Training on Fold 1

2024-04-18 01:47:14.523957: I tensorflow/core/platform/cpu\_feature\_guard.cc:182] This TensorFlow binary is optimized to use available CPU instructions in performance-critical operations.

To enable the following instructions: SSE SSE2 SSE3 SSE4.1 SSE4.2 AVX AVX2 FMA, in other operations, rebuild TensorFlow with the appropriate compiler flags.

Epoch 1/20

961/961 [==============================] - ETA: 0s - loss: 20.8069 - accuracy: 0.50532024-04-18 01:54:56.538832: W tensorflow/tsl/framework/cpu\_allocator\_impl.cc:83] Allocation of 10509312000 exceeds 10% of free system memory.

2024-04-18 01:55:02.682464: W tensorflow/tsl/framework/cpu\_allocator\_impl.cc:83] Allocation of 2463498240 exceeds 10% of free system memory.

961/961 [==============================] - 469s 484ms/step - loss: 20.8069 - accuracy: 0.5053 - val\_loss: 17.1291 - val\_accuracy: 0.5322 - lr: 1.0000e-05

Epoch 2/20

961/961 [==============================] - ETA: 0s - loss: 14.0215 - accuracy: 0.51052024-04-18 02:02:12.458457: W tensorflow/tsl/framework/cpu\_allocator\_impl.cc:83] Allocation of 10509312000 exceeds 10% of free system memory.

2024-04-18 02:02:17.431947: W tensorflow/tsl/framework/cpu\_allocator\_impl.cc:83] Allocation of 2463498240 exceeds 10% of free system memory.

961/961 [==============================] - 435s 452ms/step - loss: 14.0215 - accuracy: 0.5105 - val\_loss: 11.1865 - val\_accuracy: 0.5528 - lr: 1.0000e-05

Epoch 3/20

961/961 [==============================] - ETA: 0s - loss: 8.9327 - accuracy: 0.52432024-04-18 02:09:43.749100: W tensorflow/tsl/framework/cpu\_allocator\_impl.cc:83] Allocation of 10509312000 exceeds 10% of free system memory.

961/961 [==============================] - 451s 469ms/step - loss: 8.9327 - accuracy: 0.5243 - val\_loss: 6.9354 - val\_accuracy: 0.5605 - lr: 1.0000e-05

Epoch 4/20

961/961 [==============================] - 449s 467ms/step - loss: 5.4260 - accuracy: 0.5696 - val\_loss: 4.1104 - val\_accuracy: 0.6202 - lr: 1.0000e-05

Epoch 5/20

961/961 [==============================] - 451s 469ms/step - loss: 3.2034 - accuracy: 0.6431 - val\_loss: 2.4501 - val\_accuracy: 0.6479 - lr: 1.0000e-05

Epoch 6/20

961/961 [==============================] - 449s 467ms/step - loss: 1.9220 - accuracy: 0.6866 - val\_loss: 1.5430 - val\_accuracy: 0.6472 - lr: 1.0000e-05

Epoch 7/20

961/961 [==============================] - 448s 466ms/step - loss: 1.2187 - accuracy: 0.7189 - val\_loss: 1.0746 - val\_accuracy: 0.6492 - lr: 1.0000e-05

Epoch 8/20

961/961 [==============================] - 455s 474ms/step - loss: 0.8444 - accuracy: 0.7479 - val\_loss: 0.8423 - val\_accuracy: 0.6518 - lr: 1.0000e-05

Epoch 9/20

961/961 [==============================] - 450s 468ms/step - loss: 0.6417 - accuracy: 0.7726 - val\_loss: 0.7543 - val\_accuracy: 0.6467 - lr: 1.0000e-05

Epoch 10/20

961/961 [==============================] - 451s 469ms/step - loss: 0.5251 - accuracy: 0.7962 - val\_loss: 0.7216 - val\_accuracy: 0.6446 - lr: 1.0000e-05

Epoch 11/20

961/961 [==============================] - 451s 469ms/step - loss: 0.4545 - accuracy: 0.8163 - val\_loss: 0.7067 - val\_accuracy: 0.6439 - lr: 1.0000e-05

Epoch 12/20

961/961 [==============================] - 444s 462ms/step - loss: 0.4047 - accuracy: 0.8349 - val\_loss: 0.7290 - val\_accuracy: 0.6407 - lr: 1.0000e-05

