**DenseNet121,** training batch size=**128**, testing bs=**128,** optimizer=**SGD, lr=0.02**, **epoch=60**

+ RandomHorizontalFlip() + RandomCrop(32, padding=4)

epoch 1, loss 1.2651, train acc 0.474, test acc 0.313, time 83.7 sec

epoch 2, loss 0.5233, train acc 0.582, test acc 0.267, time 83.2 sec

epoch 3, loss 0.3016, train acc 0.648, test acc 0.330, time 81.2 sec

epoch 4, loss 0.1963, train acc 0.701, test acc 0.321, time 81.3 sec

epoch 5, loss 0.1364, train acc 0.743, test acc 0.361, time 81.5 sec

epoch 6, loss 0.1012, train acc 0.772, test acc 0.457, time 81.2 sec

epoch 7, loss 0.0790, train acc 0.795, test acc 0.411, time 81.3 sec

epoch 8, loss 0.0619, train acc 0.813, test acc 0.471, time 81.5 sec

epoch 9, loss 0.0512, train acc 0.829, test acc 0.448, time 81.8 sec

epoch 10, loss 0.0423, train acc 0.845, test acc 0.397, time 81.6 sec

epoch 11, loss 0.0365, train acc 0.853, test acc 0.483, time 81.6 sec

epoch 12, loss 0.0310, train acc 0.861, test acc 0.396, time 81.3 sec

epoch 13, loss 0.0267, train acc 0.871, test acc 0.433, time 81.5 sec

epoch 14, loss 0.0238, train acc 0.878, test acc 0.448, time 82.5 sec

epoch 15, loss 0.0205, train acc 0.886, test acc 0.489, time 81.8 sec

epoch 16, loss 0.0187, train acc 0.891, test acc 0.464, time 81.7 sec

epoch 17, loss 0.0163, train acc 0.899, test acc 0.479, time 82.3 sec

epoch 18, loss 0.0149, train acc 0.903, test acc 0.494, time 81.7 sec

epoch 19, loss 0.0132, train acc 0.909, test acc 0.439, time 81.5 sec

epoch 20, loss 0.0123, train acc 0.909, test acc 0.441, time 81.5 sec

epoch 21, loss 0.0114, train acc 0.913, test acc 0.486, time 82.1 sec

epoch 22, loss 0.0099, train acc 0.921, test acc 0.497, time 81.4 sec

epoch 23, loss 0.0090, train acc 0.924, test acc 0.486, time 82.0 sec

epoch 24, loss 0.0086, train acc 0.924, test acc 0.511, time 81.5 sec

epoch 25, loss 0.0076, train acc 0.931, test acc 0.519, time 82.1 sec

epoch 26, loss 0.0073, train acc 0.929, test acc 0.445, time 84.3 sec

epoch 27, loss 0.0070, train acc 0.929, test acc 0.501, time 81.5 sec

epoch 28, loss 0.0064, train acc 0.935, test acc 0.515, time 81.4 sec

epoch 29, loss 0.0056, train acc 0.942, test acc 0.498, time 81.5 sec

epoch 30, loss 0.0054, train acc 0.942, test acc 0.487, time 81.2 sec

epoch 31, loss 0.0054, train acc 0.939, test acc 0.513, time 81.5 sec

epoch 32, loss 0.0048, train acc 0.944, test acc 0.441, time 81.9 sec

epoch 33, loss 0.0045, train acc 0.946, test acc 0.499, time 81.8 sec

epoch 34, loss 0.0044, train acc 0.945, test acc 0.415, time 81.7 sec

epoch 35, loss 0.0041, train acc 0.949, test acc 0.505, time 81.2 sec

epoch 36, loss 0.0039, train acc 0.949, test acc 0.511, time 82.1 sec

epoch 37, loss 0.0038, train acc 0.950, test acc 0.479, time 81.8 sec

epoch 38, loss 0.0035, train acc 0.951, test acc 0.508, time 82.1 sec

epoch 39, loss 0.0033, train acc 0.953, test acc 0.485, time 82.0 sec

epoch 40, loss 0.0032, train acc 0.954, test acc 0.527, time 81.9 sec

epoch 41, loss 0.0032, train acc 0.952, test acc 0.522, time 81.7 sec

epoch 42, loss 0.0030, train acc 0.956, test acc 0.505, time 82.2 sec

epoch 43, loss 0.0029, train acc 0.957, test acc 0.501, time 81.7 sec

epoch 44, loss 0.0025, train acc 0.959, test acc 0.511, time 82.2 sec

epoch 45, loss 0.0026, train acc 0.960, test acc 0.497, time 81.6 sec

epoch 46, loss 0.0025, train acc 0.959, test acc 0.496, time 81.6 sec

epoch 47, loss 0.0024, train acc 0.961, test acc 0.500, time 81.6 sec

epoch 48, loss 0.0026, train acc 0.954, test acc 0.501, time 81.5 sec

epoch 49, loss 0.0023, train acc 0.960, test acc 0.492, time 81.8 sec

epoch 50, loss 0.0022, train acc 0.959, test acc 0.524, time 81.2 sec

epoch 51, loss 0.0021, train acc 0.962, test acc 0.489, time 82.0 sec

epoch 52, loss 0.0023, train acc 0.957, test acc 0.497, time 82.0 sec

epoch 53, loss 0.0020, train acc 0.964, test acc 0.467, time 81.5 sec

epoch 54, loss 0.0019, train acc 0.964, test acc 0.524, time 81.4 sec

epoch 55, loss 0.0019, train acc 0.963, test acc 0.518, time 82.0 sec

epoch 56, loss 0.0018, train acc 0.963, test acc 0.507, time 81.8 sec

epoch 57, loss 0.0019, train acc 0.961, test acc 0.522, time 82.3 sec

