm$ 0.000	0.254 $\pm$ 0.003
			True	0.812 $\pm$ 0.003	0.940 $\pm$ 0.001	0.256 $\pm$ 0.003
	5	False	False	0.826 $\pm$ 0.002	0.939 $\pm$ 0.000	0.278 $\pm$ 0.006
			False	0.817 $\pm$ 0.002	0.939 $\pm$ 0.000	0.265 $\pm$ 0.005
		True	True	0.825 $\pm$ 0.002	0.938 $\pm$ 0.003	0.279 $\pm$ 0.007
			True	0.821 $\pm$ 0.002	0.938 $\pm$ 0.003	0.274 $\pm$ 0.008
OC	1	False	False	0.798 $\pm$ 0.004	0.941 $\pm$ 0.002	0.244 $\pm$ 0.002
			False	0.802 $\pm$ 0.004	0.941 $\pm$ 0.002	0.247 $\pm$ 0.004
		True	True	0.792 $\pm$ 0.007	0.941 $\pm$ 0.002	0.236 $\pm$ 0.009
			True	0.796 $\pm$ 0.007	0.940 $\pm$ 0.002	0.239 $\pm$ 0.007
	5	False	False	0.821 $\pm$ 0.002	0.938 $\pm$ 0.002	0.271 $\pm$ 0.003
			False	0.813 $\pm$ 0.002	0.939 $\pm$ 0.003	0.260 $\pm$ 0.007
		True	True	0.821 $\pm$ 0.001	0.937 $\pm$ 0.002	0.273 $\pm$ 0.009
			True	0.817 $\pm$ 0.001	0.938 $\pm$ 0.002	0.268 $\pm$ 0.009
MIMO	1	False	False	0.796 $\pm$ 0.008	0.941 $\pm$ 0.002	0.241 $\pm$ 0.015
			False	0.799 $\pm$ 0.009	0.941 $\pm$ 0.002	0.244 $\pm$ 0.014
		True	True	0.794 $\pm$ 0.009	0.938 $\pm$ 0.002	0.246 $\pm$ 0.016
			True	0.797 $\pm$ 0.010	0.938 $\pm$ 0.001	0.247 $\pm$ 0.018
	5	False	False	0.818 $\pm$ 0.002	0.939 $\pm$ 0.000	0.259 $\pm$ 0.011
			False	0.808 $\pm$ 0.002	0.939 $\pm$ 0.001	0.249 $\pm$ 0.010
		True	True	0.816 $\pm$ 0.004	0.938 $\pm$ 0.001	0.256 $\pm$ 0.010
			True	0.810 $\pm$ 0.004	0.938 $\pm$ 0.001	0.250 $\pm$ 0.008
MCDropout	1	False	False	0.796 $\pm$ 0.009	0.942 $\pm$ 0.001	0.234 $\pm$ 0.017
			False	0.800 $\pm$ 0.010	0.942 $\pm$ 0.002	0.236 $\pm$ 0.017
		True	True	0.798 $\pm$ 0.001	0.939 $\pm$ 0.001	0.250 $\pm$ 0.004
			True	0.802 $\pm$ 0.001	0.940 $\pm$ 0.002	0.253 $\pm$ 0.004
	5	False	False	0.823 $\pm$ 0.002	0.939 $\pm$ 0.001	0.272 $\pm$ 0.010
			False	0.815 $\pm$ 0.002	0.939 $\pm$ 0.001	0.264 $\pm$ 0.007
		True	True	0.822 $\pm$ 0.003	0.938 $\pm$ 0.001	0.276 $\pm$ 0.010
			True	0.818 $\pm$ 0.003	0.938 $\pm$ 0.001	0.271 $\pm$ 0.009
DUE	1	False	False	0.802 $\pm$ 0.001	0.942 $\pm$ 0.001	0.235 $\pm$ 0.001
			False	0.794 $\pm$ 0.001	0.943 $\pm$ 0.001	0.231 $\pm$ 0.005
			True	0.799 $\pm$ 0.002	0.941 $\pm$ 0.002	0.230 $\pm$ 0.002
			True	0.792 $\pm$ 0.002	0.941 $\pm$ 0.002	0.226 $\pm$ 0.003

Table 12: Out-domain results for ResNet18 using measure “Largest”

