2024-04-24 13:21:53.305383: 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 1/15

1682/1682 [==============================] - ETA: 0s - loss: 6.7324 - accuracy: 0.6517INFO:tensorflow:Assets written to: ComplexModelWithHoIEGCN\assets

INFO:tensorflow:Assets written to: ComplexModelWithHoIEGCN\assets

1682/1682 [==============================] - 15263s 9s/step - loss: 6.7324 - accuracy: 0.6517 - val\_loss: 3.0532 - val\_accuracy: 0.5031 - lr: 5.0000e-05

Epoch 2/15

1682/1682 [==============================] - ETA: 0s - loss: 0.9359 - accuracy: 0.7253INFO:tensorflow:Assets written to: ComplexModelWithHoIEGCN\assets

INFO:tensorflow:Assets written to: ComplexModelWithHoIEGCN\assets

1682/1682 [==============================] - 16367s 10s/step - loss: 0.9359 - accuracy: 0.7253 - val\_loss: 0.6342 - val\_accuracy: 0.6974 - lr: 5.0000e-05

Epoch 3/15

1682/1682 [==============================] - ETA: 0s - loss: 0.4933 - accuracy: 0.7896INFO:tensorflow:Assets written to: ComplexModelWithHoIEGCN\assets

INFO:tensorflow:Assets written to: ComplexModelWithHoIEGCN\assets

1682/1682 [==============================] - 15736s 9s/step - loss: 0.4933 - accuracy: 0.7896 - val\_loss: 0.5579 - val\_accuracy: 0.6832 - lr: 5.0000e-05

Epoch 4/15

1682/1682 [==============================] - 14561s 9s/step - loss: 0.3776 - accuracy: 0.8525 - val\_loss: 0.6511 - val\_accuracy: 0.6773 - lr: 5.0000e-05

Epoch 5/15

1682/1682 [==============================] - 14512s 9s/step - loss: 0.2982 - accuracy: 0.8868 - val\_loss: 0.7977 - val\_accuracy: 0.6735 - lr: 5.0000e-05

Epoch 6/15

1682/1682 [==============================] - 15107s 9s/step - loss: 0.2393 - accuracy: 0.9133 - val\_loss: 0.9708 - val\_accuracy: 0.6705 - lr: 5.0000e-05

Epoch 7/15

1682/1682 [==============================] - 15972s 9s/step - loss: 0.1932 - accuracy: 0.9376 - val\_loss: 1.1289 - val\_accuracy: 0.6697 - lr: 5.0000e-05

2883/2883 [==============================] - 821s 284ms/step

Evaluation Metrics:

Precision: 0.6754

Recall: 0.6527

F1 Score: 0.6639

ROC AUC: 0.7576

PR AUC: 0.7491

MCC: 0.3392

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

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

...:

...: # Calculate evaluation metrics

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

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

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

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

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

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

...:

...: # Display evaluation metrics

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

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

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

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

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

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

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

Evaluation Metrics:

Precision: 0.6923

Recall: 0.6045

F1 Score: 0.6454

ROC AUC: 0.7576

PR AUC: 0.7491

MCC: 0.3386

In [11]: y\_pred = (test\_scores > 0.7).astype(int)

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

...:

...: # Calculate evaluation metrics

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

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

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

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

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

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

...:

...: # Display evaluation metrics

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

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

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

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

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

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

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

Evaluation Metrics:

