

**Project Development Phase
Model Performance Test**

Date	18 November 2023
Team ID	Team-592127
Project Name	Deep Learning Model For Detecting Diseases In Tea Leaves
Maximum Marks	10 Marks

Model Performance Testing:

S.No.	Parameter	Values
1.	Accuracy (Top-1)	Training Accuracy - 97.3 Validation Accuracy – 97.3
2.	Accuracy (Top-5)	Training Accuracy - 100 Validation Accuracy – 100

Screenshots

Training Accuracy:

```
Epoch      GPU_mem    loss  Instances    Size
35/35      0.363G    0.01391      5      64: 100%|██████████| 294/294 [00:15<00:00, 19.01it/s]
          classes  top1_acc  top5_acc: 100%|██████████| 19/19 [00:00<00:00, 23.05it/s]
          all      0.966      1

35 epochs completed in 0.142 hours.
Optimizer stripped from runs/classify/train/weights/last.pt, 3.0MB
Optimizer stripped from runs/classify/train/weights/best.pt, 3.0MB

Validating runs/classify/train/weights/best.pt...
Ultralytics YOLOv8.0.209 Python-3.10.12 torch-2.1.0+cu118 CUDA:0 (Tesla T4, 15102MiB)
YOLOv8n-cls summary (fused): 73 layers, 1442566 parameters, 0 gradients, 3.3 GFLOPs
train: /content/dataset/train... found 4693 images in 6 classes ✓
val: /content/dataset/val... found 587 images in 6 classes ✓
test: /content/dataset/test... found 587 images in 6 classes ✓
          classes  top1_acc  top5_acc: 100%|██████████| 19/19 [00:01<00:00, 18.30it/s]
          all      0.973      1

Speed: 0.1ms preprocess, 1.0ms inference, 0.0ms loss, 0.0ms postprocess per image
Results saved to runs/classify/train
Results saved to runs/classify/train
```

Validation Accuracy:

```
[ ] from ultralytics import YOLO

model = YOLO('/content/runs/classify/train/weights/best.pt') # load a custom model

# Validate the model
metrics = model.val() # no arguments needed, dataset and settings remembered
metrics.top1 # top1 accuracy
metrics.top5 # top5 accuracy
```

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YOLOv8n-cls summary (fused): 73 layers, 1442566 parameters, 0 gradients, 3.3 GFLOPs
train: /content/dataset/train... found 4693 images in 6 classes ✓
val: /content/dataset/val... found 587 images in 6 classes ✓
test: /content/dataset/test... found 587 images in 6 classes ✓
val: Scanning /content/dataset/val... 587 images, 0 corrupt: 100%|██████████| 587/587 [00:00<?, ?it/s]
classes top1_acc top5_acc: 100%|██████████| 37/37 [00:01<00:00, 29.48it/s]
all 0.973 1
Speed: 0.0ms preprocess, 1.3ms inference, 0.0ms loss, 0.0ms postprocess per image
Results saved to runs/classify/val
1.0

Classes Detected:

```
In [3]: print(result)

[ultralytics.engine.results.Results object with attributes:

boxes: None
keypoints: None
keys: ['probs']
masks: None
names: {0: 'algal_spot', 1: 'brown_blight', 2: 'gray_blight', 3: 'healthy',
4: 'helopeltis', 5: 'red_spot'}
```

Entire Training Epochs:

```
Downloading https://github.com/ultralytics/assets/releases/download/v0.0.0/yolov8n-cls.pt to 'yolov8n-cls.pt'...
100%|██████████| 5.28M/5.28M [00:00<00:00, 103MB/s]
Ultralytics YOLOv8.0.209 🚀 Python-3.10.12 torch-2.1.0+cu118 CUDA:0 (Tesla T4, 15102MiB)
engine/trainer: task=classify, mode=train, model=yolov8n-cls.pt, data=/content/dataset, epochs=35, patience=50,
train: /content/dataset/train... found 4693 images in 6 classes ✓
val: /content/dataset/val... found 587 images in 6 classes ✓
test: /content/dataset/test... found 587 images in 6 classes ✓
Overriding model.yaml nc=1000 with nc=6
```