algorithm	k	calibration	spectral	AUC ( $\uparrow$ )	InAsIn ( $\uparrow$ )	OutAsOut ( $\uparrow$ )
ERM	1	False	False	0.843 $\pm$ 0.002	0.943 $\pm$ 0.003	0.326 $\pm$ 0.003
			False	0.851 $\pm$ 0.003	0.944 $\pm$ 0.003	0.339 $\pm$ 0.003
		True	True	0.842 $\pm$ 0.003	0.943 $\pm$ 0.002	0.327 $\pm$ 0.007
			True	0.851 $\pm$ 0.004	0.943 $\pm$ 0.002	0.340 $\pm$ 0.008
	5	False	False	0.857 $\pm$ 0.001	0.942 $\pm$ 0.003	0.351 $\pm$ 0.004
			False	0.853 $\pm$ 0.001	0.942 $\pm$ 0.003	0.345 $\pm$ 0.007
		True	True	0.857 $\pm$ 0.002	0.940 $\pm$ 0.002	0.357 $\pm$ 0.005
			True	0.855 $\pm$ 0.002	0.940 $\pm$ 0.001	0.353 $\pm$ 0.006
Mixup	1	False	False	0.840 $\pm$ 0.003	0.943 $\pm$ 0.001	0.317 $\pm$ 0.005
			False	0.841 $\pm$ 0.003	0.943 $\pm$ 0.001	0.318 $\pm$ 0.004
		True	True	0.842 $\pm$ 0.005	0.941 $\pm$ 0.002	0.327 $\pm$ 0.014
			True	0.838 $\pm$ 0.005	0.942 $\pm$ 0.001	0.318 $\pm$ 0.014
	5	False	False	0.860 $\pm$ 0.002	0.940 $\pm$ 0.002	0.359 $\pm$ 0.010
			False	0.852 $\pm$ 0.003	0.940 $\pm$ 0.002	0.343 $\pm$ 0.008
		True	True	0.862 $\pm$ 0.001	0.939 $\pm$ 0.001	0.362 $\pm$ 0.003
			True	0.850 $\pm$ 0.001	0.940 $\pm$ 0.001	0.341 $\pm$ 0.005
SoftLabeler	1	False	False	0.828 $\pm$ 0.008	0.942 $\pm$ 0.001	0.300 $\pm$ 0.013
			False	0.824 $\pm$ 0.008	0.942 $\pm$ 0.001	0.296 $\pm$ 0.011
		True	True	0.832 $\pm$ 0.004	0.941 $\pm$ 0.000	0.309 $\pm$ 0.009
			True	0.827 $\pm$ 0.004	0.941 $\pm$ 0.000	0.302 $\pm$ 0.008
	5	False	False	0.854 $\pm$ 0.004	0.940 $\pm$ 0.001	0.337 $\pm$ 0.010
			False	0.841 $\pm$ 0.005	0.941 $\pm$ 0.000	0.313 $\pm$ 0.010
		True	True	0.856 $\pm$ 0.002	0.941 $\pm$ 0.001	0.342 $\pm$ 0.001
			True	0.846 $\pm$ 0.002	0.940 $\pm$ 0.001	0.322 $\pm$ 0.003
DeepAE	1	False	False	0.841 $\pm$ 0.002	0.941 $\pm$ 0.000	0.326 $\pm$ 0.008
			False	0.846 $\pm$ 0.002	0.942 $\pm$ 0.000	0.335 $\pm$ 0.008
		True	True	0.842 $\pm$ 0.001	0.942 $\pm$ 0.002	0.333 $\pm$ 0.001
			True	0.847 $\pm$ 0.002	0.942 $\pm$ 0.002	0.342 $\pm$ 0.004
	5	False	False	0.859 $\pm$ 0.000	0.942 $\pm$ 0.000	0.357 $\pm$ 0.003
			False	0.851 $\pm$ 0.003	0.942 $\pm$ 0.000	0.340 $\pm$ 0.005
		True	True	0.860 $\pm$ 0.001	0.942 $\pm$ 0.003	0.358 $\pm$ 0.005
			True	0.856 $\pm$ 0.001	0.941 $\pm$ 0.003	0.351 $\pm$ 0.006
RND	1	False	False	0.837 $\pm$ 0.002	0.942 $\pm$ 0.002	0.311 $\pm$ 0.005
			False	0.845 $\pm$ 0.002	0.942 $\pm$ 0.001	0.323 $\pm$ 0.004
		True	True	0.835 $\pm$ 0.003	0.943 $\pm$ 0.002	0.316 $\pm$ 0.009
			True	0.842 $\pm$ 0.003	0.943 $\pm$ 0.002	0.327 $\pm$ 0.011
	5	False	False	0.857 $\pm$ 0.002	0.941 $\pm$ 0.001	0.351 $\pm$ 0.007
			False	0.853 $\pm$ 0.001	0.941 $\pm$ 0.001	0.345 $\pm$ 0.003
		True	True	0.854 $\pm$ 0.002	0.940 $\pm$ 0.001	0.348 $\pm$ 0.007
			True	0.852 $\pm$ 0.002	0.940 $\pm$ 0.002	0.346 $\pm$ 0.007
OC	1	False	False	0.839 $\pm$ 0.002	0.940 $\pm$ 0.002	0.325 $\pm$ 0.014
			False	0.847 $\pm$ 0.002	0.939 $\pm$ 0.001	0.339 $\pm$ 0.014
		True	True	0.840 $\pm$ 0.002	0.944 $\pm$ 0.001	0.320 $\pm$ 0.007
			True	0.847 $\pm$ 0.002	0.944 $\pm$ 0.001	0.331 $\pm$ 0.007
	5	False	False	0.856 $\pm$ 0.002	0.941 $\pm$ 0.002	0.352 $\pm$ 0.011
			False	0.853 $\pm$ 0.002	0.942 $\pm$ 0.002	0.346 $\pm$ 0.006
		True	True	0.855 $\pm$ 0.001	0.941 $\pm$ 0.002	0.344 $\pm$ 0.009
			True	0.854 $\pm$ 0.001	0.941 $\pm$ 0.002	0.340 $\pm$ 0.008
MIMO	1	False	False	0.844 $\pm$ 0.002	0.941 $\pm$ 0.002	0.335 $\pm$ 0.001
			False	0.853 $\pm$ 0.002	0.942 $\pm$ 0.002	0.347 $\pm$ 0.001
		True	True	0.844 $\pm$ 0.003	0.942 $\pm$ 0.000	0.340 $\pm$ 0.004
			True	0.853 $\pm$ 0.003	0.942 $\pm$ 0.001	0.354 $\pm$ 0.008
	5	False	False	0.852 $\pm$ 0.001	0.939 $\pm$ 0.002	0.341 $\pm$ 0.005
			False	0.843 $\pm$ 0.003	0.938 $\pm$ 0.002	0.325 $\pm$ 0.005
		True	True	0.854 $\pm$ 0.002	0.939 $\pm$ 0.001	0.344 $\pm$ 0.007
			True	0.848 $\pm$ 0.002	0.939 $\pm$ 0.002	0.333 $\pm$ 0.008
MCDropout	1	False	False	0.843 $\pm$ 0.001	0.942 $\pm$ 0.002	0.329 $\pm$ 0.004
			False	0.850 $\pm$ 0.001	0.942 $\pm$ 0.002	0.339 $\pm$ 0.004
		True	True	0.843 $\pm$ 0.005	0.942 $\pm$ 0.001	0.333 $\pm$ 0.006
			True	0.851 $\pm$ 0.005	0.942 $\pm$ 0.000	0.346 $\pm$ 0.007
	5	False	False	0.857 $\pm$ 0.001	0.942 $\pm$ 0.002	0.350 $\pm$ 0.002
			False	0.851 $\pm$ 0.003	0.942 $\pm$ 0.002	0.341 $\pm$ 0.006
		True	True	0.857 $\pm$ 0.002	0.942 $\pm$ 0.002	0.350 $\pm$ 0.007
			True	0.856 $\pm$ 0.002	0.942 $\pm$ 0.002	0.347 $\pm$ 0.007
DUE	1	False	False	0.542 $\pm$ 0.006	0.951 $\pm$ 0.001	0.043 $\pm$ 0.002
			False	0.539 $\pm$ 0.006	0.951 $\pm$ 0.001	0.042 $\pm$ 0.001
			True	0.821 $\pm$ 0.000	0.942 $\pm$ 0.000	0.274 $\pm$ 0.000
			True	0.815 $\pm$ 0.000	0.944 $\pm$ 0.000	0.263 $\pm$ 0.000

Table 13: Out-domain results for ResNet50 using measure “Largest”

