

Homework 3

Gheorghita Stefana

December 9, 2024

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:

```

wandb: Agent Starting Run: c0edc4tr with config:
wandb: alpha: 1
wandb: augmentation_scheme: randaugument
wandb: batch_size: 64
wandb: data_path: /kaggle/input/fil-attn-2024-project-noisy-cifar-100/fil-attn-2024-project-noisy-cifar-100
wandb: dataset: CIFAR100
wandb: eta_min: 1e-05
wandb: min_delta: 0.0001
wandb: model_name: resnet18_resize
wandb: momentum: 0.9
wandb: nestorov: True
wandb: num_classes: 100
wandb: num_epochs: 100
wandb: optimizer_config: {'learning_rate': 0.0005, 'optimizer': 'adamw'}
wandb: patience: 3
wandb: patience_early_stopping: 5
wandb: pretrained: True
wandb: scheduler: cosineannealinglr
wandb: stop_mode: max
wandb: t_0: 10
wandb: t_max: 100
wandb: t_mult: 2
wandb: use_cutmix: True
wandb: use_mixup: True
wandb: warmup: 5
wandb: weight_decay: 0.0005
wandb: Currently logged in as: gheorghitastefana (@gheorghitastefana-alexandru-loom-cuza-university-lan). Use 'wandb login --relogin' to force relogin

```

Figure 1: Configuration

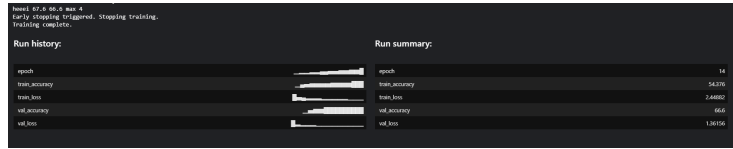


Figure 2: Result

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:

```

wandb: Agent Starting Run: vtlpzycl with config:
wandb: alpha: 1
wandb: augmentation_scheme: randaugment
wandb: batch_size: 64
wandb: data_path: /kaggle/input/fii-atnn-2024-project-noisy-cifar-100/fii-atnn-2024-project-noisy-cifar-100
wandb: dataset: CIFAR100
wandb: eta_min: 1e-05
wandb: min_delta: 0.0001
wandb: model_name: resnet18_resize
wandb: momentum: 0.9
wandb: nesterov: True
wandb: num_classes: 100
wandb: num_epochs: 100
wandb: optimizer_config: {'learning_rate': 0.001, 'optimizer': 'adamw'}
wandb: patience: 3
wandb: patience_early_stopping: 5
wandb: pretrained: True
wandb: scheduler: cosineannealinglr
wandb: stop_mode: max
wandb: t_0: 10
wandb: t_max: 100
wandb: t_mult: 2
wandb: use_cutmix: True
wandb: use_mixup: True
wandb: warmup: 5
wandb: weight_decay: 0.0005

```

Figure 3: Configuration

Need 96.19 GB (21 GB) max 4
Early stopping triggered. Stopping training.
Training complete.

Run history:		Run summary:	
epoch		epoch	12
train_accuracy		train_accuracy	31.28
train_loss		train_loss	2.5093
val_accuracy		val_accuracy	64.71
val_loss		val_loss	12.9887

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:

```

wandb: Agent Starting Run: mzw6hhmf with config:
wandb: alpha: 1
wandb: augmentation_scheme: combined_resize2
wandb: batch_size: 64
wandb: data_path: /kaggle/input/fii-atnn-2024-project-noisy-cifar-100/fii-atnn-2024-project-noisy-cifar-100
wandb: dataset: CIFAR100
wandb: eta_min: 1e-05
wandb: min_delta: 0.0001
wandb: model_name: resnet18
wandb: momentum: 0.9
wandb: nesterov: True
wandb: num_classes: 100
wandb: num_epochs: 100
wandb: optimizer_config: {'learning_rate': 0.01, 'optimizer': 'sgd'}
wandb: patience: 3
wandb: patience_early_stopping: 5
wandb: pretrained: True
wandb: scheduler: cosineannealinglr
wandb: stop_mode: max
wandb: t_0: 10
wandb: t_max: 100
wandb: t_mult: 2
wandb: use_cutmix: True
wandb: use_mixup: True
wandb: warmup: 5
wandb: weight_decay: 0.0005

