##--Targets ==> 405 | 344 | 61 --##

##--Train Split ==> 211 Slides

-------------------------

Number of Slides: 211

Number of tiles: 131716

Max tiles: 1875

Min tiles: 16

Average tiles: 624.2464454976304

nonMSI: 178

MSI: 33

##--Val Split ==> 94 Slides

-------------------------

Number of Slides: 94

Number of tiles: 55618

Max tiles: 1682

Min tiles: 6

Average tiles: 591.6808510638298

nonMSI: 81

MSI: 13

##--Test Split ==> 100 Slides

-------------------------

Number of Slides: 100

Number of tiles: 55849

Max tiles: 1942

Min tiles: 30

Average tiles: 558.49

nonMSI: 85

MSI: 15

211

Number of TopK 1426

Number of randk k 13276

Number of randk and topk combined 14702

Train Epoch: [ 1/ 4] Batch: 1, Training Loss: 0.5857, Acc: 75.78%

Training Epoch: [1/4] Loss: 0.4176 Accuracy: 83

Inference Epoch: [ 1/ 4] Batch: [ 1/29] Validation Loss: 0.3652, acc: 84.57%

Inference Epoch: [ 1/ 4] Batch: [ 1/109] Validation Loss: 0.9187, acc: 56.25%

Inference Epoch: [ 1/ 4] Batch: [101/109] Validation Loss: 0.5306, acc: 77.13%

----------------------Validation Results -------------------------------------

F1-scores (Val): MV=0.589 AVG=0.589 MAX=0.561 top10=0.548

Balanced Acc (Val): MV=0.592 AVG=0.592 MAX=0.587 top10=0.561

AUC-scores (Val): AVG=0.683 MAX=0.534 top10=0.531

------------------------------------------------------------------

Saved checkpoint\_best\_F1.pth

Saved checkpoint\_best\_AUC.pth

Number of randk k 13276

Number of randk and topk combined 13560

Train Epoch: [ 2/ 4] Batch: 1, Training Loss: 0.3710, Acc: 85.35%

Training Epoch: [2/4] Loss: 0.3506 Accuracy: 85

Inference Epoch: [ 2/ 4] Batch: [ 1/27] Validation Loss: 0.1078, acc: 98.24%

Inference Epoch: [ 2/ 4] Batch: [ 1/109] Validation Loss: 0.0643, acc: 99.80%

Inference Epoch: [ 2/ 4] Batch: [101/109] Validation Loss: 0.3656, acc: 90.75%

----------------------Validation Results -------------------------------------

F1-scores (Val): MV=0.463 AVG=0.463 MAX=0.460 top10=0.460

Balanced Acc (Val): MV=0.500 AVG=0.500 MAX=0.494 top10=0.494

AUC-scores (Val): AVG=0.531 MAX=0.491 top10=0.470

------------------------------------------------------------------

Number of randk k 13276

Number of randk and topk combined 13549

Train Epoch: [ 3/ 4] Batch: 1, Training Loss: 0.3078, Acc: 88.67%

Training Epoch: [3/4] Loss: 0.3192 Accuracy: 87

Inference Epoch: [ 3/ 4] Batch: [ 1/27] Validation Loss: 0.2665, acc: 89.65%

Inference Epoch: [ 3/ 4] Batch: [ 1/109] Validation Loss: 0.2561, acc: 91.80%

Inference Epoch: [ 3/ 4] Batch: [101/109] Validation Loss: 0.4442, acc: 85.64%

----------------------Validation Results -------------------------------------

F1-scores (Val): MV=0.570 AVG=0.631 MAX=0.552 top10=0.598

Balanced Acc (Val): MV=0.558 AVG=0.603 MAX=0.546 top10=0.585

AUC-scores (Val): AVG=0.648 MAX=0.550 top10=0.556

------------------------------------------------------------------

Saved checkpoint\_best\_F1.pth

Number of randk k 13276

Number of randk and topk combined 13549

Train Epoch: [ 4/ 4] Batch: 1, Training Loss: 0.2929, Acc: 88.28%

Training Epoch: [4/4] Loss: 0.2903 Accuracy: 87

Inference Epoch: [ 4/ 4] Batch: [ 1/27] Validation Loss: 0.1107, acc: 99.22%

Inference Epoch: [ 4/ 4] Batch: [ 1/109] Validation Loss: 0.0901, acc: 99.61%

Inference Epoch: [ 4/ 4] Batch: [101/109] Validation Loss: 0.3388, acc: 90.37%

----------------------Validation Results -------------------------------------

F1-scores (Val): MV=0.463 AVG=0.463 MAX=0.460 top10=0.460

Balanced Acc (Val): MV=0.500 AVG=0.500 MAX=0.494 top10=0.494

AUC-scores (Val): AVG=0.677 MAX=0.619 top10=0.623

------------------------------------------------------------------

Inference Epoch: [ 4/ 4] Batch: [ 1/110] Validation Loss: 1.0732, acc: 64.26%

Inference Epoch: [ 4/ 4] Batch: [101/110] Validation Loss: 0.6350, acc: 72.76%

Predicted Tiles: 55849, classes: 2, total targets: 100

----------------------Test Set Results-------------------------------

Test F1-scores: MV=0.574, AVG=0.574, MAX=0.562, top10=0.526

Test Balanced Acc: MV=0.565, AVG=0.565, MAX=0.588, top10=0.533

Test AUC-scores: AVG=0.694, MAX=0.669, top10=0.679

Confusion Matrix (Average Predictions):

[[79 6]

[12 3]]

Classification Report (Average Predictions):

precision recall f1-score support

0 0.87 0.93 0.90 85

1 0.33 0.20 0.25 15

accuracy 0.82 100

macro avg 0.60 0.56 0.57 100

weighted avg 0.79 0.82 0.80 100

------------------------------------------------------

..............Test set done ...............