algorithm	k	calibration	spectral	AUC ( $\uparrow$ )	InAsIn ( $\uparrow$ )	OutAsOut ( $\uparrow$ )
ERM	5	False True	False	$0.788 \pm 0.006$	$0.940 \pm 0.000$	$0.137 \pm 0.001$
			False	$0.788 \pm 0.006$	$0.940 \pm 0.000$	$0.137 \pm 0.001$
			True	$0.792 \pm 0.004$	$0.950 \pm 0.006$	$0.137 \pm 0.002$
			True	$0.792 \pm 0.004$	$0.950 \pm 0.006$	$0.137 \pm 0.002$
Mixup	1	False True	False	$0.438 \pm 0.007$	$0.943 \pm 0.005$	$0.041 \pm 0.001$
			False	$0.528 \pm 0.002$	$0.961 \pm 0.005$	$0.049 \pm 0.002$
			True	$0.475 \pm 0.002$	$0.948 \pm 0.005$	$0.046 \pm 0.006$
			True	$0.471 \pm 0.004$	$0.948 \pm 0.006$	$0.059 \pm 0.002$
	5	False True	False	$0.781 \pm 0.000$	$0.935 \pm 0.000$	$0.135 \pm 0.000$
			False	$0.781 \pm 0.000$	$0.935 \pm 0.000$	$0.135 \pm 0.000$
			True	$0.776 \pm 0.000$	$0.943 \pm 0.000$	$0.114 \pm 0.000$
			True	$0.776 \pm 0.000$	$0.943 \pm 0.000$	$0.114 \pm 0.000$
SoftLabeler	1	False True	False	$0.774 \pm 0.006$	$0.941 \pm 0.001$	$0.233 \pm 0.010$
			False	$0.740 \pm 0.005$	$0.941 \pm 0.001$	$0.231 \pm 0.009$
			True	$0.774 \pm 0.015$	$0.939 \pm 0.001$	$0.236 \pm 0.011$
			True	$0.740 \pm 0.015$	$0.939 \pm 0.001$	$0.235 \pm 0.009$
	5	False True	False	$0.763 \pm 0.000$	$0.933 \pm 0.000$	$0.120 \pm 0.000$
			False	$0.763 \pm 0.000$	$0.933 \pm 0.000$	$0.120 \pm 0.000$
			True	$0.775 \pm 0.000$	$0.942 \pm 0.000$	$0.143 \pm 0.000$
			True	$0.775 \pm 0.000$	$0.942 \pm 0.000$	$0.143 \pm 0.000$
DeepAE	1	False True	False	$0.373 \pm 0.003$	$0.958 \pm 0.002$	$0.006 \pm 0.000$
			False	$0.373 \pm 0.003$	$0.958 \pm 0.002$	$0.006 \pm 0.000$
			True	$0.372 \pm 0.019$	$0.958 \pm 0.001$	$0.008 \pm 0.003$
			True	$0.372 \pm 0.019$	$0.958 \pm 0.001$	$0.008 \pm 0.003$
RND	1	False True	False	$0.411 \pm 0.014$	$0.957 \pm 0.002$	$0.018 \pm 0.007$
			False	$0.411 \pm 0.014$	$0.957 \pm 0.002$	$0.018 \pm 0.007$
			True	$0.405 \pm 0.008$	$0.958 \pm 0.001$	$0.012 \pm 0.001$
			True	$0.405 \pm 0.008$	$0.958 \pm 0.001$	$0.012 \pm 0.001$
	5	False True	False	$0.792 \pm 0.005$	$0.946 \pm 0.002$	$0.133 \pm 0.013$
			False	$0.792 \pm 0.005$	$0.946 \pm 0.002$	$0.133 \pm 0.013$
			True	$0.791 \pm 0.001$	$0.943 \pm 0.003$	$0.138 \pm 0.005$
			True	$0.791 \pm 0.001$	$0.943 \pm 0.003$	$0.138 \pm 0.005$
OC	1	False True	False	$0.500 \pm 0.000$	$1.000 \pm 0.000$	$0.000 \pm 0.000$
			False	$0.500 \pm 0.000$	$1.000 \pm 0.000$	$0.000 \pm 0.000$
			True	$0.500 \pm 0.000$	$1.000 \pm 0.000$	$0.000 \pm 0.000$
			True	$0.500 \pm 0.000$	$1.000 \pm 0.000$	$0.000 \pm 0.000$
	5	False True	False	$0.783 \pm 0.000$	$0.936 \pm 0.001$	$0.145 \pm 0.008$
			False	$0.783 \pm 0.000$	$0.936 \pm 0.001$	$0.145 \pm 0.008$
			True	$0.784 \pm 0.008$	$0.943 \pm 0.002$	$0.146 \pm 0.008$
			True	$0.784 \pm 0.008$	$0.943 \pm 0.002$	$0.146 \pm 0.008$
MIMO	5	False True	False	$0.762 \pm 0.000$	$0.948 \pm 0.000$	$0.093 \pm 0.000$
			False	$0.762 \pm 0.000$	$0.948 \pm 0.000$	$0.093 \pm 0.000$
			True	$0.772 \pm 0.000$	$0.946 \pm 0.000$	$0.096 \pm 0.000$
			True	$0.772 \pm 0.000$	$0.946 \pm 0.000$	$0.096 \pm 0.000$
MCDropout	1	False True	False	$0.520 \pm 0.002$	$0.961 \pm 0.001$	$0.097 \pm 0.003$
			False	$0.520 \pm 0.002$	$0.961 \pm 0.001$	$0.097 \pm 0.003$
			True	$0.516 \pm 0.002$	$0.960 \pm 0.002$	$0.095 \pm 0.002$
			True	$0.516 \pm 0.002$	$0.960 \pm 0.002$	$0.095 \pm 0.002$
	5	False True	False	$0.794 \pm 0.000$	$0.945 \pm 0.000$	$0.127 \pm 0.000$
			False	$0.794 \pm 0.000$	$0.945 \pm 0.000$	$0.127 \pm 0.000$
			True	$0.785 \pm 0.000$	$0.951 \pm 0.000$	$0.124 \pm 0.000$
			True	$0.785 \pm 0.000$	$0.951 \pm 0.000$	$0.124 \pm 0.000$
DUE	1	False True	False	$0.824 \pm 0.002$	$0.942 \pm 0.003$	$0.248 \pm 0.003$
			False	$0.824 \pm 0.002$	$0.942 \pm 0.003$	$0.247 \pm 0.003$
			True	$0.822 \pm 0.002$	$0.941 \pm 0.002$	$0.243 \pm 0.003$
			True	$0.822 \pm 0.002$	$0.941 \pm 0.002$	$0.242 \pm 0.004$

Table 14: Out-domain results for ResNet18 using measure “Native”

