resnet18 = models.resnet18(weights=None)

# for param in resnet18.parameters():

#     param.requires\_grad = True

# Modify the final fully connected layer to output 10 classes

resnet18.fc = nn.Sequential(

    nn.Linear(resnet18.fc.in\_features, 512),

    nn.BatchNorm1d(512),

    nn.ReLU(),

    # nn.Dropout(p=0.25),

    nn.Linear(512, 200))

model = resnet18.to(device)

without weight decay and dropout

Epoch [1/10000], Train Loss: 4.8328, Train Accuracy: 4.06%

Validation Accuracy: 6.81%, Validation Loss: 4.5106

Epoch [2/10000], Train Loss: 4.0518, Train Accuracy: 12.62%

Validation Accuracy: 15.79%, Validation Loss: 3.7775

Epoch [3/10000], Train Loss: 3.4798, Train Accuracy: 21.16%

Validation Accuracy: 23.20%, Validation Loss: 3.3791

Epoch [4/10000], Train Loss: 3.0952, Train Accuracy: 27.72%

Validation Accuracy: 28.91%, Validation Loss: 3.1025

Epoch [5/10000], Train Loss: 2.7743, Train Accuracy: 33.93%

Validation Accuracy: 31.95%, Validation Loss: 2.9323

Epoch [6/10000], Train Loss: 2.5117, Train Accuracy: 39.19%

Validation Accuracy: 37.74%, Validation Loss: 2.6438

Epoch [7/10000], Train Loss: 2.2876, Train Accuracy: 43.75%

Validation Accuracy: 40.53%, Validation Loss: 2.4947

Epoch [8/10000], Train Loss: 2.0853, Train Accuracy: 47.82%

Validation Accuracy: 41.60%, Validation Loss: 2.4370

Epoch [9/10000], Train Loss: 1.8994, Train Accuracy: 52.01%

Validation Accuracy: 43.52%, Validation Loss: 2.4309

Epoch [10/10000], Train Loss: 1.7226, Train Accuracy: 55.78%

Validation Accuracy: 44.14%, Validation Loss: 2.4287

Epoch [11/10000], Train Loss: 1.5544, Train Accuracy: 59.36%

Validation Accuracy: 45.45%, Validation Loss: 2.3950

Epoch [12/10000], Train Loss: 1.3777, Train Accuracy: 63.55%

Validation Accuracy: 45.64%, Validation Loss: 2.4787

Epoch [13/10000], Train Loss: 1.2180, Train Accuracy: 66.86%

Validation Accuracy: 44.96%, Validation Loss: 2.5946

Epoch [14/10000], Train Loss: 0.8089, Train Accuracy: 77.53%

Validation Accuracy: 47.41%, Validation Loss: 2.6869

Epoch [15/10000], Train Loss: 0.6427, Train Accuracy: 81.74%

Validation Accuracy: 47.43%, Validation Loss: 2.9010

Epoch [16/10000], Train Loss: 0.4175, Train Accuracy: 88.20%

Validation Accuracy: 47.93%, Validation Loss: 3.0758

Early stopping after 16 epochs without improvement.

Early stopping triggered.

Training complete!