Precision: 0.7113

Recall: 0.5642

F1 Score: 0.6293

ROC AUC: 0.7576

PR AUC: 0.7491

MCC: 0.3427

Εικόνα που περιέχει κείμενο, διάγραμμα, γραμμή, στιγμιότυπο οθόνης

Περιγραφή που δημιουργήθηκε αυτόματα

Εικόνα που περιέχει κείμενο, στιγμιότυπο οθόνης, λογισμικό, λειτουργικό σύστημα

Περιγραφή που δημιουργήθηκε αυτόματα

Εικόνα που περιέχει κείμενο, στιγμιότυπο οθόνης, οθόνη, λογισμικό

Περιγραφή που δημιουργήθηκε αυτόματα

Εικόνα που περιέχει κείμενο, στιγμιότυπο οθόνης, διάγραμμα, πολυχρωμία

Περιγραφή που δημιουργήθηκε αυτόματα

Εικόνα που περιέχει κείμενο, διάγραμμα, γραμμή, γράφημα

Περιγραφή που δημιουργήθηκε αυτόματα

Εικόνα που περιέχει διάγραμμα, κείμενο, γράφημα, γραμμή

Περιγραφή που δημιουργήθηκε αυτόματα

Εικόνα που περιέχει κείμενο, στιγμιότυπο οθόνης, διάγραμμα, ορθογώνιο παραλληλόγραμμο

Περιγραφή που δημιουργήθηκε αυτόματα

Triplet 1 (Original):

Subject: https://ec.europa.eu/eurostat/NLP4StatRef/knowledge/glossaryArticle118, Predicate: https://ec.europa.eu/eurostat/NLP4StatRef/ontology/hasReference, Object: https://ec.europa.eu/eurostat/NLP4StatRef/knowledge/referenceSource59

157/157 [==============================] - 44s 270ms/step

Intercept 0.3680372198509803

Prediction\_local [0.42985216]

Right: 0.106806375

Feature Importances (Coefficients):

Predicate: 0.36054917610729664

Object: -0.2732848137123616

Subject: -0.025449419485481278

Triplet 2 (Original):

Subject: https://ec.europa.eu/eurostat/NLP4StatRef/knowledge/hlth\_ehis\_aw1u, Predicate: https://ec.europa.eu/eurostat/NLP4StatRef/ontology/term, Object: hlth\_ehis\_aw1u

157/157 [==============================] - 43s 271ms/step

Intercept 0.5323467746410051

Prediction\_local [0.10973848]

Right: 0.0068876804

Feature Importances (Coefficients):

Predicate: -0.4827865793081219

Object: 0.05602372502748154

Subject: 0.004154562312843857

Triplet 3 (Original):

Subject: https://ec.europa.eu/eurostat/NLP4StatRef/knowledge/paragraph9574\_3455, Predicate: http://www.w3.org/1999/02/22-rdf-syntax-ns#type, Object: https://ec.europa.eu/eurostat/NLP4StatRef/ontology/Paragraph

157/157 [==============================] - 46s 290ms/step

Intercept 0.46293581582618326

Prediction\_local [0.41630669]

Right: 0.19365114

Feature Importances (Coefficients):

Predicate: -0.12850856902974112

Object: 0.12022734895051186

Subject: -0.03834790113475665

Triplet 4 (Original):

Subject: https://ec.europa.eu/eurostat/NLP4StatRef/ontology/fats\_08, Predicate: https://ec.europa.eu/eurostat/NLP4StatRef/ontology/level, Object: 4

157/157 [==============================] - 43s 273ms/step

Intercept 0.19845717375034155

Prediction\_local [0.8055936]

Right: 0.0002484958

Feature Importances (Coefficients):

Predicate: 0.428052834316885

Object: 0.168105521726745

Subject: 0.010978069513871282

Triplet 5 (Original):

Subject: https://ec.europa.eu/eurostat/NLP4StatRef/ontology/ei\_qna, Predicate: http://www.w3.org/1999/02/22-rdf-syntax-ns#type, Object: https://ec.europa.eu/eurostat/NLP4StatRef/ontology/StatisticalData

157/157 [==============================] - 43s 276ms/step

Intercept 0.426413043910638

Prediction\_local [0.4772985]

Right: 0.87392455

Feature Importances (Coefficients):

Object: 0.038407776745188506

Predicate: 0.016442131634920053

Subject: -0.003964454203048042