Epoch 1/20

1682/1682 [==============================] - ETA: 0s - loss: 392.2192 - accuracy: 0.70682024-06-09 23:14:22.679579: W tensorflow/tsl/framework/cpu\_allocator\_impl.cc:83] Allocation of 21018624000 exceeds 10% of free system memory.

2024-06-09 23:15:00.942680: W tensorflow/tsl/framework/cpu\_allocator\_impl.cc:83] Allocation of 2463498240 exceeds 10% of free system memory.

2024-06-09 23:15:01.903818: W tensorflow/tsl/framework/cpu\_allocator\_impl.cc:83] Allocation of 2463498240 exceeds 10% of free system memory.

1682/1682 [==============================] - 1530s 907ms/step - loss: 392.2192 - accuracy: 0.7068 - val\_loss: 63.7938 - val\_accuracy: 0.9785 - lr: 1.0000e-04

Epoch 2/20

1682/1682 [==============================] - ETA: 0s - loss: 75.1112 - accuracy: 0.94462024-06-09 23:39:59.289445: W tensorflow/tsl/framework/cpu\_allocator\_impl.cc:83] Allocation of 21018624000 exceeds 10% of free system memory.

2024-06-09 23:41:08.539655: W tensorflow/tsl/framework/cpu\_allocator\_impl.cc:83] Allocation of 2463498240 exceeds 10% of free system memory.

1682/1682 [==============================] - 1568s 932ms/step - loss: 75.1112 - accuracy: 0.9446 - val\_loss: 34.7837 - val\_accuracy: 0.9880 - lr: 1.0000e-04

Epoch 3/20

1682/1682 [==============================] - 1516s 901ms/step - loss: 35.9806 - accuracy: 0.9735 - val\_loss: 17.3152 - val\_accuracy: 0.9910 - lr: 1.0000e-04

Epoch 4/20

1682/1682 [==============================] - 1556s 925ms/step - loss: 18.2080 - accuracy: 0.9810 - val\_loss: 7.1618 - val\_accuracy: 0.9905 - lr: 1.0000e-04

Epoch 5/20

1682/1682 [==============================] - 1580s 939ms/step - loss: 9.0731 - accuracy: 0.9845 - val\_loss: 3.0289 - val\_accuracy: 0.9899 - lr: 1.0000e-04

Epoch 6/20

1682/1682 [==============================] - 1450s 862ms/step - loss: 5.5148 - accuracy: 0.9860 - val\_loss: 1.8209 - val\_accuracy: 0.9890 - lr: 1.0000e-04

Epoch 7/20

1682/1682 [==============================] - 1420s 844ms/step - loss: 3.8202 - accuracy: 0.9878 - val\_loss: 1.6489 - val\_accuracy: 0.9888 - lr: 1.0000e-04

Epoch 8/20

1682/1682 [==============================] - 1452s 863ms/step - loss: 2.8638 - accuracy: 0.9887 - val\_loss: 1.5446 - val\_accuracy: 0.9894 - lr: 1.0000e-04

Epoch 9/20

1682/1682 [==============================] - 1449s 861ms/step - loss: 2.2580 - accuracy: 0.9902 - val\_loss: 1.7376 - val\_accuracy: 0.9877 - lr: 1.0000e-04

Epoch 10/20

1682/1682 [==============================] - 1523s 905ms/step - loss: 1.7954 - accuracy: 0.9911 - val\_loss: 1.9954 - val\_accuracy: 0.9892 - lr: 1.0000e-04

Epoch 11/20

1682/1682 [==============================] - 1628s 968ms/step - loss: 1.6962 - accuracy: 0.9915 - val\_loss: 2.9456 - val\_accuracy: 0.9855 - lr: 1.0000e-04

Epoch 12/20

1682/1682 [==============================] - 1627s 967ms/step - loss: 1.4417 - accuracy: 0.9918 - val\_loss: 2.2547 - val\_accuracy: 0.9866 - lr: 1.0000e-04

Epoch 13/20

1682/1682 [==============================] - ETA: 0s - loss: 1.2359 - accuracy: 0.9928

Epoch 13: ReduceLROnPlateau reducing learning rate to 5.999999848427251e-05.

1682/1682 [==============================] - 1699s 1s/step - loss: 1.2359 - accuracy: 0.9928 - val\_loss: 2.7158 - val\_accuracy: 0.9831 - lr: 1.0000e-04

2883/2883 [==============================] - 59s 20ms/step

Evaluation Metrics:

Precision: 0.9930

Recall: 0.9883

F1 Score: 0.9906

ROC AUC: 0.9998

PR AUC: 0.9998

MCC: 0.9813

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)

...:

...: # Confusion Matrix

...: conf\_matrix = confusion\_matrix(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: 0.9987

Recall: 0.9715

F1 Score: 0.9849

ROC AUC: 0.9998

PR AUC: 0.9998

MCC: 0.9705

In [4]: 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)

...:

...: # Confusion Matrix

...: conf\_matrix = confusion\_matrix(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: 1.0000

Recall: 0.9499

F1 Score: 0.9743

ROC AUC: 0.9998

PR AUC: 0.9998

MCC: 0.9510

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

Περιγραφή που δημιουργήθηκε αυτόματα

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

Περιγραφή που δημιουργήθηκε αυτόματα

Εικόνα που περιέχει κείμενο, διάγραμμα, γραμμή, γράφημα

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Περιγραφή που δημιουργήθηκε αυτόματα

Εικόνα που περιέχει κείμενο, στιγμιότυπο οθόνης, οθόνη, διάγραμμα

Περιγραφή που δημιουργήθηκε αυτόματα

Triplet 1 (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 [==============================] - 3s 18ms/step

Intercept 0.69882305686967

Prediction\_local [0.95978611]

Right: 0.9760258

Feature Importances (Coefficients):

Subject: 0.09537366418768155

Predicate: 0.08482511507398548

Object: 0.08076427764860555

Triplet 2 (Original):

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

157/157 [==============================] - 3s 17ms/step

Intercept 0.832367805183065

Prediction\_local [0.68881586]

Right: 0.6409517

Feature Importances (Coefficients):

Subject: -0.18295784459323453

Predicate: 0.09034329773511819

Object: -0.050937400953636996

Triplet 3 (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 [==============================] - 3s 17ms/step

Intercept 0.7786377792237467

Prediction\_local [0.81555131]

Right: 0.86464894

Feature Importances (Coefficients):

Predicate: -0.12324704514518972

Object: 0.0918410306453744

Subject: 0.06831954576800926

Triplet 4 (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 [==============================] - 3s 17ms/step

Intercept 0.747195113018561

Prediction\_local [0.85565345]

Right: 0.76948535

Feature Importances (Coefficients):

Subject: 0.08729721819494927

Predicate: 0.08670697023764137

Object: -0.06554585383430928

Triplet 5 (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 [==============================] - 3s 17ms/step

Intercept 0.8238042487657841

Prediction\_local [0.71553525]

Right: 0.76374406

Feature Importances (Coefficients):

Predicate: -0.07559039897590612

Subject: -0.022293362718226028

Object: -0.010385233615990168