1 C:\ProgramData\Anaconda3\envs\MLenv\python.exe "C:\Users\aberf\Documents\GitHub\CS-534\Final Project\
  EMNIST_train.py"
2
3 Loading Datasets...
4 Total No of Images in EMNIST-Letters dataset: 145600
5 No of images in Training dataset: 124800
6 No of images in Testing dataset: 20800
7
8 Training Parameters:
9 Epoch Count: 24,   Batch Size: 100
10 Learning Rate: 0.0001, Weight Decay: 0.0001
11
12 Training Epoch...
13 100%|███████| 1248/1248 [00:42<00:00, 29.66it/s]
14
15 Testing Model...
16 100%|███████| 208/208 [00:03<00:00, 52.21it/s]
17 Epoch: 1, Val-Loss: 0.7869, Val-Accuracy: 75.2%,   Train-Accuracy: 74.0%
18
19 Training Epoch...
20 100%|███████| 1248/1248 [00:28<00:00, 43.40it/s]
21
22 Testing Model...
23 100%|███████| 208/208 [00:04<00:00, 46.85it/s]
24 Epoch: 2, Val-Loss: 0.5805, Val-Accuracy: 81.69999999999999%,   Train-Accuracy: 82.0%
25
26 Training Epoch...
27 100%|███████| 1248/1248 [00:28<00:00, 44.02it/s]
28
29 Testing Model...
30 100%|███████| 208/208 [00:04<00:00, 47.69it/s]
31 Epoch: 3, Val-Loss: 0.4993, Val-Accuracy: 84.5%,   Train-Accuracy: 78.0%
32
33 Training Epoch...
34 100%|███████| 1248/1248 [00:29<00:00, 41.65it/s]

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35
36 Testing Model...
37 100%|          | 208/208 [00:04<00:00, 46.52it/s]
38 Epoch: 4,   Val-Loss: 0.452,   Val-Accuracy: 86.0%,   Train-Accuracy: 87.0%
39
40 Training Epoch...
41 100%|          | 1248/1248 [00:29<00:00, 42.90it/s]
42
43 Testing Model...
44 100%|          | 208/208 [00:04<00:00, 43.47it/s]
45 Epoch: 5,   Val-Loss: 0.4229,  Val-Accuracy: 86.5%,   Train-Accuracy: 85.0%
46
47 Training Epoch...
48 100%|          | 1248/1248 [00:28<00:00, 43.73it/s]
49
50 Testing Model...
51 100%|          | 208/208 [00:04<00:00, 47.69it/s]
52 Epoch: 6,   Val-Loss: 0.4106,  Val-Accuracy: 86.7%,   Train-Accuracy: 85.0%
53
54 Training Epoch...
55 100%|          | 1248/1248 [00:29<00:00, 42.66it/s]
56
57 Testing Model...
58 100%|          | 208/208 [00:04<00:00, 44.63it/s]
59 Epoch: 7,   Val-Loss: 0.3897,  Val-Accuracy: 87.7%,   Train-Accuracy: 88.0%
60
61 Training Epoch...
62 100%|          | 1248/1248 [00:29<00:00, 41.96it/s]
63
64 Testing Model...
65 100%|          | 208/208 [00:05<00:00, 36.63it/s]
66 Epoch: 8,   Val-Loss: 0.3696,  Val-Accuracy: 88.3%,   Train-Accuracy: 84.0%
67
68 Training Epoch...
69 100%|          | 1248/1248 [00:32<00:00, 38.86it/s]
```

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 70
 71 Testing Model...
 72 100%|████████| 208/208 [00:04<00:00, 45.88it/s]
 73 Epoch: 9,   Val-Loss: 0.3562,   Val-Accuracy: 88.6%,   Train-Accuracy: 88.0%
 74
 75 Training Epoch...
 76 100%|████████| 1248/1248 [00:29<00:00, 41.87it/s]
 77
 78 Testing Model...
 79 100%|████████| 208/208 [00:04<00:00, 47.76it/s]
 80 Epoch: 10,  Val-Loss: 0.346,   Val-Accuracy: 88.8%,   Train-Accuracy: 91.0%
 81
 82 Training Epoch...
 83 100%|████████| 1248/1248 [00:29<00:00, 42.60it/s]
 84
 85 Testing Model...
 86 100%|████████| 208/208 [00:04<00:00, 48.97it/s]
 87 Epoch: 11,  Val-Loss: 0.3442,   Val-Accuracy: 89.1%,   Train-Accuracy: 88.0%
 88
 89 Training Epoch...
 90 100%|████████| 1248/1248 [00:27<00:00, 45.01it/s]
