Model Building

We built a Sequential model using TensorFlow and Keras. The model architecture included:

- An Embedding layer for word embeddings.
- Two Bidirectional LSTM layers for capturing both past and future context.
- A Dense layer with ReLU activation for non-linear transformation.
- A Dropout layer for regularization to prevent overfitting.
- A final Dense layer with softmax activation for binary classification.

The model was compiled with the Adam optimizer, categorical cross-entropy loss function, and accuracy as the evaluation metric.

Model Training

The model was trained on the training data with a batch size of 16, validation split of 0.1, for 10 epochs. We used ModelCheckpoint callbacks to save the model weights after each epoch and to save the best model weights based on validation accuracy. The training process was verbose and the training data was shuffled before each epoch.

Model Evaluation

The model was evaluated on the testing data. The evaluation metrics included the model's loss value and accuracy on the test data.

Visualization

We used Matplotlib and Seaborn to visualize the distribution of classes in the dataset and the training history of the model (accuracy and loss over epochs). We also generated a confusion matrix to examine the performance of the classification model.

Conclusion

This project demonstrated the application of NLP techniques and deep learning methods for text classification. The model was able to classify news articles as either 'fake' or 'real' with very high accuracy.