algorithm	k	calibration	spectral	AUC ( $\uparrow$ )	InAsIn ( $\uparrow$ )	OutAsOut ( $\uparrow$ )
Mixup	1	False True	False	$0.459 \pm 0.001$	$0.930 \pm 0.001$	$0.050 \pm 0.002$
			False	$0.445 \pm 0.001$	$0.951 \pm 0.003$	$0.037 \pm 0.001$
			True	$0.456 \pm 0.002$	$0.936 \pm 0.000$	$0.049 \pm 0.002$
			True	$0.467 \pm 0.013$	$0.956 \pm 0.005$	$0.044 \pm 0.002$
SoftLabeler	1	False True	False	$0.815 \pm 0.009$	$0.942 \pm 0.001$	$0.300 \pm 0.013$
			False	$0.771 \pm 0.012$	$0.942 \pm 0.001$	$0.296 \pm 0.011$
			True	$0.820 \pm 0.005$	$0.941 \pm 0.000$	$0.309 \pm 0.009$
			True	$0.775 \pm 0.006$	$0.941 \pm 0.000$	$0.302 \pm 0.008$
DeepAE	1	False True	False	$0.376 \pm 0.017$	$0.956 \pm 0.001$	$0.004 \pm 0.001$
			False	$0.376 \pm 0.017$	$0.956 \pm 0.001$	$0.004 \pm 0.001$
			True	$0.371 \pm 0.005$	$0.956 \pm 0.000$	$0.005 \pm 0.001$
			True	$0.371 \pm 0.005$	$0.956 \pm 0.000$	$0.005 \pm 0.001$
RND	1	False True	False	$0.496 \pm 0.004$	$0.957 \pm 0.002$	$0.023 \pm 0.002$
			False	$0.496 \pm 0.004$	$0.957 \pm 0.002$	$0.023 \pm 0.002$
			True	$0.441 \pm 0.047$	$0.956 \pm 0.001$	$0.021 \pm 0.012$
			True	$0.441 \pm 0.047$	$0.956 \pm 0.001$	$0.021 \pm 0.012$
OC	1	False True	False	$0.500 \pm 0.000$	$1.000 \pm 0.000$	$0.000 \pm 0.000$
			False	$0.500 \pm 0.000$	$1.000 \pm 0.000$	$0.000 \pm 0.000$
			True	$0.500 \pm 0.000$	$1.000 \pm 0.000$	$0.000 \pm 0.000$
			True	$0.500 \pm 0.000$	$1.000 \pm 0.000$	$0.000 \pm 0.000$
MCDropout	1	False True	False	$0.523 \pm 0.001$	$0.969 \pm 0.000$	$0.094 \pm 0.000$
			False	$0.523 \pm 0.001$	$0.969 \pm 0.000$	$0.094 \pm 0.000$
			True	$0.522 \pm 0.002$	$0.968 \pm 0.002$	$0.095 \pm 0.002$
			True	$0.522 \pm 0.002$	$0.968 \pm 0.002$	$0.095 \pm 0.002$
DUE	1	False True	False	$0.553 \pm 0.008$	$0.950 \pm 0.001$	$0.038 \pm 0.002$
			False	$0.553 \pm 0.008$	$0.950 \pm 0.000$	$0.038 \pm 0.002$
			True	$0.840 \pm 0.000$	$0.942 \pm 0.000$	$0.286 \pm 0.000$
			True	$0.839 \pm 0.000$	$0.942 \pm 0.000$	$0.286 \pm 0.000$

Table 15: Out-domain results for ResNet50 using measure “Native”

## C HYPER-PARAMETER GRIDS

Algorithm	Hyper-parameter	Default value	Random search distribution
all	learning rate	0.1	$10^{\text{Uniform}(-2, -0.3)}$
	momentum	0.9	$\text{Choice}([0.5, 0.9, 0.99])$
	weight decay	$10^{-4}$	$10^{\text{Uniform}(-5, -3)}$
Mixup	mixing parameter	0.3	$\text{Choice}([0.1, 0.2, 0.3, 1, 2])$
MC-Dropout	dropout rate	0.05	$\text{Choice}([0.05, 0.1, 0.2])$
	number of passes	10	$\text{Choice}([10])$
MIMO	number of subnetworks	2	$\text{RandInt}(2, 5)$
	prob. input repetition	0.6	$\text{Uniform}(0, 1)$
	batch repetition	2	$\text{RandInt}(1, 5)$
RND, OC, DeepAE	teacher width	128	$\text{Choice}([64, 128, 256])$
	teacher depth	3	$\text{Choice}([2, 3, 4])$
	regularization	0	$10^{\text{Uniform}(-2, 1)}$
Soft labeler	soft label value	128	$\text{Choice}([0.7, 0.8, 0.9])$

### C.1 RELATIONSHIP BETWEEN VALIDATION SET NEGATIVE LOG-LIKELIHOOD AND OUT-OF-DOMAIN MEASURES

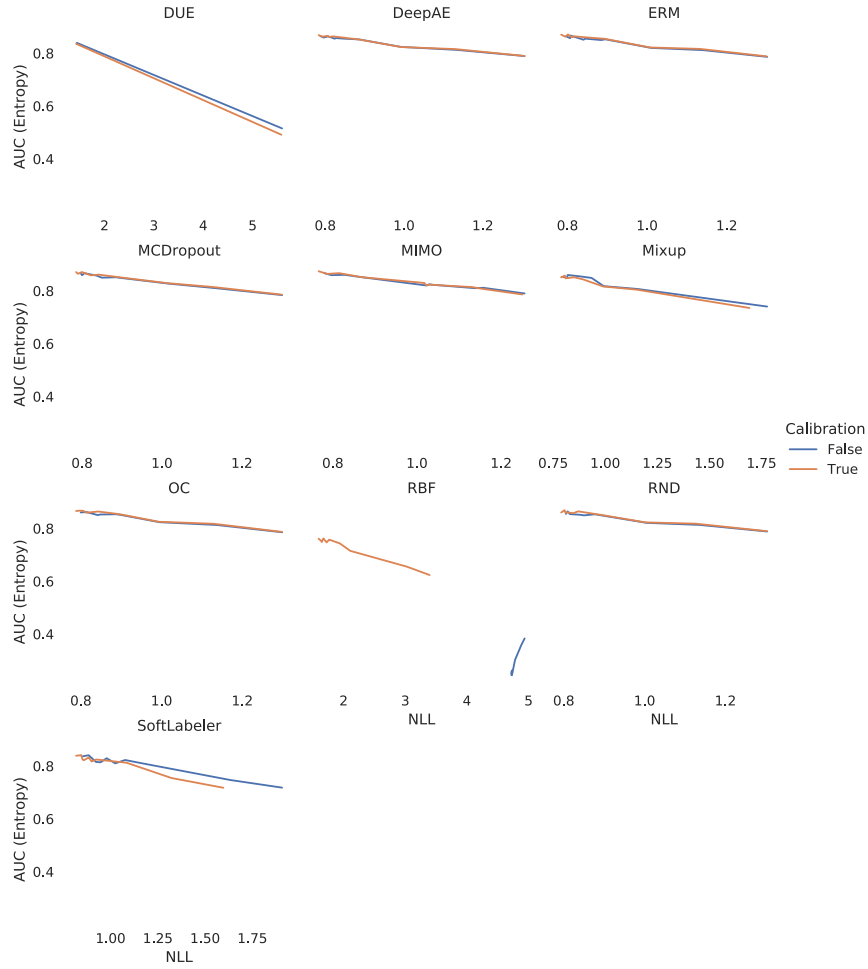


Figure 1: AUC metric on the out-of-domain test set as a function of the in-domain validation set negative likelihoods for each model and hyper-parameter samples trained.