Epoch 13/20

961/961 [==============================] - 447s 466ms/step - loss: 0.3679 - accuracy: 0.8506 - val\_loss: 0.7671 - val\_accuracy: 0.6362 - lr: 1.0000e-05

Epoch 14/20

961/961 [==============================] - 450s 468ms/step - loss: 0.3370 - accuracy: 0.8644 - val\_loss: 0.7947 - val\_accuracy: 0.6417 - lr: 1.0000e-05

Epoch 15/20

961/961 [==============================] - 442s 460ms/step - loss: 0.3107 - accuracy: 0.8774 - val\_loss: 0.8339 - val\_accuracy: 0.6345 - lr: 1.0000e-05

Epoch 16/20

961/961 [==============================] - ETA: 0s - loss: 0.2865 - accuracy: 0.8887

Epoch 16: ReduceLROnPlateau reducing learning rate to 5.999999848427251e-06.

961/961 [==============================] - 442s 460ms/step - loss: 0.2865 - accuracy: 0.8887 - val\_loss: 0.8990 - val\_accuracy: 0.6288 - lr: 1.0000e-05

Training on Fold 2

Epoch 1/20

961/961 [==============================] - 457s 474ms/step - loss: 20.7602 - accuracy: 0.5041 - val\_loss: 17.0501 - val\_accuracy: 0.5335 - lr: 1.0000e-05

Epoch 2/20

961/961 [==============================] - 461s 480ms/step - loss: 13.9324 - accuracy: 0.5121 - val\_loss: 11.0966 - val\_accuracy: 0.5333 - lr: 1.0000e-05

Epoch 3/20

961/961 [==============================] - 457s 475ms/step - loss: 8.8503 - accuracy: 0.5310 - val\_loss: 6.8651 - val\_accuracy: 0.5389 - lr: 1.0000e-05

Epoch 4/20

961/961 [==============================] - 456s 474ms/step - loss: 5.3705 - accuracy: 0.5633 - val\_loss: 4.0717 - val\_accuracy: 0.5993 - lr: 1.0000e-05

Epoch 5/20

961/961 [==============================] - 456s 474ms/step - loss: 3.1661 - accuracy: 0.6310 - val\_loss: 2.4178 - val\_accuracy: 0.6396 - lr: 1.0000e-05

Epoch 6/20

961/961 [==============================] - 456s 475ms/step - loss: 1.9004 - accuracy: 0.6762 - val\_loss: 1.5249 - val\_accuracy: 0.6467 - lr: 1.0000e-05

Epoch 7/20

961/961 [==============================] - 458s 477ms/step - loss: 1.2125 - accuracy: 0.7113 - val\_loss: 1.0762 - val\_accuracy: 0.6463 - lr: 1.0000e-05

Epoch 8/20

961/961 [==============================] - 460s 479ms/step - loss: 0.8471 - accuracy: 0.7428 - val\_loss: 0.8519 - val\_accuracy: 0.6467 - lr: 1.0000e-05

Epoch 9/20

961/961 [==============================] - 456s 474ms/step - loss: 0.6479 - accuracy: 0.7684 - val\_loss: 0.7493 - val\_accuracy: 0.6467 - lr: 1.0000e-05

Epoch 10/20

961/961 [==============================] - 458s 477ms/step - loss: 0.5344 - accuracy: 0.7906 - val\_loss: 0.7227 - val\_accuracy: 0.6430 - lr: 1.0000e-05

Epoch 11/20

961/961 [==============================] - 456s 475ms/step - loss: 0.4621 - accuracy: 0.8123 - val\_loss: 0.7185 - val\_accuracy: 0.6405 - lr: 1.0000e-05

Epoch 12/20

961/961 [==============================] - 459s 478ms/step - loss: 0.4126 - accuracy: 0.8309 - val\_loss: 0.7413 - val\_accuracy: 0.6379 - lr: 1.0000e-05

Epoch 13/20

961/961 [==============================] - 458s 477ms/step - loss: 0.3737 - accuracy: 0.8468 - val\_loss: 0.7785 - val\_accuracy: 0.6324 - lr: 1.0000e-05

Epoch 14/20

961/961 [==============================] - 455s 474ms/step - loss: 0.3429 - accuracy: 0.8614 - val\_loss: 0.8167 - val\_accuracy: 0.6326 - lr: 1.0000e-05

Epoch 15/20

961/961 [==============================] - 458s 477ms/step - loss: 0.3152 - accuracy: 0.8752 - val\_loss: 0.8356 - val\_accuracy: 0.6310 - lr: 1.0000e-05

Epoch 16/20

961/961 [==============================] - ETA: 0s - loss: 0.2904 - accuracy: 0.8875

Epoch 16: ReduceLROnPlateau reducing learning rate to 5.999999848427251e-06.