```

Figure 5: Configuration

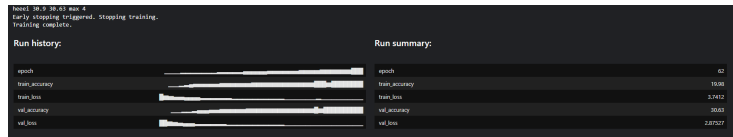


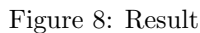
Figure 6: Result

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;

- ## 5. Experiment 5:

Figure 7: 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:

```
wandb: Agent Starting Run: chh8z02o with config:
wandb:   alpha: 1
wandb:   augmentation_scheme: randaugment
wandb:   batch_size: 64
wandb:   data_path: /kaggle/input/fii-atnn-2024-project-noisy-cifar-100/fii-atnn-2024-project-noisy-cifar-100
wandb:   dataset: CIFAR100
wandb:   eta_min: 1e-05
wandb:   min_delta: 0.0001
wandb:   model_name: resnet50
wandb:   momentum: 0.9
wandb:   nesterov: True
wandb:   num_classes: 100
wandb:   num_epochs: 100
wandb:   optimizer_config: {'learning_rate': 0.01, 'optimizer': 'sgd'}
wandb:   patience: 3
wandb:   patience_early_stopping: 5
wandb:   pretrained: True
wandb:   scheduler: cosineannealinglr
wandb:   stop_mode: max
wandb:   t_0: 10
wandb:   t_max: 100
wandb:   t_mult: 2
wandb:   use_cutmix: True
wandb:   use_mixup: True
wandb:   warmup: 5
wandb:   weight_decay: 0.0005
```

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:

```
wandb: Agent Starting Run: q2qaxzej with config:
wandb:   alpha: 1
wandb:   augmentation_scheme: randaugment
wandb:   batch_size: 64
wandb:   data_path: /kaggle/input/fii-atnn-2024-project-noisy-cifar-100/fii-atnn-2024-project-noisy-cifar-100
wandb:   dataset: CIFAR100
wandb:   eta_min: 1e-05
wandb:   min_delta: 0.0001
wandb:   model_name: resnet50
wandb:   momentum: 0.9
wandb:   nesterov: True
wandb:   num_classes: 100
wandb:   num_epochs: 100
wandb:   optimizer_config: {'learning_rate': 0.0005, 'optimizer': 'adamw'}
wandb:   patience: 5
wandb:   patience_early_stopping: 5
wandb:   pretrained: True
wandb:   scheduler: cosineannealinglr
wandb:   stop_mode: max
wandb:   t_0: 10
wandb:   t_max: 100
wandb:   t_mult: 2
wandb:   use_cutmix: True
wandb:   use_mixup: True
wandb:   warmup: 5
wandb:   weight_decay: 0.0005
```