##--Targets ==> 405 | 344 | 61 --##

##--Train Split ==> 200 Slides

-------------------------

Number of Slides: 200

Number of tiles: 119899

Max tiles: 1942

Min tiles: 18

Average tiles: 599.495

nonMSI: 172

MSI: 28

##--Val Split ==> 111 Slides

-------------------------

Number of Slides: 111

Number of tiles: 67666

Max tiles: 1849

Min tiles: 16

Average tiles: 609.6036036036036

nonMSI: 91

MSI: 20

##--Test Split ==> 94 Slides

-------------------------

Number of Slides: 94

Number of tiles: 55618

Max tiles: 1682

Min tiles: 6

Average tiles: 591.6808510638298

nonMSI: 81

MSI: 13

200

Number of TopK 1300

Number of randk k 12091

Number of randk and topk combined 13391

Train Epoch: [ 1/ 4] Batch: 1, Training Loss: 1.0388, Acc: 21.29%

Training Epoch: [1/4] Loss: 0.4674 Accuracy: 77

Inference Epoch: [ 1/ 4] Batch: [ 1/27] Validation Loss: 0.6852, acc: 72.07%

Inference Epoch: [ 1/ 4] Batch: [ 1/133] Validation Loss: 0.0908, acc: 98.63%

Inference Epoch: [ 1/ 4] Batch: [101/133] Validation Loss: 0.8475, acc: 77.06%

----------------------Validation Results -------------------------------------

F1-scores (Val): MV=0.450 AVG=0.450 MAX=0.546 top10=0.546

Balanced Acc (Val): MV=0.500 AVG=0.500 MAX=0.550 top10=0.550

AUC-scores (Val): AVG=0.677 MAX=0.684 top10=0.657

------------------------------------------------------------------

Saved checkpoint\_best\_F1.pth

Saved checkpoint\_best\_AUC.pth

Number of randk k 12091

Number of randk and topk combined 12357

Train Epoch: [ 2/ 4] Batch: 1, Training Loss: 0.4015, Acc: 84.38%

Training Epoch: [2/4] Loss: 0.3319 Accuracy: 87

Inference Epoch: [ 2/ 4] Batch: [ 1/25] Validation Loss: 0.6109, acc: 73.44%

Inference Epoch: [ 2/ 4] Batch: [ 1/133] Validation Loss: 0.3375, acc: 86.33%

Inference Epoch: [ 2/ 4] Batch: [101/133] Validation Loss: 0.6585, acc: 75.10%

----------------------Validation Results -------------------------------------

F1-scores (Val): MV=0.588 AVG=0.588 MAX=0.722 top10=0.692

Balanced Acc (Val): MV=0.575 AVG=0.575 MAX=0.698 top10=0.659

AUC-scores (Val): AVG=0.792 MAX=0.776 top10=0.761

------------------------------------------------------------------

Saved checkpoint\_best\_F1.pth

Saved checkpoint\_best\_AUC.pth

Number of randk k 12091

Number of randk and topk combined 12349

Train Epoch: [ 3/ 4] Batch: 1, Training Loss: 0.3131, Acc: 88.48%

Training Epoch: [3/4] Loss: 0.2974 Accuracy: 88

Inference Epoch: [ 3/ 4] Batch: [ 1/25] Validation Loss: 0.5003, acc: 76.95%

Inference Epoch: [ 3/ 4] Batch: [ 1/133] Validation Loss: 0.0583, acc: 100.00%

Inference Epoch: [ 3/ 4] Batch: [101/133] Validation Loss: 0.9813, acc: 76.12%

----------------------Validation Results -------------------------------------

F1-scores (Val): MV=0.450 AVG=0.450 MAX=0.495 top10=0.500

Balanced Acc (Val): MV=0.500 AVG=0.500 MAX=0.520 top10=0.525

AUC-scores (Val): AVG=0.637 MAX=0.634 top10=0.624

------------------------------------------------------------------

Number of randk k 12091

Number of randk and topk combined 12348

Train Epoch: [ 4/ 4] Batch: 1, Training Loss: 0.3250, Acc: 86.72%

Training Epoch: [4/4] Loss: 0.2813 Accuracy: 88

Inference Epoch: [ 4/ 4] Batch: [ 1/25] Validation Loss: 0.5505, acc: 74.41%

Inference Epoch: [ 4/ 4] Batch: [ 1/133] Validation Loss: 0.1500, acc: 97.07%

Inference Epoch: [ 4/ 4] Batch: [101/133] Validation Loss: 0.7077, acc: 75.58%

----------------------Validation Results -------------------------------------

F1-scores (Val): MV=0.450 AVG=0.450 MAX=0.527 top10=0.539

Balanced Acc (Val): MV=0.500 AVG=0.500 MAX=0.534 top10=0.545

AUC-scores (Val): AVG=0.760 MAX=0.741 top10=0.733

------------------------------------------------------------------

Inference Epoch: [ 4/ 4] Batch: [ 1/109] Validation Loss: 0.1922, acc: 94.73%

Inference Epoch: [ 4/ 4] Batch: [101/109] Validation Loss: 0.4125, acc: 87.29%

Predicted Tiles: 55618, classes: 2, total targets: 94

----------------------Test Set Results-------------------------------

Test F1-scores: MV=0.537, AVG=0.537, MAX=0.580, top10=0.570

Test Balanced Acc: MV=0.538, AVG=0.538, MAX=0.565, top10=0.558

Test AUC-scores: AVG=0.550, MAX=0.538, top10=0.499

Confusion Matrix (Average Predictions):

[[81 0]

[12 1]]

Classification Report (Average Predictions):

precision recall f1-score support

0 0.87 1.00 0.93 81

1 1.00 0.08 0.14 13

accuracy 0.87 94

macro avg 0.94 0.54 0.54 94

weighted avg 0.89 0.87 0.82 94

------------------------------------------------------

..............Test set done ...............