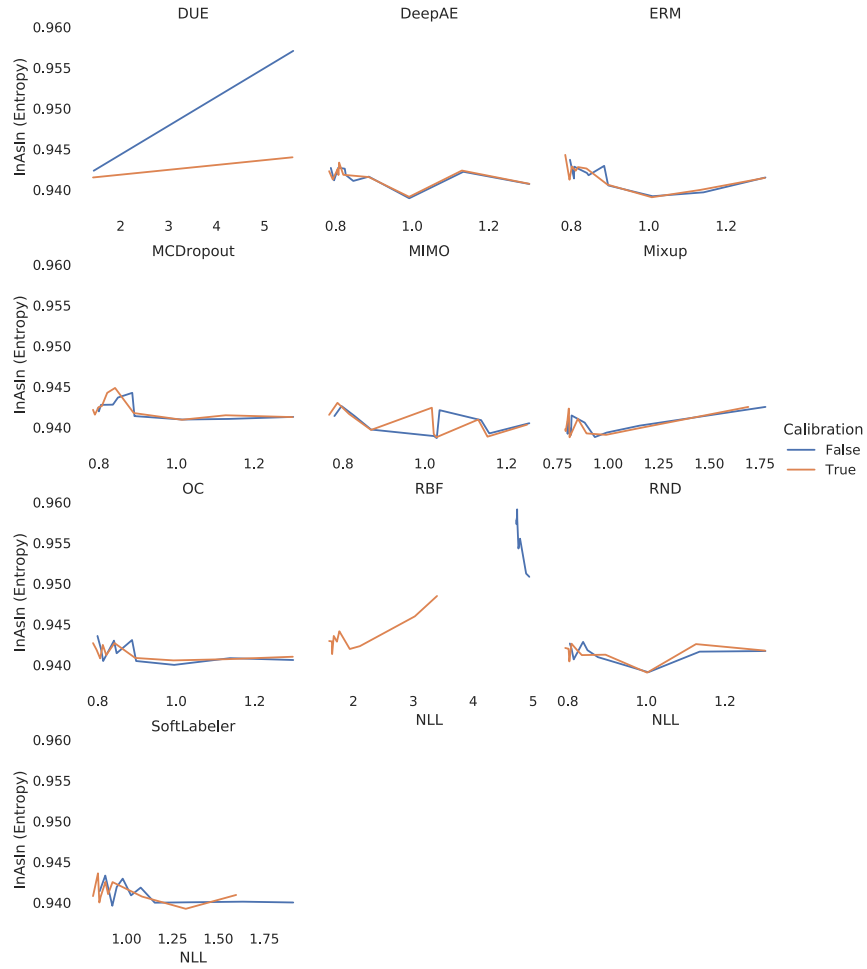


Figure 2: InAsIn metric on the out-of-domain test set as a function of the in-domain validation set negative likelihoods for each model and hyper-parameter samples trained.

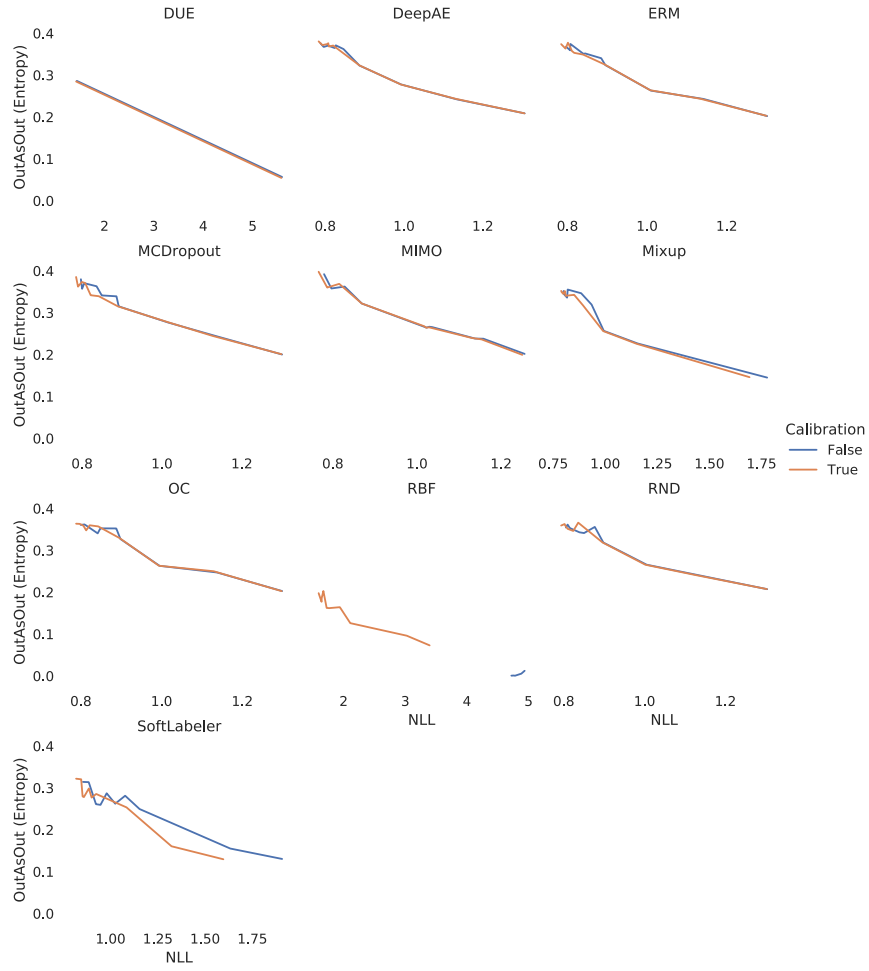


Figure 3: OutAsOut metric on the out-of-domain test set as a function of the in-domain validation set negative likelihoods for each model and hyper-parameter samples trained.



## D IMAGENOT DATASET

ImageNot is a class partition of the ImageNet ILSVRC2012 dataset (Russakovsky et al., 2015).

### D.1 IN-DOMAIN CLASSES

n02666196 abacus  
 n02669723 academic gown, academic robe, judge's robe  
 n02672831 accordion, piano accordion, squeeze box  
 n02690373 airliner  
 n02699494 altar  
 n02776631 bakery, bakeshop, bakehouse  
 n02783161 ballpoint, ballpoint pen, ballpen, Biro  
 n02786058 Band Aid  
 n02791124 barber chair  
 n02793495 barn  
 n02794156 barometer  
 n02797295 barrow, garden cart, lawn cart, wheelbarrow  
 n02799071 baseball  
 n02804610 bassoon  
 n02808304 bath towel  
 n02808440 bathtub, bathing tub, bath, tub  
 n02814860 beacon, lighthouse, beacon light, pharos  
 n02817516 bearskin, busby, shako  
 n02834397 bib  
 n02835271 bicycle-built-for-two, tandem bicycle, tandem  
 n02837789 bikini, two-piece  
 n02840245 binder, ring-binder  
 n02859443 boathouse  
 n02860847 bobsled, bobsleigh, bob  
 n02869837 bonnet, poke bonnet  
 n02871525 bookshop, bookstore, bookstall  
 n02877765 bottlecap  
 n02883205 bow tie, bow-tie, bowtie  
 n02892767 brassiere, bra, bandeau  
 n02894605 breakwater, groin, groyne, mole, bulwark, seawall, jetty  
 n02895154 breastplate, aegis, egis  
 n02909870 bucket, pail  
 n02927161 butcher shop, meat market  
 n02951358 canoe  
 n02951585 can opener, tin opener  
 n02966687 carpenter's kit, tool kit  
 n02974003 car wheel  
 n02977058 cash machine, cash dispenser, automated teller machine, ATM  
 n02979186 cassette player  
 n02980441 castle  
 n02981792 catamaran  
 n02992211 cello, violoncello  
 n03000684 chain saw, chainsaw  
 n03026506 Christmas stocking  
 n03028079 church, church building  
 n03032252 cinema, movie theater, movie theatre, movie house, picture palace  
 n03042490 cliff dwelling  
 n03045698 cloak  
 n03063599 coffee mug  
 n03075370 combination lock  
 n03085013 computer keyboard, keypad  
 n03095699 container ship, containership, container vessel  
 n03124170 cowboy hat, ten-gallon hat  
 n03127747 crash helmet  
 n03127925 crate  
 n03131574 crib, cot  
 n03160309 dam, dike, dyke  
 n03180011 desktop computer  
 n03187595 dial telephone, dial phone  
 n03201208 dining table, board  
 n03207743 dishrag, dishcloth  
 n03207941 dishwasher, dish washer, dishwashing machine  
 n03216828 dock, dockage, docking facility  
 n03223299 doormat, welcome mat  
 n03240683 drilling platform, offshore rig  
 n03249569 drum, membranophone, tympan  
 n03272010 electric guitar  
 n03272562 electric locomotive  
 n03290653 entertainment center  
 n03291819 envelope  
 n03325584 feather boa, boa  
 n03337140 file, file cabinet, filing cabinet  
 n03344393 fireboat  
 n03347037 fire screen, fireguard  
 n03372029 flute, transverse flute  
 n03384352 forklift  
 n03388549 four-poster  
 n03393912 freight car  
 n03394916 French horn, horn  
 n03417042 garbage truck, dustcart  
 n03425413 gas pump, gasoline pump, petrol pump, island dispenser  
 n03445777 golf ball  
 n03445924 golfcart, golf cart