Figure 11: Configuration

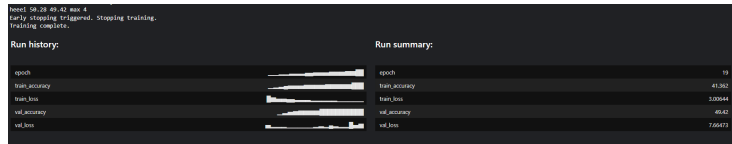


Figure 12: Result

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:

```
wandb: Agent Starting Run: he70n7gc with config:
wandb: alpha: 1
wandb: augmentation_scheme: randaugment
wandb: batch_size: 64
wandb: data_path: /kaggle/input/fii-atnn-2024-project-noisy-cifar-100/fii-atnn-2024-project-noisy-cifar-100
wandb: dataset: CIFAR100
wandb: eta_min: 1e-05
wandb: min_delta: 0.0001
wandb: model_name: resnet18
wandb: momentum: 0.9
wandb: nesterov: True
wandb: num_classes: 100
wandb: num_epochs: 100
wandb: optimizer_config: {'learning_rate': 0.01, 'optimizer': 'sgd'}
wandb: patience: 3
wandb: patience_early_stopping: 5
wandb: pretrained: True
wandb: scheduler: cosineannealinglr
wandb: stop_mode: max
wandb: t_0: 10
wandb: t_max: 100
wandb: t_mult: 2
wandb: use_cutmix: True
wandb: use_mixup: True
wandb: warmup: 5
wandb: weight_decay: 0.0005
```

Figure 13: Configuration

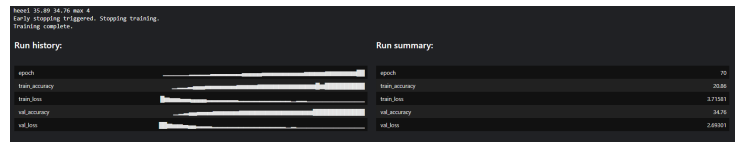


Figure 14: Result

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:

```
wandb: Agent Starting Run: 00y55a0p with config:
wandb: alpha: 1
wandb: augmentation_scheme: randaugment
wandb: batch_size: 64
wandb: data_path: /kaggle/input/fil-atnn-2024-project-noisy-cifar-100/fil-atnn-2024-project-noisy-cifar-100
wandb: dataset: CIFAR100
wandb: eta_min: 1e-05
wandb: min_delta: 0.0001
wandb: model_name: resnet18
wandb: momentum: 0.9
wandb: nesterov: True
wandb: num_classes: 100
wandb: num_epochs: 100
wandb: optimizer_config: {'learning_rate': 0.0005, 'optimizer': 'adamw'}
wandb: patience: 3
wandb: patience_early_stopping: 5
wandb: pretrained: True
wandb: scheduler: cosineannealinglr
wandb: stop_mode: max
wandb: t_0: 10
wandb: t_max: 100
wandb: t_mult: 2
wandb: use_cutmix: True
wandb: use_mixup: True
wandb: warmup: 5
wandb: weight_decay: 0.0005
wandb: Currently logged in as: gheorghitastefana (gheorghitastefana-alexandru-ioan-cuza-university-iasi). Use `
```

Figure 15: Configuration

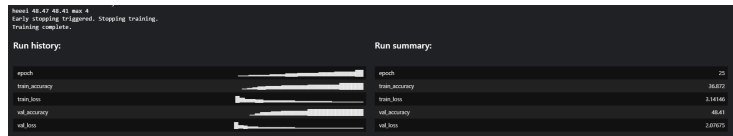


Figure 16: Result

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:

```
wandb: Agent Starting Run: do3lfrbo with config:
wandb: alpha: 1
wandb: augmentation_scheme: randaugment
wandb: batch_size: 64
wandb: data_path: /kaggle/input/fii-atnn-2024-project-noisy-cifar-100/fii-atnn-2024-project-noisy-cifar-100
wandb: dataset: CIFAR100
wandb: eta_min: 1e-05
wandb: min_delta: 0.0001
wandb: model_name: resnet50_resize
wandb: momentum: 0.9
wandb: nesterov: True
wandb: num_classes: 100
wandb: num_epochs: 100
wandb: optimizer_config: {'learning_rate': 0.001, 'optimizer': 'adamw'}
wandb: patience: 3
wandb: patience_early_stopping: 5
wandb: pretrained: True
wandb: scheduler: cosineannealinglr
wandb: stop_mode: max
wandb: t_0: 10
wandb: t_max: 100
wandb: t_mult: 2
wandb: use_cutmix: True
wandb: use_mixup: True
wandb: warmup: 5
wandb: weight_decay: 0.0005
```