##--Targets ==> 405 | 344 | 61 --##

##--Train Split ==> 194 Slides

-------------------------

Number of Slides: 194

Number of tiles: 111467

Max tiles: 1942

Min tiles: 6

Average tiles: 574.5721649484536

nonMSI: 166

MSI: 28

##--Val Split ==> 100 Slides

-------------------------

Number of Slides: 100

Number of tiles: 64050

Max tiles: 1875

Min tiles: 18

Average tiles: 640.5

nonMSI: 87

MSI: 13

##--Test Split ==> 111 Slides

-------------------------

Number of Slides: 111

Number of tiles: 67666

Max tiles: 1849

Min tiles: 16

Average tiles: 609.6036036036036

nonMSI: 91

MSI: 20

194

Number of TopK 1211

Number of randk k 11248

Number of randk and topk combined 12459

Train Epoch: [ 1/ 4] Batch: 1, Training Loss: 0.4082, Acc: 86.33%

Training Epoch: [1/4] Loss: 0.3302 Accuracy: 87

Inference Epoch: [ 1/ 4] Batch: [ 1/25] Validation Loss: 0.6320, acc: 72.66%

Inference Epoch: [ 1/ 4] Batch: [ 1/126] Validation Loss: 0.0397, acc: 99.80%

Inference Epoch: [ 1/ 4] Batch: [101/126] Validation Loss: 0.8249, acc: 82.60%

----------------------Validation Results -------------------------------------

F1-scores (Val): MV=0.465 AVG=0.465 MAX=0.465 top10=0.465

Balanced Acc (Val): MV=0.500 AVG=0.500 MAX=0.500 top10=0.500

AUC-scores (Val): AVG=0.618 MAX=0.694 top10=0.706

------------------------------------------------------------------

Saved checkpoint\_best\_F1.pth

Saved checkpoint\_best\_AUC.pth

Number of randk k 11248

Number of randk and topk combined 11497

Train Epoch: [ 2/ 4] Batch: 1, Training Loss: 0.2719, Acc: 89.65%

Training Epoch: [2/4] Loss: 0.2768 Accuracy: 89

Inference Epoch: [ 2/ 4] Batch: [ 1/23] Validation Loss: 0.3992, acc: 77.73%

Inference Epoch: [ 2/ 4] Batch: [ 1/126] Validation Loss: 0.0662, acc: 99.41%

Inference Epoch: [ 2/ 4] Batch: [101/126] Validation Loss: 0.8077, acc: 82.46%

----------------------Validation Results -------------------------------------

F1-scores (Val): MV=0.465 AVG=0.465 MAX=0.465 top10=0.465

Balanced Acc (Val): MV=0.500 AVG=0.500 MAX=0.500 top10=0.500

AUC-scores (Val): AVG=0.611 MAX=0.658 top10=0.661

------------------------------------------------------------------

Number of randk k 11248

Number of randk and topk combined 11493

Train Epoch: [ 3/ 4] Batch: 1, Training Loss: 0.2187, Acc: 91.60%

Training Epoch: [3/4] Loss: 0.2515 Accuracy: 90

Inference Epoch: [ 3/ 4] Batch: [ 1/23] Validation Loss: 0.4680, acc: 78.12%

Inference Epoch: [ 3/ 4] Batch: [ 1/126] Validation Loss: 0.0520, acc: 99.80%

Inference Epoch: [ 3/ 4] Batch: [101/126] Validation Loss: 0.7878, acc: 82.05%

----------------------Validation Results -------------------------------------

F1-scores (Val): MV=0.539 AVG=0.539 MAX=0.646 top10=0.660