n03447721 gong, tam-tam  
 n03452741 grand piano, grand  
 n03459775 grille, radiator grille  
 n03461385 grocery store, grocery, food market, market  
 n03467068 guillotine  
 n03478589 half track  
 n03481172 hammer  
 n03482405 hamper  
 n03495258 harp  
 n03496892 harvester, reaper  
 n03498962 hatchet  
 n03527444 holster  
 n03534580 hoopskirt, crinoline  
 n03535780 horizontal bar, high bar  
 n03584254 iPod  
 n03590841 jack-o'-lantern  
 n03594734 jean, blue jean, denim  
 n03594945 jeep, landrover  
 n03627232 knot  
 n03633091 ladle  
 n03657121 lens cap, lens cover  
 n03661043 library  
 n03670208 limousine, limo  
 n03680355 Loafer  
 n03690938 lotion  
 n03706229 magnetic compass  
 n03709823 mailbag, postbag  
 n03710193 mailbox, letter box  
 n03710721 maillot, tank suit  
 n03717622 manhole cover  
 n03720891 maraca  
 n03721384 marimba, xylophone  
 n03729826 matchstick  
 n03733281 maze, labyrinth  
 n03733805 measuring cup  
 n03742115 medicine chest, medicine cabinet  
 n03743016 megalith, megalithic structure  
 n03759954 microphone, mike  
 n03761084 microwave, microwave oven  
 n03763968 military uniform  
 n03769881 minibus  
 n03773504 missile  
 n03775071 mitten  
 n03775546 mixing bowl  
 n03777568 Model T  
 n03781244 monastery  
 n03782006 monitor  
 n03785016 moped  
 n03786901 mortar  
 n03787032 mortarboard  
 n03788365 mosquito net  
 n03791053 motor scooter, scooter  
 n03793489 mouse, computer mouse  
 n03794056 mousetrap  
 n03803284 muzzle  
 n03814639 neck brace  
 n03841143 odometer, hodometer, mileometer, milometer  
 n03843555 oil filter  
 n03857828 oscilloscope, scope, cathode-ray oscilloscope, CRO  
 n03866082 overskirt  
 n03868863 oxygen mask  
 n03874293 paddlewheel, paddle wheel  
 n03874599 padlock  
 n03877845 palace  
 n03884397 panpipe, pandean pipe, syrinx  
 n03887697 paper towel  
 n03891332 parking meter  
 n03895866 passenger car, coach, carriage  
 n03903868 pedestal, plinth, footstall  
 n03920288 Petri dish  
 n03924679 photocopier  
 n03930313 picket fence, paling  
 n03933933 pier  
 n03938244 pillow  
 n03947888 pirate, pirate ship  
 n03950228 pitcher, ewer  
 n03956157 planetarium  
 n03958227 plastic bag  
 n03967562 plow, plough  
 n03976657 pole  
 n03982430 pool table, billiard table, snooker table  
 n03983396 pop bottle, soda bottle  
 n03995372 power drill  
 n04004767 printer  
 n04008634 projectile, missile  
 n04019541 puck, hockey puck  
 n04023962 punching bag, punch bag, punching ball, punchball  
 n04033995 quilt, comforter, comfort, puff  
 n04037443 racer, race car, racing car  
 n04039381 racket, racquet  
 n04041544 radio, wireless  
 n04065272 recreational vehicle, RV, R.V.

n04067472 reel  
 n04070727 refrigerator , icebox  
 n04081281 restaurant , eating house , eating place , eatery  
 n04086273 revolver , six-gun , six-shooter  
 n04090263 rifle  
 n04118776 rule , ruler  
 n04131690 saltshaker , salt shaker  
 n04141327 scabbard  
 n04146614 school bus  
 n04153751 screw  
 n04154565 screwdriver  
 n04162706 seat belt , seatbelt  
 n04179913 sewing machine  
 n04192698 shield , buckler  
 n04201297 shoji  
 n04208210 shovel  
 n04209133 shower cap  
 n04228054 ski  
 n04235860 sleeping bag  
 n04238763 slide rule , slipstick  
 n04243546 slot , one-armed bandit  
 n04254120 soap dispenser  
 n04254777 sock  
 n04258138 solar dish , solar collector , solar furnace  
 n04259630 sombrero  
 n04264628 space bar  
 n04266014 space shuttle  
 n04270147 spatula  
 n04273569 speedboat  
 n04286575 spotlight , spot  
 n04311004 steel arch bridge  
 n04311174 steel drum  
 n04317175 stethoscope  
 n04325704 stole  
 n04326547 stone wall  
 n04330267 stove  
 n04332243 strainer  
 n04346328 stupa , tope  
 n04347754 submarine , pigboat , sub , U-boat  
 n04355933 sunglasses  
 n04356056 sunglasses , dark glasses , shades  
 n04357314 sunscreen , sunblock , sun blocker  
 n04371430 swimming trunks , bathing trunks  
 n04371774 swing  
 n04372370 switch , electric switch , electrical switch  
 n04376876 syringe  
 n04399382 teddy , teddy bear  
 n04404412 television , television system  
 n04409515 tennis ball  
 n04418357 theater curtain , theatre curtain  
 n04447861 toilet seat  
 n04456115 torch  
 n04458633 totem pole  
 n04462240 toyshop  
 n04465501 tractor  
 n04476259 tray  
 n04482393 tricycle , trike , velocipede  
 n04485082 tripod  
 n04487394 trombone  
 n04501370 turnstile  
 n04517823 vacuum , vacuum cleaner  
 n04522168 vase  
 n04525038 velvet  
 n04525305 vending machine  
 n04540053 volleyball  
 n04548280 wall clock  
 n04548362 wallet , billfold , notecase , pocketbook  
 n04550184 wardrobe , closet , press  
 n04552348 warplane , military plane  
 n04553703 washbasin , handbasin , washbowl , lavabo , wash-hand basin  
 n04560804 water jug  
 n04579145 whiskey jug  
 n04584207 wig  
 n04590129 window shade  
 n04591157 Windsor tie  
 n04591713 wine bottle  
 n04592741 wing  
 n04604644 worm fence , snake fence , snake-rail fence , Virginia fence  
 n04612504 yawl  
 n04613696 yurt  
 n06359193 web site , website , internet site , site  
 n07802026 hay  
 n07930864 cup  
 n09193705 alp  
 n09246464 cliff , drop , drop-off  
 n09288635 geyser  
 n09332890 lakeside , lakeshore  
 n09421951 sandbar , sand bar  
 n09472597 volcano  
 n10148035 groom , bridegroom  
 n15075141 toilet tissue , toilet paper , bathroom tissue

