

Supplementary Material for Paper Title "AggSS: An Aggregated Self-Supervised Approach for Class-Incremental Learning"

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1 PyTorch Sample Code for Incorporating AggSS into Model Training and Inference for CIL Algorithms

Sample PyTorch training code for incorporating AggSS into model training is provided in Listing 1, while the corresponding inference code is given in Listing 2.

```

1 ##### Training #####
2 for batch_idx, (inputs, targets) in enumerate(trainloader):
3     inputs, targets = inputs.to(device), targets.to(device)
4     H, W = inputs.shape[-1], inputs.shape[-2]
5     inputs = torch.stack([torch.rot90(inputs, k, (2, 3)) for k in range(4)], 1)
6     inputs = inputs.view(-1, 3, H, W)
7     targets = torch.stack([targets * 4 + k for k in range(4)], 1).view(-1)
8
9     optimizer.zero_grad()
10    outputs = net(inputs)
11    loss = criterion(outputs, targets)
12    loss.backward()
13    optimizer.step()

```

Listing 1: Incorporating AggSS in training

```

1 ##### Inference #####
2 for batch_idx, (inputs, _) in enumerate(testloader):
3     inputs = inputs.to(device)
4     H, W = inputs.shape[-1], inputs.shape[-2]
5     inputs = torch.stack([torch.rot90(inputs, k, (2, 3)) for k in range(4)], 1)
6     inputs = inputs.view(-1, 3, H, W)
7     outputs = net(inputs)
8     AG = 0.
9     for k in range(4):
10        AG = AG + outputs[k::4, k::4] / 4.
11    _, predicted = AG.max(1)

```

Listing 2: Incorporating AggSS at inference

2 Illustration of data distributions:

In this section, we present visualizations of the class-wise distribution of CIFAR100 datasets across various Class-Incremental Learning (CIL) paradigms. Figure 1 displays the traditional CIL scenario, while Figure 2 depicts the shuffled long-tail CIL distribution. Additionally, Figure 3 showcases the ordered long-tail CIL distribution, and Figure 4 illustrates the data distribution settings for Semi-Supervised CIL.

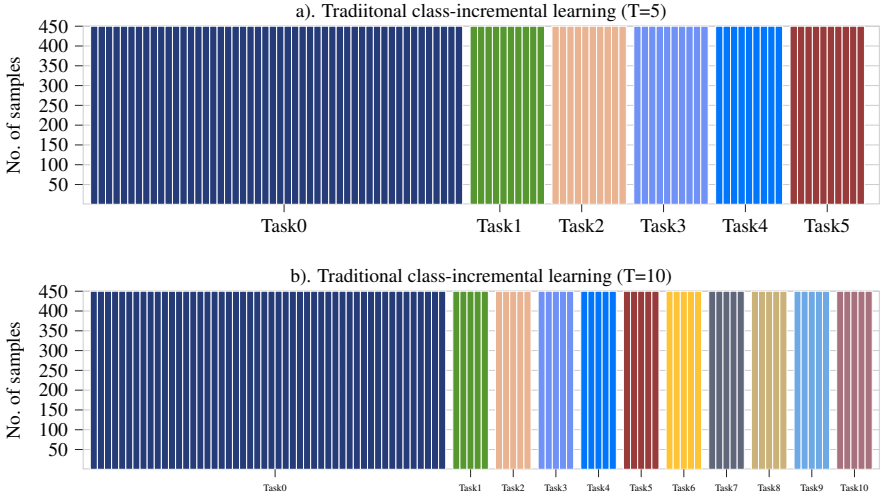


Figure 1: CIFAR100 data distributions class incremental learning for T=5 and T=10 tasks.