Balanced Acc (Val): MV=0.538 AVG=0.538 MAX=0.610 top10=0.615

AUC-scores (Val): AVG=0.640 MAX=0.683 top10=0.681

------------------------------------------------------------------

Saved checkpoint\_best\_F1.pth

Number of randk k 11248

Number of randk and topk combined 11492

Train Epoch: [ 4/ 4] Batch: 1, Training Loss: 0.3008, Acc: 87.11%

Training Epoch: [4/4] Loss: 0.2370 Accuracy: 90

Inference Epoch: [ 4/ 4] Batch: [ 1/23] Validation Loss: 0.3825, acc: 80.47%

Inference Epoch: [ 4/ 4] Batch: [ 1/126] Validation Loss: 0.0861, acc: 99.22%

Inference Epoch: [ 4/ 4] Batch: [101/126] Validation Loss: 0.7388, acc: 79.93%

----------------------Validation Results -------------------------------------

F1-scores (Val): MV=0.462 AVG=0.462 MAX=0.634 top10=0.539

Balanced Acc (Val): MV=0.494 AVG=0.494 MAX=0.604 top10=0.538

AUC-scores (Val): AVG=0.625 MAX=0.681 top10=0.687

------------------------------------------------------------------

Inference Epoch: [ 4/ 4] Batch: [ 1/133] Validation Loss: 0.1352, acc: 96.09%

Inference Epoch: [ 4/ 4] Batch: [101/133] Validation Loss: 0.8690, acc: 76.58%

Predicted Tiles: 67666, classes: 2, total targets: 111

----------------------Test Set Results-------------------------------

Test F1-scores: MV=0.450, AVG=0.450, MAX=0.450, top10=0.450

Test Balanced Acc: MV=0.500, AVG=0.500, MAX=0.500, top10=0.500

Test AUC-scores: AVG=0.742, MAX=0.729, top10=0.734

Confusion Matrix (Average Predictions):

[[91 0]

[20 0]]

Classification Report (Average Predictions):

precision recall f1-score support

0 0.82 1.00 0.90 91

1 0.00 0.00 0.00 20

accuracy 0.82 111

macro avg 0.41 0.50 0.45 111

weighted avg 0.67 0.82 0.74 111

------------------------------------------------------

..............Test set done ...............

c:\Anaconda3\envs\tcga\Lib\site-packages\sklearn\metrics\\_classification.py:1517: UndefinedMetricWarning: Precision is ill-defined and being set to 0.0 in labels with no predicted samples. Use `zero\_division` parameter to control this behavior.

\_warn\_prf(average, modifier, f"{metric.capitalize()} is", len(result))

c:\Anaconda3\envs\tcga\Lib\site-packages\sklearn\metrics\\_classification.py:1517: UndefinedMetricWarning: Precision is ill-defined and being set to 0.0 in labels with no predicted samples. Use `zero\_division` parameter to control this behavior.

\_warn\_prf(average, modifier, f"{metric.capitalize()} is", len(result))

c:\Anaconda3\envs\tcga\Lib\site-packages\sklearn\metrics\\_classification.py:1517: UndefinedMetricWarning: Precision is ill-defined and being set to 0.0 in labels with no predicted samples. Use `zero\_division` parameter to control this behavior.

\_warn\_prf(average, modifier, f"{metric.capitalize()} is", len(result))