## D.2 OUT-DOMAIN CLASSES

n01440764 tench, *Tinca tinca*  
 n01443537 goldfish, *Carassius auratus*  
 n01484850 great white shark, white shark, man-eater, man-eating shark, *Carcharodon carcharias*  
 n01491361 tiger shark, *Galeocerdo cuvieri*  
 n01494475 hammerhead, hammerhead shark  
 n01496331 electric ray, crampfish, numbfish, torpedo  
 n01498041 stingray  
 n01514668 cock  
 n01514859 hen  
 n01518878 ostrich, *Struthio camelus*  
 n01530575 brambling, *Fringilla montifringilla*  
 n01531178 goldfinch, *Carduelis carduelis*  
 n01532829 house finch, linnet, *Carpodacus mexicanus*  
 n01534433 junco, snowbird  
 n01537544 indigo bunting, indigo finch, indigo bird, *Passerina cyanea*  
 n01558993 robin, American robin, *Turdus migratorius*  
 n01560419 bulbul  
 n01580077 jay  
 n01582220 magpie  
 n01592084 chickadee  
 n01601694 water ouzel, dipper  
 n01608432 kite  
 n01614925 bald eagle, American eagle, *Haliaeetus leucocephalus*  
 n01616318 vulture  
 n01622779 great grey owl, great gray owl, *Strix nebulosa*  
 n01629819 European fire salamander, *Salamandra salamandra*  
 n01630670 common newt, *Triturus vulgaris*  
 n01631663 eft  
 n01632458 spotted salamander, *Ambystoma maculatum*  
 n01632777 axolotl, mud puppy, *Ambystoma mexicanum*  
 n01641577 bullfrog, *Rana catesbeiana*  
 n01644373 tree frog, tree-frog  
 n01644900 tailed frog, bell toad, ribbed toad, tailed toad, *Ascaphus trui*  
 n01664065 loggerhead, loggerhead turtle, *Caretta caretta*  
 n01665541 leatherback turtle, leatherback, leathery turtle, *Dermochelys coriacea*  
 n01667114 mud turtle  
 n01667778 terrapin  
 n01669191 box turtle, box tortoise  
 n01675722 banded gecko  
 n01677366 common iguana, iguana, *Iguana iguana*  
 n01682714 American chameleon, anole, *Anolis carolinensis*  
 n01685808 whiptail, whiptail lizard  
 n01687978 agama  
 n01688243 frilled lizard, *Chlamydosaurus kingi*  
 n01689811 alligator lizard  
 n01692333 Gila monster, *Heloderma suspectum*  
 n01693334 green lizard, *Lacerta viridis*  
 n01694178 African chameleon, *Chamaeleo chamaeleon*  
 n01695060 Komodo dragon, Komodo lizard, dragon lizard, giant lizard, *Varanus komodoensis*  
 n01697457 African crocodile, Nile crocodile, *Crocodylus niloticus*  
 n01698640 American alligator, *Alligator mississippiensis*  
 n01704323 triceratops  
 n01728572 thunder snake, worm snake, *Carphophis amoenus*  
 n01728920 ringneck snake, ring-necked snake, ring snake  
 n01729322 hognose snake, puff adder, sand viper  
 n01729977 green snake, grass snake  
 n01734418 king snake, kingsnake  
 n01735189 garter snake, grass snake  
 n01737021 water snake  
 n01739381 vine snake  
 n01740131 night snake, *Hypsiglena torquata*  
 n01742172 boa constrictor, *Constrictor constrictor*  
 n01744401 rock python, rock snake, *Python sebae*  
 n01748264 Indian cobra, *Naja naja*  
 n01749939 green mamba  
 n01751748 sea snake  
 n01753488 horned viper, cerastes, sand viper, horned asp, *Cerastes cornutus*  
 n01755581 diamondback, diamondback rattlesnake, *Crotalus adamanteus*  
 n01756291 sidewinder, horned rattlesnake, *Crotalus cerastes*  
 n01768244 trilobite  
 n01770081 harvestman, daddy longlegs, *Phalangium opilio*  
 n01770393 scorpion  
 n01773157 black and gold garden spider, *Argiope aurantia*  
 n01773549 barn spider, *Araneus cavaticus*  
 n01773797 garden spider, *Aranea diademata*  
 n01774384 black widow, *Latrodectus mactans*  
 n01774750 tarantula  
 n01775062 wolf spider, hunting spider  
 n01776313 tick  
 n01784675 centipede  
 n01795545 black grouse  
 n01796340 ptarmigan  
 n01797886 ruffed grouse, partridge, *Bonasa umbellus*  
 n01798484 prairie chicken, prairie grouse, prairie fowl  
 n01806143 peacock  
 n01806567 quail  
 n01807496 partridge  
 n01817953 African grey, African gray, *Psittacus erithacus*  
 n01818515 macaw  
 n01819313 sulphur-crested cockatoo, *Kakatoe galerita*, *Cacatua galerita*