YOLOv8n-cls summary: 99 layers, 1445974 parameters, 1445974 gradients, 3.4 GFLOPs
 Transferred 156/158 items from pretrained weights
TensorBoard: Start with 'tensorboard --logdir runs/classify/train', view at <http://localhost:6006/>
 AMP: running Automatic Mixed Precision (AMP) checks with YOLOv8n...
 Downloading <https://github.com/ultralytics/assets/releases/download/v0.0.0/yolov8n.pt> to 'yolov8n.pt'...
 100%|██████████| 6.23M/6.23M [00:00<00:00, 255MB/s]
 AMP: checks passed ✓
train: Scanning /content/dataset/train... 4693 images, 0 corrupt: 100%|██████████| 4693/4693 [00:00<00:00, 5217.49it/s]
train: New cache created: /content/dataset/train.cache
albumentations: RandomResizedCrop(p=1.0, height=64, width=64, scale=(0.5, 1.0), ratio=(0.75, 1.3333333333333333), int
val: Scanning /content/dataset/val... 587 images, 0 corrupt: 100%|██████████| 587/587 [00:00<00:00, 3515.94it/s]
val: New cache created: /content/dataset/val.cache
optimizer: 'optimizer=auto' found, ignoring 'lr=0.01' and 'momentum=0.937' and determining best 'optimizer', 'lr' a
optimizer: AdamW(lr=0.000714, momentum=0.9) with parameter groups 26 weight(decay=0.0), 27 weight(decay=0.0005), 27 b
 Image sizes 64 train, 64 val
 Using 2 dataloader workers
 Logging results to runs/classify/train
 Starting training for 35 epochs...

Epoch	GPU_mem	loss	Instances	Size
1/35	0.384G	0.4849	16	64: 11% ██████ 33/294 [00:02<00:16, 15.65it/s]Downloading
1/35	0.384G	0.4563	16	64: 25% ██████ 73/294 [00:05<00:16, 13.26it/s]
100% ██████████	755k/755k	[00:00<00:00, 40.2MB/s]		
1/35	0.384G	0.3088	5	64: 100% ██████████ 294/294 [00:21<00:00, 13.67it/s]
	classes	top1_acc	top5_acc: 100%	19/19 [00:01<00:00, 15.88it/s]
	all	0.785	1	

Epoch	GPU_mem	loss	Instances	Size
2/35	0.363G	0.1491	5	64: 100% ██████████ 294/294 [00:15<00:00, 18.95it/s]
	classes	top1_acc	top5_acc: 100%	19/19 [00:00<00:00, 24.66it/s]
	all	0.847	1	

Epoch	GPU_mem	loss	Instances	Size
3/35	0.363G	0.1269	5	64: 100% ██████████ 294/294 [00:12<00:00, 23.23it/s]
	classes	top1_acc	top5_acc: 100%	19/19 [00:00<00:00, 20.81it/s]
	all	0.862	0.998	

Epoch	GPU_mem	loss	Instances	Size
4/35	0.363G	0.1063	5	64: 100% ██████████ 294/294 [00:12<00:00, 24.15it/s]
	classes	top1_acc	top5_acc: 100%	19/19 [00:00<00:00, 20.64it/s]
	all	0.864	1	

Epoch	GPU_mem	loss	Instances	Size
5/35	0.363G	0.09134	5	64: 100% ██████████ 294/294 [00:12<00:00, 23.64it/s]
	classes	top1_acc	top5_acc: 100%	19/19 [00:00<00:00, 36.35it/s]
	all	0.882	0.998	

Epoch	GPU_mem	loss	Instances	Size
6/35	0.363G	0.08104	5	64: 100% ██████████ 294/294 [00:13<00:00, 22.24it/s]
	classes	top1_acc	top5_acc: 100%	19/19 [00:00<00:00, 38.15it/s]
	all	0.881	1	

Epoch	GPU_mem	loss	Instances	Size
7/35	0.363G	0.07359	5	64: 100% ██████████ 294/294 [00:13<00:00, 21.55it/s]
	classes	top1_acc	top5_acc: 100%	19/19 [00:00<00:00, 36.75it/s]
	all	0.893	1	

Epoch	GPU_mem	loss	Instances	Size
8/35	0.363G	0.06513	5	64: 100% ██████████ 294/294 [00:13<00:00, 21.08it/s]
	classes	top1_acc	top5_acc: 100%	19/19 [00:00<00:00, 36.20it/s]
	all	0.917	1	

Epoch	GPU_mem	loss	Instances	Size
9/35	0.363G	0.05679	5	64: 100% ██████████ 294/294 [00:13<00:00, 21.62it/s]
	classes	top1_acc	top5_acc: 100%	19/19 [00:00<00:00, 35.75it/s]
	all	0.927	1	