##--Targets ==> 405 | 344 | 61 --##

##--Train Split ==> 205 Slides

-------------------------

Number of Slides: 205

Number of tiles: 123284

Max tiles: 1849

Min tiles: 6

Average tiles: 601.3853658536585

nonMSI: 172

MSI: 33

##--Val Split ==> 100 Slides

-------------------------

Number of Slides: 100

Number of tiles: 55849

Max tiles: 1942

Min tiles: 30

Average tiles: 558.49

nonMSI: 85

MSI: 15

##--Test Split ==> 100 Slides

-------------------------

Number of Slides: 100

Number of tiles: 64050

Max tiles: 1875

Min tiles: 18

Average tiles: 640.5

nonMSI: 87

MSI: 13

205

Number of TopK 1337

Number of randk k 12433

Number of randk and topk combined 13770

Train Epoch: [ 1/ 4] Batch: 1, Training Loss: 1.4279, Acc: 14.06%

Training Epoch: [1/4] Loss: 0.5282 Accuracy: 73

Inference Epoch: [ 1/ 4] Batch: [ 1/27] Validation Loss: 0.4750, acc: 81.05%

Inference Epoch: [ 1/ 4] Batch: [ 1/110] Validation Loss: 0.9157, acc: 78.71%

Inference Epoch: [ 1/ 4] Batch: [101/110] Validation Loss: 0.4999, acc: 81.97%

----------------------Validation Results -------------------------------------

F1-scores (Val): MV=0.459 AVG=0.459 MAX=0.459 top10=0.459

Balanced Acc (Val): MV=0.500 AVG=0.500 MAX=0.500 top10=0.500

AUC-scores (Val): AVG=0.801 MAX=0.711 top10=0.722

------------------------------------------------------------------

Saved checkpoint\_best\_F1.pth

Saved checkpoint\_best\_AUC.pth

Number of randk k 12433

Number of randk and topk combined 12700

Train Epoch: [ 2/ 4] Batch: 1, Training Loss: 0.3321, Acc: 87.50%

Training Epoch: [2/4] Loss: 0.3200 Accuracy: 87

Inference Epoch: [ 2/ 4] Batch: [ 1/25] Validation Loss: 0.4229, acc: 83.01%

Inference Epoch: [ 2/ 4] Batch: [ 1/110] Validation Loss: 0.5587, acc: 78.71%

Inference Epoch: [ 2/ 4] Batch: [101/110] Validation Loss: 0.5532, acc: 81.58%

----------------------Validation Results -------------------------------------

F1-scores (Val): MV=0.459 AVG=0.459 MAX=0.459 top10=0.459

Balanced Acc (Val): MV=0.500 AVG=0.500 MAX=0.500 top10=0.500

AUC-scores (Val): AVG=0.771 MAX=0.755 top10=0.730

------------------------------------------------------------------

Number of randk k 12433

Number of randk and topk combined 12694

Train Epoch: [ 3/ 4] Batch: 1, Training Loss: 0.2939, Acc: 87.89%

Training Epoch: [3/4] Loss: 0.2877 Accuracy: 88