n01820546 lorikeet  
 n01824575 coucal  
 n01828970 bee eater  
 n01829413 hornbill  
 n01833805 hummingbird  
 n01843065 jacamar  
 n01843383 toucan  
 n01847000 drake  
 n01855032 red-breasted merganser, *Mergus serrator*  
 n01855672 goose  
 n01860187 black swan, *Cygnus atratus*  
 n01871265 tusker  
 n01872401 echidna, spiny anteater, anteater  
 n01873310 platypus, duckbill, duckbilled platypus, duck-billed platypus, *Ornithorhynchus anatinus*  
 n01877812 wallaby, brush kangaroo  
 n01882714 koala, koala bear, kangaroo bear, native bear, *Phascolarctos cinereus*  
 n01883070 wombat  
 n01910747 jellyfish  
 n01914609 sea anemone, anemone  
 n01917289 brain coral  
 n01924916 flatworm, platyhelminth  
 n01930112 nematode, nematode worm, roundworm  
 n01943899 conch  
 n01944390 snail  
 n01945685 slug  
 n01950731 sea slug, nudibranch  
 n01955084 chiton, coat-of-mail shell, sea cradle, polyplacophore  
 n01968897 chambered nautilus, pearly nautilus, nautilus  
 n01978287 Dungeness crab, Cancer magister  
 n01978455 rock crab, *Cancer irroratus*  
 n01980166 fiddler crab  
 n01981276 king crab, Alaska crab, Alaskan king crab, Alaska king crab, *Paralithodes camtschatica*  
 n01983481 American lobster, Northern lobster, Maine lobster, *Homarus americanus*  
 n01984695 spiny lobster, langouste, rock lobster, crawfish, crayfish, sea crawfish  
 n01985128 crayfish, crawfish, crawdad, crawdaddy  
 n01986214 hermit crab  
 n01990800 isopod  
 n02002556 white stork, *Ciconia ciconia*  
 n02002724 black stork, *Ciconia nigra*  
 n02006656 spoonbill  
 n02007558 flamingo  
 n02009229 little blue heron, *Egretta caerulea*  
 n02009912 American egret, great white heron, *Egretta albus*  
 n02011460 bittern  
 None  
 n02013706 limpkin, *Aramus pictus*  
 n02017213 European gallinule, *Porphyrio porphyrio*  
 n02018207 American coot, marsh hen, mud hen, water hen, *Fulica americana*  
 n02018795 bustard  
 n02025239 ruddy turnstone, *Arenaria interpres*  
 n02027492 red-backed sandpiper, dunlin, *Erolia alpina*  
 n02028035 redshank, *Tringa totanus*  
 n02033041 dowitcher  
 n02037110 oystercatcher, oyster catcher  
 n02051845 pelican  
 n02056570 king penguin, *Aptenodytes patagonica*  
 n02058221 albatross, mollymawk  
 n02066245 grey whale, gray whale, devilfish, *Eschrichtius gibbosus*, *Eschrichtius robustus*  
 n02071294 killer whale, killer, orca, grampus, sea wolf, *Orcinus orca*  
 n02074367 dugong, *Dugong dugon*  
 n02077923 sea lion  
 n02085620 Chihuahua  
 n02085782 Japanese spaniel  
 n02085936 Maltese dog, Maltese terrier, Maltese  
 n02086079 Pekinese, Pekingese, Peke  
 n02086240 Shih-Tzu  
 n02086646 Blenheim spaniel  
 n02086910 papillon  
 n02087046 toy terrier  
 n02087394 Rhodesian ridgeback  
 n02088094 Afghan hound, Afghan  
 n02088238 basset, basset hound  
 n02088364 beagle  
 n02088466 bloodhound, sleuthhound  
 n02088632 bluetick  
 n02089078 black-and-tan coonhound  
 n02089867 Walker hound, Walker foxhound  
 n02089973 English foxhound  
 n02090379 redbone  
 n02090622 borzoi, Russian wolfhound  
 n02090721 Irish wolfhound  
 n02091032 Italian greyhound  
 n02091134 whippet  
 n02091244 Ibizan hound, Ibizan Podenco  
 n02091467 Norwegian elkhound, elkhound  
 n02091635 otterhound, otter hound  
 n02091831 Saluki, gazelle hound  
 n02092002 Scottish deerhound, deerhound  
 n02092339 Weimaraner  
 n02093256 Staffordshire bullterrier, Staffordshire bull terrier  
 n02093428 American Staffordshire terrier, pit bull terrier  
 n02093647 Bedlington terrier

n02093754 Border terrier  
 n02093859 Kerry blue terrier  
 n02093991 Irish terrier  
 n02094114 Norfolk terrier  
 n02094258 Norwich terrier  
 n02094433 Yorkshire terrier  
 n02095314 wire-haired fox terrier  
 n02095570 Lakeland terrier  
 n02095889 Sealyham terrier, Sealyham  
 n02096051 Airedale, Airedale terrier  
 n02096177 cairn, cairn terrier  
 n02096294 Australian terrier  
 n02096437 Dandie Dinmont, Dandie Dinmont terrier  
 n02096585 Boston bull, Boston terrier  
 n02097047 miniature schnauzer  
 n02097130 giant schnauzer  
 n02097209 standard schnauzer  
 n02097298 Scotch terrier, Scottish terrier, Scottie  
 n02097474 Tibetan terrier, chrysanthemum dog  
 n02097658 silky terrier, Sydney silky  
 n02098105 soft-coated wheaten terrier  
 n02098286 West Highland white terrier  
 n02098413 Lhasa, Lhasa apso  
 n02099267 flat-coated retriever  
 n02099429 curly-coated retriever  
 n02099601 golden retriever  
 n02099712 Labrador retriever  
 n02099849 Chesapeake Bay retriever  
 n02100236 German short-haired pointer  
 n02100583 vizsla, Hungarian pointer  
 n02100735 English setter  
 n02100877 Irish setter, red setter  
 n02101006 Gordon setter  
 n02101388 Brittany spaniel  
 n02101556 clumber, clumber spaniel  
 n02102040 English springer, English springer spaniel  
 n02102177 Welsh springer spaniel  
 n02102318 cocker spaniel, English cocker spaniel, cocker  
 n02102480 Sussex spaniel  
 n02102973 Irish water spaniel  
 n02104029 kuvasz  
 n02104365 schipperke  
 n02105056 groenendael  
 n02105162 malinois  
 n02105251 briard  
 n02105412 kelpie  
 n02105505 komondor  
 n02105641 Old English sheepdog, bobtail  
 n02105855 Shetland sheepdog, Shetland sheep dog, Shetland  
 n02106030 collie  
 n02106166 Border collie  
 n02106382 Bouvier des Flandres, Bouviers des Flandres  
 n02106550 Rottweiler  
 n02106662 German shepherd, German shepherd dog, German police dog, alsatian  
 n02107142 Doberman, Doberman pinscher  
 n02107312 miniature pinscher  
 n02107574 Greater Swiss Mountain dog  
 n02107683 Bernese mountain dog  
 n02107908 Appenzeller  
 n02108000 EntleBucher  
 n02108089 boxer  
 n02108422 bull mastiff  
 n02108551 Tibetan mastiff  
 n02108915 French bulldog  
 n02109047 Great Dane  
 n02109525 Saint Bernard, St Bernard  
 n02109961 Eskimo dog, husky  
 n02110063 malamute, malemute, Alaskan malamute  
 n02110185 Siberian husky  
 n02110341 dalmatian, coach dog, carriage dog  
 n02110627 affenpinscher, monkey pinscher, monkey dog  
 n02110806 basenji  
 n02110958 pug, pug-dog  
 n02111129 Leonberg  
 n02111277 Newfoundland, Newfoundland dog  
 n02111500 Great Pyrenees  
 n02111889 Samoyed, Samoyede  
 n02112018 Pomeranian  
 n02112137 chow, chow chow  
 n02112350 keeshond  
 n02112706 Brabancon griffon  
 n02113023 Pembroke, Pembroke Welsh corgi  
 n02113186 Cardigan, Cardigan Welsh corgi  
 n02113624 toy poodle