With dropout =0.25

Epoch [1/10000], Train Loss: 4.8728, Train Accuracy: 3.75%

Validation Accuracy: 5.99%, Validation Loss: 4.4935

Epoch [2/10000], Train Loss: 4.1683, Train Accuracy: 10.44%

Validation Accuracy: 10.61%, Validation Loss: 4.1986

Epoch [3/10000], Train Loss: 3.6618, Train Accuracy: 17.50%

Validation Accuracy: 22.00%, Validation Loss: 3.4043

Epoch [4/10000], Train Loss: 3.3262, Train Accuracy: 23.26%

Validation Accuracy: 27.51%, Validation Loss: 3.1225

Epoch [5/10000], Train Loss: 3.0501, Train Accuracy: 28.42%

Validation Accuracy: 31.04%, Validation Loss: 2.9042

Epoch [6/10000], Train Loss: 2.8168, Train Accuracy: 32.95%

Validation Accuracy: 35.58%, Validation Loss: 2.7020

Epoch [7/10000], Train Loss: 2.6156, Train Accuracy: 36.69%

Validation Accuracy: 38.81%, Validation Loss: 2.5545

Epoch [8/10000], Train Loss: 2.4393, Train Accuracy: 40.34%

Validation Accuracy: 41.31%, Validation Loss: 2.4716

Epoch [9/10000], Train Loss: 2.2703, Train Accuracy: 43.90%

Validation Accuracy: 41.95%, Validation Loss: 2.4240

Epoch [10/10000], Train Loss: 2.1171, Train Accuracy: 46.99%

Validation Accuracy: 42.85%, Validation Loss: 2.4415

Epoch [11/10000], Train Loss: 1.9754, Train Accuracy: 50.00%

Validation Accuracy: 43.79%, Validation Loss: 2.3767

Epoch [12/10000], Train Loss: 1.8341, Train Accuracy: 53.16%

Validation Accuracy: 46.01%, Validation Loss: 2.2859

Epoch [13/10000], Train Loss: 1.6948, Train Accuracy: 56.10%

Validation Accuracy: 46.55%, Validation Loss: 2.3228

Epoch [14/10000], Train Loss: 1.5673, Train Accuracy: 59.04%

Validation Accuracy: 46.57%, Validation Loss: 2.3274

Epoch [15/10000], Train Loss: 1.2065, Train Accuracy: 67.31%

Validation Accuracy: 50.28%, Validation Loss: 2.2829

Epoch [16/10000], Train Loss: 1.0538, Train Accuracy: 70.78%

Validation Accuracy: 50.45%, Validation Loss: 2.3558

Epoch [17/10000], Train Loss: 0.9476, Train Accuracy: 73.29%

Validation Accuracy: 49.18%, Validation Loss: 2.5299

Epoch [18/10000], Train Loss: 0.7255, Train Accuracy: 79.08%

Validation Accuracy: 51.15%, Validation Loss: 2.5389

Epoch [19/10000], Train Loss: 0.6391, Train Accuracy: 81.14%

Validation Accuracy: 50.52%, Validation Loss: 2.6871

Epoch [20/10000], Train Loss: 0.5282, Train Accuracy: 84.31%

Validation Accuracy: 51.32%, Validation Loss: 2.7922

Early stopping after 20 epochs without improvement.

Early stopping triggered.

Training complete!

Dropout = 0.5

Epoch [1/10000], Train Loss: 4.9850, Train Accuracy: 3.11%

Validation Accuracy: 6.49%, Validation Loss: 4.5613

Epoch [2/10000], Train Loss: 4.3482, Train Accuracy: 8.38%

Validation Accuracy: 13.54%, Validation Loss: 3.9358

Epoch [3/10000], Train Loss: 3.8879, Train Accuracy: 14.32%

Validation Accuracy: 18.29%, Validation Loss: 3.6442

Epoch [4/10000], Train Loss: 3.5879, Train Accuracy: 18.87%

Validation Accuracy: 24.06%, Validation Loss: 3.2888

Epoch [5/10000], Train Loss: 3.3395, Train Accuracy: 23.03%

Validation Accuracy: 28.14%, Validation Loss: 3.0813

Epoch [6/10000], Train Loss: 3.1294, Train Accuracy: 26.84%

Validation Accuracy: 31.20%, Validation Loss: 2.9700

Epoch [7/10000], Train Loss: 2.9200, Train Accuracy: 31.07%

Validation Accuracy: 35.78%, Validation Loss: 2.6918

Epoch [8/10000], Train Loss: 2.7398, Train Accuracy: 34.53%

Validation Accuracy: 36.01%, Validation Loss: 2.6605

Epoch [9/10000], Train Loss: 2.5743, Train Accuracy: 37.96%

Validation Accuracy: 38.73%, Validation Loss: 2.5543

Epoch [10/10000], Train Loss: 2.4183, Train Accuracy: 41.12%

Validation Accuracy: 41.39%, Validation Loss: 2.4470

Epoch [11/10000], Train Loss: 2.2821, Train Accuracy: 43.94%

Validation Accuracy: 43.35%, Validation Loss: 2.3677

Epoch [12/10000], Train Loss: 2.1477, Train Accuracy: 46.83%

Validation Accuracy: 43.56%, Validation Loss: 2.4038

Epoch [13/10000], Train Loss: 2.0122, Train Accuracy: 49.64%

Validation Accuracy: 45.74%, Validation Loss: 2.3104

Epoch [14/10000], Train Loss: 1.9019, Train Accuracy: 51.80%

Validation Accuracy: 46.43%, Validation Loss: 2.2848

Epoch [15/10000], Train Loss: 1.7753, Train Accuracy: 54.40%

Validation Accuracy: 46.32%, Validation Loss: 2.3239

Epoch [16/10000], Train Loss: 1.6651, Train Accuracy: 56.75%

Validation Accuracy: 47.12%, Validation Loss: 2.3207

Epoch [17/10000], Train Loss: 1.3205, Train Accuracy: 64.89%

Validation Accuracy: 50.67%, Validation Loss: 2.2532

Epoch [18/10000], Train Loss: 1.1782, Train Accuracy: 67.90%

Validation Accuracy: 50.55%, Validation Loss: 2.3585

Epoch [19/10000], Train Loss: 1.0782, Train Accuracy: 70.18%

Validation Accuracy: 50.27%, Validation Loss: 2.3972

Epoch [20/10000], Train Loss: 0.8752, Train Accuracy: 75.35%

Validation Accuracy: 51.11%, Validation Loss: 2.5325

Epoch [21/10000], Train Loss: 0.8000, Train Accuracy: 77.08%

Validation Accuracy: 51.53%, Validation Loss: 2.5524

Epoch [22/10000], Train Loss: 0.6845, Train Accuracy: 80.14%

Validation Accuracy: 51.38%, Validation Loss: 2.6952

Early stopping after 22 epochs without improvement.

Early stopping triggered.

Training complete!

We need weight decay