Neural Network Results

Multi-layer perceptron for binary classification

model = Sequential()

model.add(Dense(512, input\_shape=(max\_words,), activation='relu'))

model.add(Dropout(0.5))

model.add(Dense(256, activation='relu'))

model.add(Dropout(0.5))

model.add(Dense(1, activation='sigmoid'))

max\_words = 1000

Train Accuracy: 0.9706

Test Accuracy: 0.8296

Train f1 Score: 0.9711481844946026

Test f1 Score: 0.8428624123939507

ROC\_AUC Score: 0.8296

Classification Report:

precision recall f1-score support

0 0.90 0.75 0.81 2500

1 0.78 0.91 0.84 2500

accuracy 0.83 5000

macro avg 0.84 0.83 0.83 5000

weighted avg 0.84 0.83 0.83 5000

Confusion matrix:

[[1863 637]

[ 215 2285]]

max\_words = 500

Train Accuracy: 0.9548

Test Accuracy: 0.8108

Train f1 Score: 0.9548361310951239

Test f1 Score: 0.808424463345484

ROC\_AUC Score: 0.8107999999999999

Classification Report:

precision recall f1-score support

0 0.80 0.82 0.81 2500

1 0.82 0.80 0.81 2500

accuracy 0.81 5000

macro avg 0.81 0.81 0.81 5000

weighted avg 0.81 0.81 0.81 5000

Confusion matrix:

[[2058 442]

[ 504 1996]]

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max\_words = 1500

Train Accuracy: 0.9812

Test Accuracy: 0.8502

Train f1 Score: 0.9812674372259864

Test f1 Score: 0.8513593967056957

ROC\_AUC Score: 0.8502000000000001

Classification Report:

precision recall f1-score support

0 0.86 0.84 0.85 2500

1 0.84 0.86 0.85 2500

accuracy 0.85 5000

macro avg 0.85 0.85 0.85 5000

weighted avg 0.85 0.85 0.85 5000

Confusion matrix:

[[2106 394]

[ 355 2145]]

max\_words = 2000 Best so far

Train Accuracy: 0.9802

Test Accuracy: 0.8548

Train f1 Score: 0.9802513464991023

Test f1 Score: 0.8550898203592815

ROC\_AUC Score: 0.8548

Classification Report:

precision recall f1-score support

0 0.86 0.85 0.85 2500

1 0.85 0.86 0.86 2500

accuracy 0.85 5000

macro avg 0.85 0.85 0.85 5000

weighted avg 0.85 0.85 0.85 5000

Confusion matrix:

[[2132 368]

[ 358 2142]]

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max\_words = 2500

Train Accuracy: 0.9818

Test Accuracy: 0.8466

Train f1 Score: 0.9819265143992056

Test f1 Score: 0.850224565514548

ROC\_AUC Score: 0.8466

Classification Report:

precision recall f1-score support

0 0.86 0.82 0.84 2500

1 0.83 0.87 0.85 2500

accuracy 0.85 5000

macro avg 0.85 0.85 0.85 5000

weighted avg 0.85 0.85 0.85 5000

Confusion matrix:

[[2056 444]

[ 323 2177]]