epoch 58, loss 0.0018, train acc 0.962, test acc 0.526, time 81.8 sec

epoch 59, loss 0.0016, train acc 0.966, test acc 0.503, time 82.2 sec

epoch 60, loss 0.0016, train acc 0.966, test acc 0.512, time 81.9 sec

Validation: Accuracy of the network: 85.36666666666666 %

OOD accuracy without the "unknown" label: Accuracy of the network: 51.18 %

threshold is 0.00:

Threshold accuracy: 51.200 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.3906796770334244

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.28380165748596187

threshold is 0.05:

Threshold accuracy: 51.200 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.3906796770334244

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.28380165748596187

threshold is 0.10:

Threshold accuracy: 51.200 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.3906796770334244

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.28380165748596187

threshold is 0.15:

Threshold accuracy: 51.200 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.3906796770334244

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.28380165748596187

threshold is 0.20:

Threshold accuracy: 51.200 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.3906796770334244

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.28380165748596187

threshold is 0.25:

Threshold accuracy: 51.200 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.3906796770334244

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.28380165748596187

threshold is 0.30:

Threshold accuracy: 51.200 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.3906796770334244

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.28380165748596187

threshold is 0.35:

Threshold accuracy: 51.250 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.39099291763305666

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.2864096740722656

threshold is 0.40:

Threshold accuracy: 51.560 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.3921026350021362

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.28912732391357415

threshold is 0.45:

Threshold accuracy: 52.040 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.3926596092224121

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.2915509445190429

threshold is 0.50:

Threshold accuracy: 52.870 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.39252190446853635

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.2939026293754577

threshold is 0.55:

Threshold accuracy: 54.230 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.3942114948272705

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.2937563251495361

threshold is 0.60:

Threshold accuracy: 55.020 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.39270417251586914

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.2933144561767578

threshold is 0.65:

Threshold accuracy: 55.980 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.3902646255493164

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.2910628219604492

threshold is 0.70:

Threshold accuracy: 57.130 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.3870084426879883

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.28891130218505856

threshold is 0.75:

Threshold accuracy: 58.200 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.3837285057067871

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.28555051116943353

threshold is 0.80:

Threshold accuracy: 59.670 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.3798989952087402

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.2811798461914062

threshold is 0.85:

Threshold accuracy: 61.020 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.37473311805725096

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.2778874926567077

threshold is 0.90:

Threshold accuracy: 62.720 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.3670903190612793

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.2745733184814453

threshold is 0.95:

Threshold accuracy: 64.540 %

Brier before calibration: 0.787629735041774

ECE before calibration: 0.35718595809936526

calibrating...

Brier temperature\_scaling calibration: 0.643226013317304

ECE temperature\_scaling calibration: 0.2691028717041016