Epoch	GPU_mem	loss	Instances	Size	
10/35	0.363G	0.05083	5	64: 100%	294/294 [00:15<00:00, 18.69it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 35.70it/s]
	all	0.923	1		
Epoch	GPU_mem	loss	Instances	Size	
11/35	0.363G	0.04987	5	64: 100%	294/294 [00:13<00:00, 21.83it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 37.02it/s]
	all	0.923	1		
Epoch	GPU_mem	loss	Instances	Size	
12/35	0.363G	0.04463	5	64: 100%	294/294 [00:13<00:00, 21.59it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 36.82it/s]
	all	0.94	1		
Epoch	GPU_mem	loss	Instances	Size	
13/35	0.363G	0.04684	5	64: 100%	294/294 [00:13<00:00, 22.12it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 29.22it/s]
	all	0.947	1		
Epoch	GPU_mem	loss	Instances	Size	
14/35	0.363G	0.04144	5	64: 100%	294/294 [00:12<00:00, 23.48it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 20.52it/s]
	all	0.92	1		
Epoch	GPU_mem	loss	Instances	Size	
15/35	0.363G	0.03656	5	64: 100%	294/294 [00:12<00:00, 23.37it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 20.62it/s]
	all	0.939	1		
Epoch	GPU_mem	loss	Instances	Size	
16/35	0.363G	0.03804	5	64: 100%	294/294 [00:12<00:00, 23.05it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 35.31it/s]
	all	0.944	0.998		
Epoch	GPU_mem	loss	Instances	Size	
17/35	0.363G	0.03226	5	64: 100%	294/294 [00:13<00:00, 21.68it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 37.12it/s]
	all	0.944	1		
Epoch	GPU_mem	loss	Instances	Size	
18/35	0.363G	0.0311	5	64: 100%	294/294 [00:13<00:00, 21.78it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 35.70it/s]
	all	0.939	1		
Epoch	GPU_mem	loss	Instances	Size	
19/35	0.363G	0.02792	5	64: 100%	294/294 [00:13<00:00, 21.98it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 36.49it/s]
	all	0.947	1		
Epoch	GPU_mem	loss	Instances	Size	
20/35	0.363G	0.02527	5	64: 100%	294/294 [00:13<00:00, 21.84it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 36.38it/s]
	all	0.949	1		
Epoch	GPU_mem	loss	Instances	Size	
21/35	0.363G	0.02352	5	64: 100%	294/294 [00:13<00:00, 21.88it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 36.44it/s]
	all	0.956	1		
Epoch	GPU_mem	loss	Instances	Size	
22/35	0.363G	0.02413	5	64: 100%	294/294 [00:13<00:00, 21.71it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 37.25it/s]
	all	0.952	1		

Epoch	GPU_mem	loss	Instances	Size	
23/35	0.363G	0.02429	5	64: 100%	294/294 [00:13<00:00, 22.53it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 24.83it/s]
	all	0.961	1		
Epoch	GPU_mem	loss	Instances	Size	
24/35	0.363G	0.02163	5	64: 100%	294/294 [00:12<00:00, 23.59it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 23.03it/s]
	all	0.957	1		
Epoch	GPU_mem	loss	Instances	Size	
25/35	0.363G	0.0205	5	64: 100%	294/294 [00:11<00:00, 24.58it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 21.05it/s]
	all	0.954	1		
Epoch	GPU_mem	loss	Instances	Size	
26/35	0.363G	0.01876	5	64: 100%	294/294 [00:13<00:00, 22.38it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 24.25it/s]
	all	0.954	1		
Epoch	GPU_mem	loss	Instances	Size	
27/35	0.363G	0.01728	5	64: 100%	294/294 [00:13<00:00, 22.58it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 36.02it/s]
	all	0.961	1		
Epoch	GPU_mem	loss	Instances	Size	
28/35	0.363G	0.01947	5	64: 100%	294/294 [00:13<00:00, 21.20it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 35.90it/s]
	all	0.954	1		
Epoch	GPU_mem	loss	Instances	Size	
29/35	0.363G	0.01651	5	64: 100%	294/294 [00:13<00:00, 21.60it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 36.96it/s]
	all	0.959	1		
Epoch	GPU_mem	loss	Instances	Size	
30/35	0.363G	0.01784	5	64: 100%	294/294 [00:13<00:00, 21.62it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 33.68it/s]
	all	0.963	1		
Epoch	GPU_mem	loss	Instances	Size	
31/35	0.363G	0.01503	5	64: 100%	294/294 [00:13<00:00, 21.52it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 37.58it/s]
	all	0.961	1		
Epoch	GPU_mem	loss	Instances	Size	
32/35	0.363G	0.01415	5	64: 100%	294/294 [00:13<00:00, 21.85it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 34.88it/s]
	all	0.973	1		
Epoch	GPU_mem	loss	Instances	Size	
33/35	0.363G	0.01237	5	64: 100%	294/294 [00:13<00:00, 21.56it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 36.41it/s]
	all	0.966	1		
Epoch	GPU_mem	loss	Instances	Size	
34/35	0.363G	0.01272	5	64: 100%	294/294 [00:13<00:00, 22.61it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 21.23it/s]
	all	0.964	1		
Epoch	GPU_mem	loss	Instances	Size	
35/35	0.363G	0.01391	5	64: 100%	294/294 [00:15<00:00, 19.01it/s]
	classes	top1_acc	top5_acc:	100%	19/19 [00:00<00:00, 23.05it/s]
	all	0.966	1		

```
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```

THE END