Homework 3

Gheorghita Stefana

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1 Results:

No	Experiment	Best Accuracy
1	Baseline Model*	27.43%
2	H3 (1)	67.6%
3	H3 (2)	66.19%
4	H3 (3)	30.9%
5	H3 (4)	45.36%
6	H3 (5)	33.24%
7	H3 (6)	50.28%
8	H3 (7)	35.89%
9	H3 (8)	48.47%
10	H3 (9)	70.55%

Table 1: Summary of experiments and their best accuracies.

1. **Experiment 1**: *Configuration*:
   - Model: ResNet18 Cifar 10;
   - Optimizer: SGD, Learning rate: 0.001;
   - Scheduler: None;
   - Augmentation: None
   - Batch size: 64;
   - Early stopping;
   - Number of epochs: 50;
2. **Experiment 2**:

Figure 1: Configuration

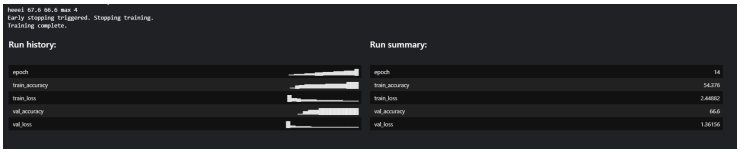

Figure 2: Result

Configuration:

- Model: ResNet18 pretrained (+ UmSampling);
- Optimizer: AdamW, Learning rate: 0.0005;
- Scheduler: CosineAnnealingLR, t_max= 100, eta_min=1e-5;
- Augmentation:
  - CutMix
  - MixUp
  - RandAugment()
  - ToImage(),
  - ToDtype(torch.float32, scale=True),
  - Normalize((0.5,), (0.5,))
- Batch size: 64;
- Early stopping;
- Number of epochs: 100;

3. **Experiment 3**:

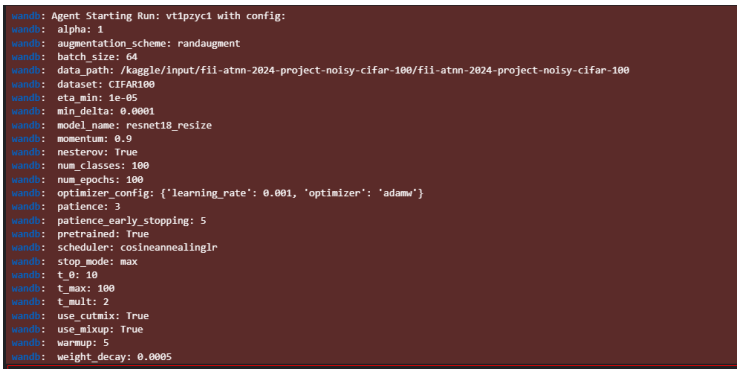

Figure 3: Configuration

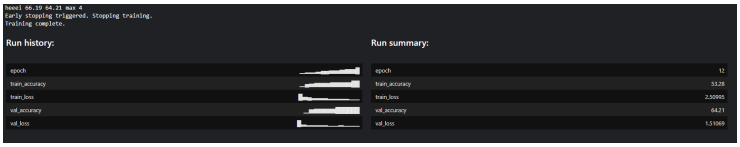

Figure 4: Result

Configuration:

- Model: ResNet18 pretrained (+ UmSampling);
- Optimizer: AdamW, Learning rate: 0.001;
- Scheduler: CosineAnnealingLR, t_max= 100, eta_min=1e-5;
- Augmentation:
  - CutMix
  - MixUp
  - RandAugment()
  - ToImage(),
  - ToDtype(torch.float32, scale=True),
  - Normalize((0.5,), (0.5,))
- Batch size: 64;
- Early stopping;
- Number of epochs: 100;

4. **Experiment 4**:

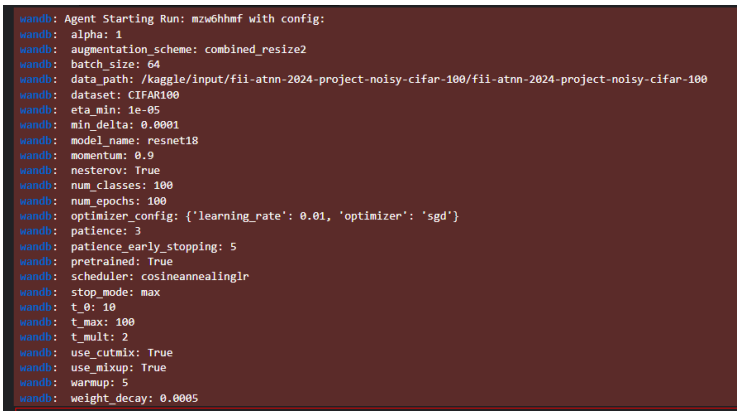

Figure 5: Configuration

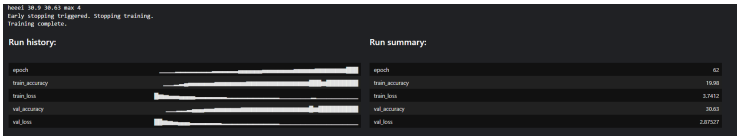

Figure 6: Result

Configuration:

- Model: ResNet18;
- Optimizer: SGD, Learning rate: 0.01;
- Scheduler: CosineAnnealingLR, t_max= 100, eta_min=1e-5;
- Augmentation:
  - CutMix
  - MixUp
  - RandomRotation(10),
  - RandomResizedCrop(32, scale=(0.9, 1.1)),
  - RandomHorizontalFlip(),
  - RandomAffine(degrees=0, shear=10),
  - RandomCrop(32, padding=3),
  - ToImage(),
  - ToDtype(torch.float32, scale=True),
  - Normalize((0.4914, 0.4822, 0.4465), (0.247, 0.243, 0.261))
- Batch size: 64;
- Early stopping;

- Number of epochs: 100;

5. **Experiment 5**:

Figure 7: Configuration

Figure 8: Result

Configuration:

- Model: ResNet18;
- Optimizer: SGD, Learning rate: 0.01;
- Scheduler: CosineAnnealingLR, t_max= 100, eta_min=1e-5;
- Augmentation:
  - CutMix
  - MixUp
  - RandomRotation(10),
  - RandomResizedCrop(32, scale=(0.9, 1.1)),
  - RandomHorizontalFlip(),
  - RandomAffine(degrees=0, shear=10),
  - RandomCrop(32, padding=3),
  - ToImage(),
  - ToDtype(torch.float32, scale=True),
  - Normalize((0.4914, 0.4822, 0.4465), (0.247, 0.243, 0.261))
- Batch size: 64;

- Early stopping;
- Number of epochs: 100;

6. **Experiment 6**:

Figure 9: Configuration

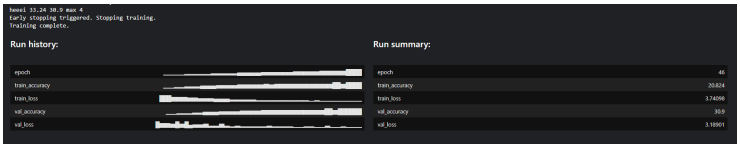

Figure 10: Result

Configuration:

- Model: ResNet50;
- Optimizer: SGD, Learning rate: 0.01;
- Scheduler: CosineAnnealingLR, t_max= 100, eta_min=1e-5;
- Augmentation:
  - CutMix
  - MixUp
  - RandAugment()
  - ToImage(),
  - ToDtype(torch.float32, scale=True),
  - Normalize((0.5,), (0.5,))
- Batch size: 64;
- Early stopping;

- Number of epochs: 100;

7. **Experiment 7**:

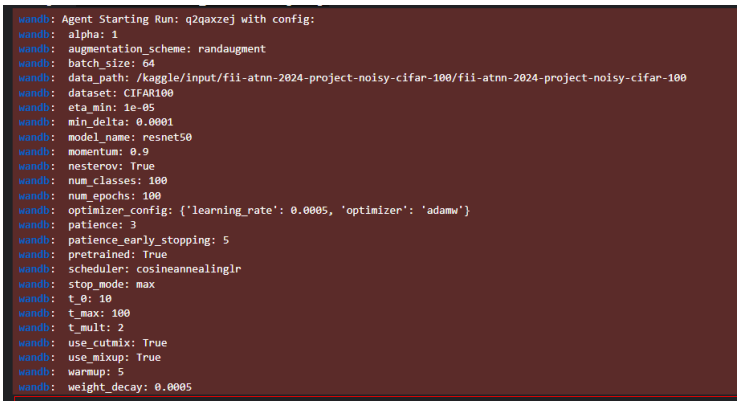

Figure 11: Configuration

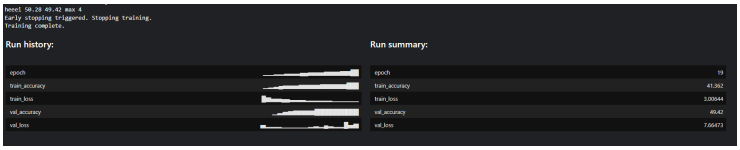

Figure 12: Result

Configuration:

- Model: ResNet50;
- Optimizer: AdamW, Learning rate: 0.0005;
- Scheduler: CosineAnnealingLR, t_max= 100, eta_min=1e-5;
- Augmentation:
  - CutMix
  - MixUp
  - RandAugment()
  - ToImage(),
  - ToDtype(torch.float32, scale=True),
  - Normalize((0.5,), (0.5,))
- Batch size: 64;
- Early stopping;
- Number of epochs: 100;

8. **Experiment 8**:

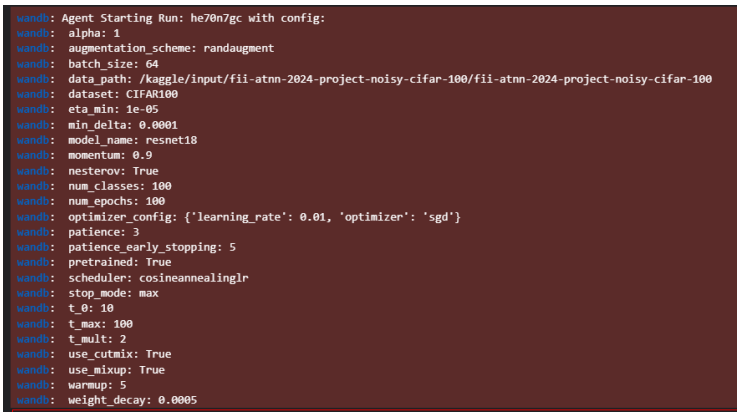

Figure 13: Configuration

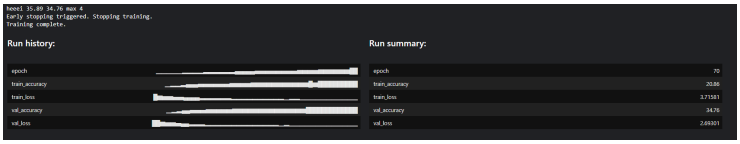

Figure 14: Result

Configuration:

- Model: ResNet18;
- Optimizer: SGD, Learning rate: 0.01;
- Scheduler: CosineAnnealingLR, t_max= 100, eta_min=1e-5;
- Augmentation:
  - CutMix
  - MixUp
  - RandAugment()
  - ToImage(),
  - ToDtype(torch.float32, scale=True),
  - Normalize((0.5,), (0.5,))
- Batch size: 64;
- Early stopping;
- Number of epochs: 100;

9. **Experiment 9**:

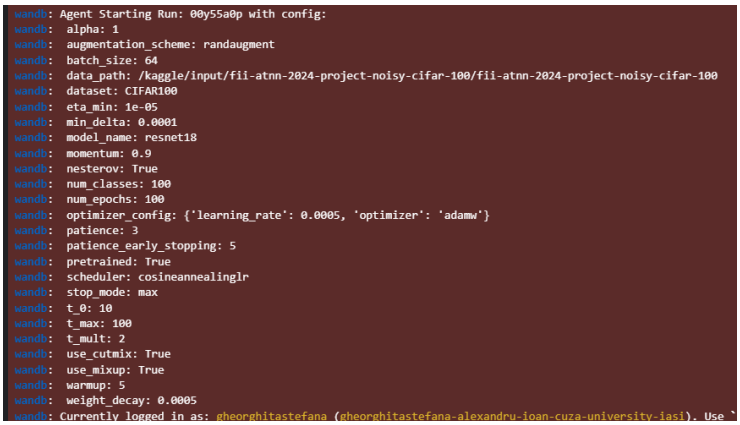

Figure 15: Configuration

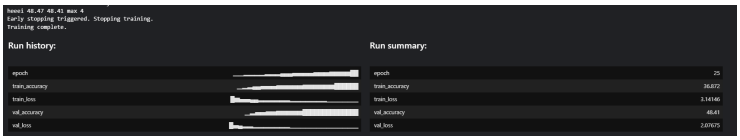

Figure 16: Result

Configuration:

- Model: ResNet18;
- Optimizer: AdamW, Learning rate: 0.0005;
- Scheduler: CosineAnnealingLR, t_max= 100, eta_min=1e-5;
- Augmentation:
  - CutMix
  - MixUp
  - RandAugment()
  - ToImage(),
  - ToDtype(torch.float32, scale=True),
  - Normalize((0.5,), (0.5,))
- Batch size: 64;
- Early stopping;
- Number of epochs: 100;

10. **Experiment 10**:

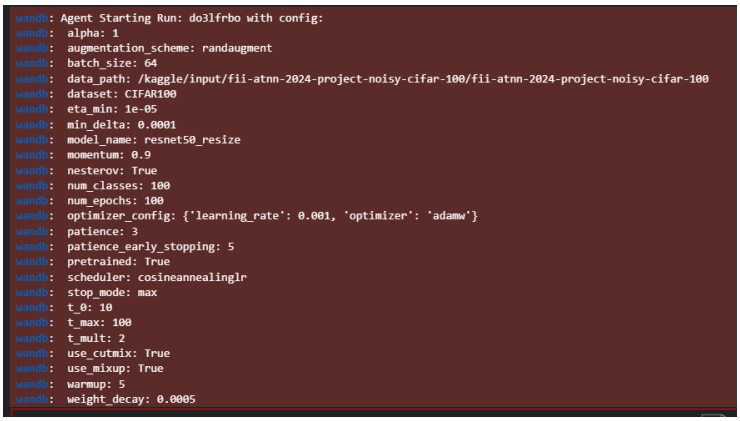

Figure 17: Configuration

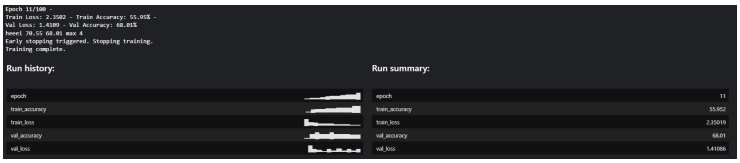

Figure 18: Result

Configuration:

- Model: ResNet50 pretrained (+ UmSampling);
- Optimizer: AdamW, Learning rate: 0.001;
- Scheduler: CosineAnnealingLR, t_max= 100, eta_min=1e-5;
- Augmentation:
  - CutMix
  - MixUp
  - RandAugment()
  - ToImage(),
  - ToDtype(torch.float32, scale=True),
  - Normalize((0.5,), (0.5,))
- Batch size: 64;
- Early stopping;
- Number of epochs: 100;

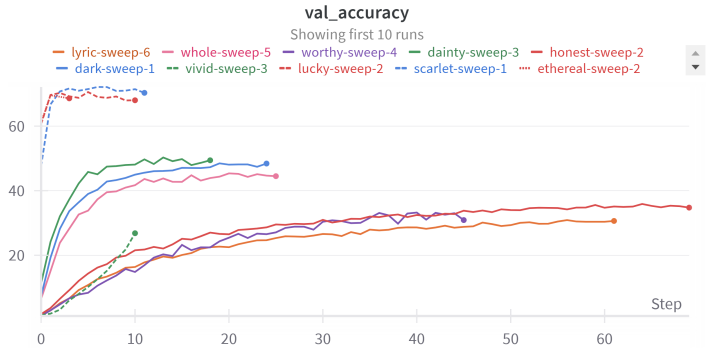

Figure 19: Val Accuracy

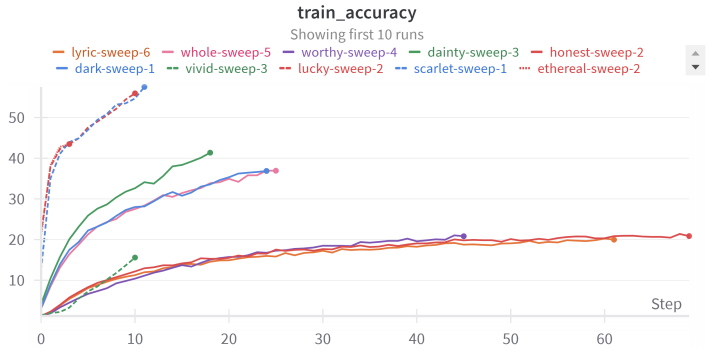

Figure 20: Train Accuracy

Figure 21: train Loss

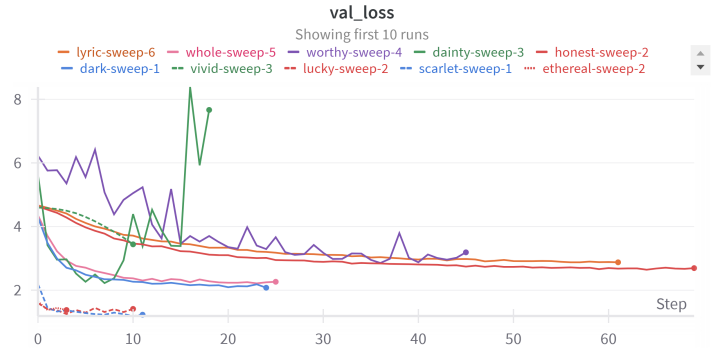

Figure 22: Val Loss