Inference Epoch: [ 3/ 4] Batch: [ 1/25] Validation Loss: 0.3811, acc: 85.94%

Inference Epoch: [ 3/ 4] Batch: [ 1/110] Validation Loss: 0.3640, acc: 78.91%

Inference Epoch: [ 3/ 4] Batch: [101/110] Validation Loss: 0.5438, acc: 81.96%

----------------------Validation Results -------------------------------------

F1-scores (Val): MV=0.459 AVG=0.459 MAX=0.591 top10=0.564

Balanced Acc (Val): MV=0.500 AVG=0.500 MAX=0.576 top10=0.555

AUC-scores (Val): AVG=0.766 MAX=0.787 top10=0.776

------------------------------------------------------------------

Saved checkpoint\_best\_F1.pth

Number of randk k 12433

Number of randk and topk combined 12694

Train Epoch: [ 4/ 4] Batch: 1, Training Loss: 0.2904, Acc: 87.89%

Training Epoch: [4/4] Loss: 0.2687 Accuracy: 89

Inference Epoch: [ 4/ 4] Batch: [ 1/25] Validation Loss: 0.3466, acc: 85.16%

Inference Epoch: [ 4/ 4] Batch: [ 1/110] Validation Loss: 0.8813, acc: 71.48%

Inference Epoch: [ 4/ 4] Batch: [101/110] Validation Loss: 0.5342, acc: 79.53%

----------------------Validation Results -------------------------------------

F1-scores (Val): MV=0.582 AVG=0.524 MAX=0.681 top10=0.667

Balanced Acc (Val): MV=0.567 AVG=0.533 MAX=0.649 top10=0.627

AUC-scores (Val): AVG=0.790 MAX=0.815 top10=0.798

------------------------------------------------------------------

Saved checkpoint\_best\_F1.pth

Saved checkpoint\_best\_AUC.pth

Inference Epoch: [ 4/ 4] Batch: [ 1/126] Validation Loss: 0.2676, acc: 88.67%

Inference Epoch: [ 4/ 4] Batch: [101/126] Validation Loss: 0.6857, acc: 77.27%

Predicted Tiles: 64050, classes: 2, total targets: 100

----------------------Test Set Results-------------------------------

Test F1-scores: MV=0.582, AVG=0.622, MAX=0.621, top10=0.622

Test Balanced Acc: MV=0.565, AVG=0.598, MAX=0.614, top10=0.598

Test AUC-scores: AVG=0.664, MAX=0.695, top10=0.684

Confusion Matrix (Average Predictions):

[[84 3]

[10 3]]

Classification Report (Average Predictions):

precision recall f1-score support

0 0.89 0.97 0.93 87

1 0.50 0.23 0.32 13

accuracy 0.87 100

macro avg 0.70 0.60 0.62 100

weighted avg 0.84 0.87 0.85 100

------------------------------------------------------

..............Test set done ...............

**Average Test Results of Four Folds**

F1-scores Balanc Acc AUC-scores

MV 0.53575 0.54200 NaN

AVG 0.54575 0.55025 0.66250

MAX 0.55325 0.56675 0.65775

top10 0.54200 0.54725 0.64900