Figure 17: Configuration

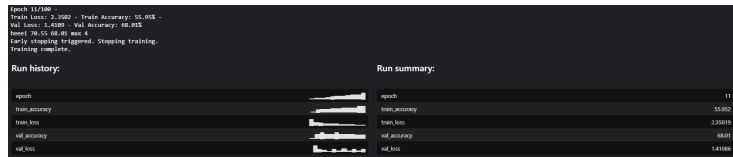


Figure 18: Result

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;

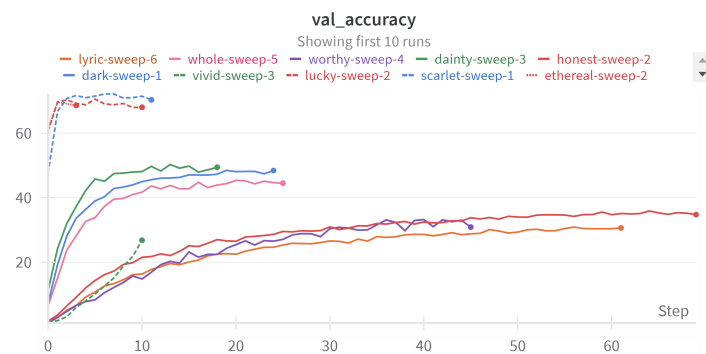


Figure 19: Val Accuracy

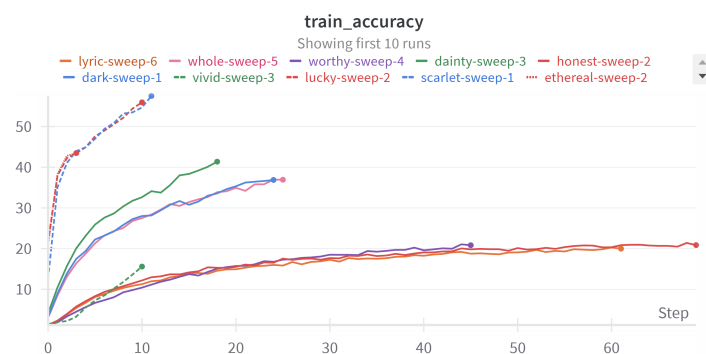


Figure 20: Train Accuracy

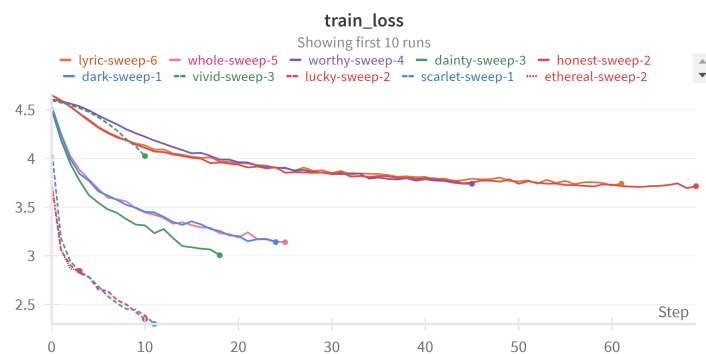


Figure 21: train Loss

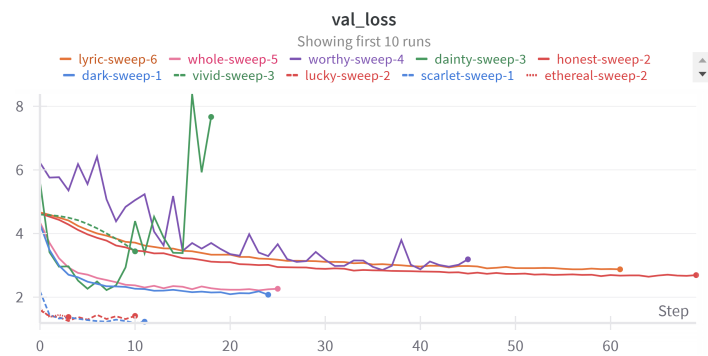


Figure 22: Val Loss