961/961 [==============================] - 458s 477ms/step - loss: 0.2904 - accuracy: 0.8875 - val\_loss: 0.8841 - val\_accuracy: 0.6293 - lr: 1.0000e-05

3844/3844 [==============================] - 38s 10ms/step

Test Metrics:

Precision: 0.6184

Recall: 0.7405

F1 Score: 0.6740

ROC AUC: 0.7496

PR AUC: 0.7881

MCC: 0.2892

y\_test\_pred = (test\_scores > 0.6).astype(int)

...: y\_test\_true = y\_test.astype(int)

...:

...: # Calculate and display evaluation metrics for the test set

...: precision\_test = precision\_score(y\_test\_true, y\_test\_pred)

...: recall\_test = recall\_score(y\_test\_true, y\_test\_pred)

...: f1\_test = f1\_score(y\_test\_true, y\_test\_pred)

...: roc\_auc\_test = roc\_auc\_score(y\_test\_true, test\_scores)

...: pr\_auc\_test = average\_precision\_score(y\_test\_true, test\_scores)

...: mcc\_test = matthews\_corrcoef(y\_test\_true, y\_test\_pred)

...:

...: print("\nTest Metrics:")

...: print(f'Precision: {precision\_test:.4f}')

...: print(f'Recall: {recall\_test:.4f}')

...: print(f'F1 Score: {f1\_test:.4f}')

...: print(f'ROC AUC: {roc\_auc\_test:.4f}')

...: print(f'PR AUC: {pr\_auc\_test:.4f}')

...: print(f'MCC: {mcc\_test:.4f}')

...: y\_test\_pred = (test\_scores > 0.5).astype(int)

...: y\_test\_true = y\_test.astype(int)

...:

Test Metrics:

Precision: 0.6365

Recall: 0.6819

F1 Score: 0.6584

ROC AUC: 0.7496

PR AUC: 0.7881

MCC: 0.2933

In [12]: y\_test\_pred = (test\_scores > 0.7).astype(int)

...: y\_test\_true = y\_test.astype(int)

...:

...: # Calculate and display evaluation metrics for the test set

...: precision\_test = precision\_score(y\_test\_true, y\_test\_pred)

...: recall\_test = recall\_score(y\_test\_true, y\_test\_pred)

...: f1\_test = f1\_score(y\_test\_true, y\_test\_pred)

...: roc\_auc\_test = roc\_auc\_score(y\_test\_true, test\_scores)

...: pr\_auc\_test = average\_precision\_score(y\_test\_true, test\_scores)

...: mcc\_test = matthews\_corrcoef(y\_test\_true, y\_test\_pred)

...:

...: print("\nTest Metrics:")

...: print(f'Precision: {precision\_test:.4f}')

...: print(f'Recall: {recall\_test:.4f}')

...: print(f'F1 Score: {f1\_test:.4f}')

...: print(f'ROC AUC: {roc\_auc\_test:.4f}')

...: print(f'PR AUC: {pr\_auc\_test:.4f}')

...: print(f'MCC: {mcc\_test:.4f}')

...: y\_test\_pred = (test\_scores > 0.5).astype(int)

...: y\_test\_true = y\_test.astype(int)

...:

Test Metrics:

Precision: 0.6614

Recall: 0.6207

F1 Score: 0.6404

ROC AUC: 0.7496

PR AUC: 0.7881

MCC: 0.3036

Intercept 0.49537667250260337

Prediction\_local [0.40560174]

Right: 0.059723925

157/157 [==============================] - 2s 10ms/step

Intercept 0.48152182781567376

Prediction\_local [0.41844254]

Right: 0.04770035

157/157 [==============================] - 2s 10ms/step

Intercept 0.48348653760447236

Prediction\_local [0.41340621]

Right: 0.5159115Εικόνα που περιέχει κείμενο, γραμμή, διάγραμμα, γράφημα

Περιγραφή που δημιουργήθηκε αυτόματα

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Περιγραφή που δημιουργήθηκε αυτόματα