 91
 92 Testing Model...
 93 100%|████████| 208/208 [00:04<00:00, 49.65it/s]
 94 Epoch: 12,  Val-Loss: 0.3384,   Val-Accuracy: 89.2%,   Train-Accuracy: 89.0%
 95
 96 Training Epoch...
 97 100%|████████| 1248/1248 [00:28<00:00, 44.00it/s]
 98
 99 Testing Model...
100 100%|████████| 208/208 [00:04<00:00, 47.01it/s]
101 Epoch: 13,  Val-Loss: 0.3361,   Val-Accuracy: 89.4%,   Train-Accuracy: 86.0%
102
103 Training Epoch...
104 100%|████████| 1248/1248 [00:28<00:00, 44.12it/s]
```

```
105
106 Testing Model...
107 100%|          | 208/208 [00:04<00:00, 49.11it/s]
108 Epoch: 14, Val-Loss: 0.3255,   Val-Accuracy: 89.4%,    Train-Accuracy: 91.0%
109
110 Training Epoch...
111 100%|          | 1248/1248 [00:29<00:00, 42.47it/s]
112
113 Testing Model...
114 100%|          | 208/208 [00:04<00:00, 47.18it/s]
115 Epoch: 15, Val-Loss: 0.3238,   Val-Accuracy: 89.60000000000001%,   Train-Accuracy: 90.0%
116
117 Training Epoch...
118 100%|          | 1248/1248 [00:27<00:00, 44.79it/s]
119
120 Testing Model...
121 100%|          | 208/208 [00:04<00:00, 50.04it/s]
122 Epoch: 16, Val-Loss: 0.3177,   Val-Accuracy: 89.8%,    Train-Accuracy: 89.0%
123
124 Training Epoch...
125 100%|          | 1248/1248 [00:28<00:00, 43.75it/s]
126
127 Testing Model...
128 100%|          | 208/208 [00:04<00:00, 48.22it/s]
129 Epoch: 17, Val-Loss: 0.3224,   Val-Accuracy: 89.9%,    Train-Accuracy: 87.0%
130
131 Training Epoch...
132 100%|          | 1248/1248 [00:28<00:00, 44.53it/s]
133
134 Testing Model...
135 100%|          | 208/208 [00:04<00:00, 49.10it/s]
136 Epoch: 18, Val-Loss: 0.3209,   Val-Accuracy: 90.0%,    Train-Accuracy: 92.0%
137
138 Training Epoch...
139 100%|          | 1248/1248 [00:29<00:00, 42.62it/s]
```

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140
141 Testing Model...
142 100%|███████████████| 208/208 [00:04<00:00, 48.92it/s]
143 Epoch: 19,  Val-Loss: 0.3053,   Val-Accuracy: 90.3%,   Train-Accuracy:  86.0%
144
145 Training Epoch...
146 100%|███████████████| 1248/1248 [00:27<00:00, 44.62it/s]
147
148 Testing Model...
149 100%|███████████████| 208/208 [00:04<00:00, 49.66it/s]
150 Epoch: 20,  Val-Loss: 0.3062,   Val-Accuracy: 90.2%,   Train-Accuracy:  93.0%
151
152 Training Epoch...
153 100%|███████████████| 1248/1248 [00:29<00:00, 42.35it/s]
154
155 Testing Model...
156 100%|███████████████| 208/208 [00:04<00:00, 47.34it/s]
157 Epoch: 21,  Val-Loss: 0.3039,   Val-Accuracy: 90.5%,   Train-Accuracy:  93.0%
158
159 Training Epoch...
160 100%|███████████████| 1248/1248 [00:26<00:00, 46.43it/s]
161
162 Testing Model...
163 100%|███████████████| 208/208 [00:04<00:00, 48.41it/s]
164 Epoch: 22,  Val-Loss: 0.3053,   Val-Accuracy: 90.4%,   Train-Accuracy:  87.0%
165
166 Training Epoch...
167 100%|███████████████| 1248/1248 [00:30<00:00, 41.30it/s]
168
169 Testing Model...
170 100%|███████████████| 208/208 [00:04<00:00, 49.47it/s]
171 Epoch: 23,  Val-Loss: 0.2989,   Val-Accuracy: 90.3%,   Train-Accuracy:  93.0%
172
173 Training Epoch...
174 100%|███████████████| 1248/1248 [00:28<00:00, 43.21it/s]
```

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175
176 Testing Model...
177 100%|████████| 208/208 [00:04<00:00, 49.65it/s]
178 Epoch: 24, Val-Loss: 0.302,  Val-Accuracy: 90.5%,  Train-Accuracy: 91.0%
179
180
181 Process finished with exit code 0
182
```