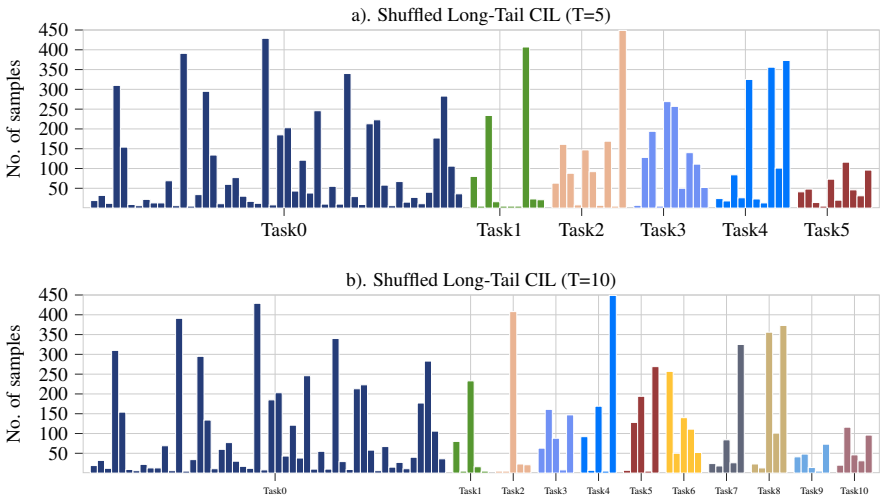


Figure 2: CIFAR100 data distributions long-tail class incremental learning (shuffled) for T=5 and T=10 tasks.

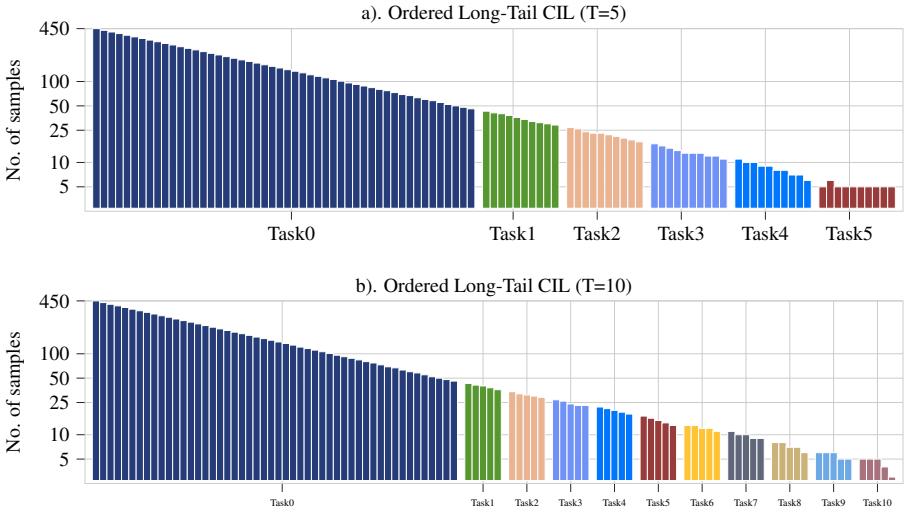


Figure 3: CIFAR100 data distributions long-tail class incremental learning (ordered) for T=5 and T=10 tasks..

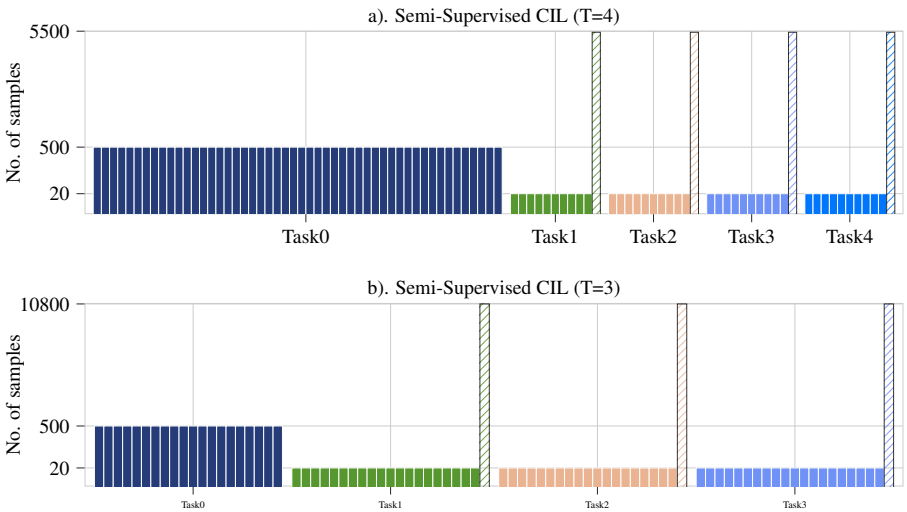


Figure 4: CIFAR100 data distributions semi-supervised CIL for T=4 and T=3 tasks. The slanted lines inside bars indicate the presence of unlabeled data available at each task.