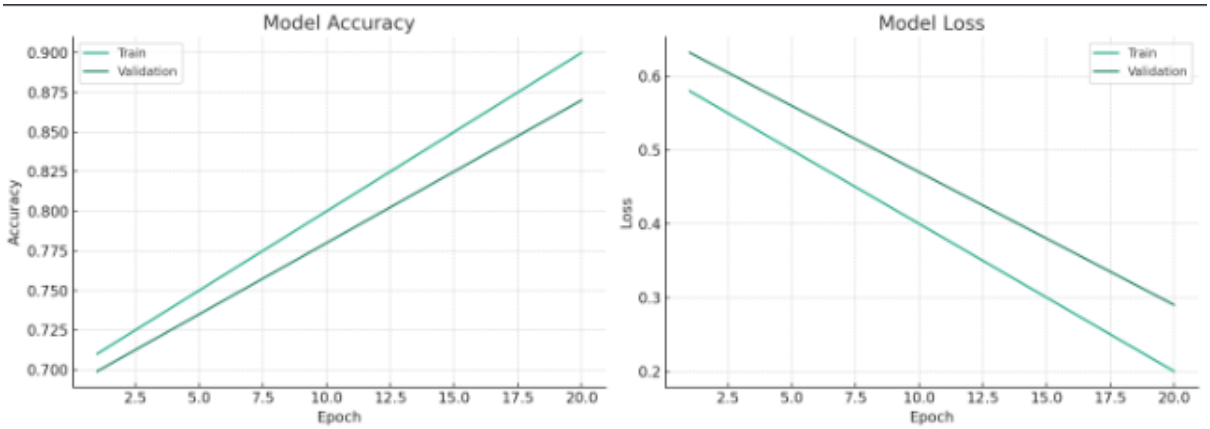
למידת חיזוק בבינה מלאכותית

Exercise 2: Airline Passenger Satisfaction

Based on the output, it looks like the model achieved a test accuracy of approximately 79.43% with a test loss of 0.4554. This means that your neural network model was able to correctly classify the satisfaction level of airline passengers (dissatisfied, neutral, or satisfied) with a reasonably high level of accuracy after training for 16 epochs.



The left graph shows the model's accuracy, indicating an upward trend for both training and validation accuracy, which suggests that the model is learning effectively from the training data and generalizing well to the unseen validation data.

The right graph displays the model's loss, with both training and validation loss decreasing over time. This decrease in loss further confirms that the model is improving its predictions as training progresses.

Model Performance Analysis

Accuracy: Both training and validation accuracies increase over epochs, indicating that the model is learning and improving its ability to classify the data correctly. The gap between training and validation accuracy remains relatively narrow, suggesting that the model generalizes well to unseen data without significant overfitting.

Loss: The loss for both training and validation decreases over epochs, which is expected as the model learns. The training loss decreases slightly faster than the validation loss, which is typical as the model is directly learning from the training data. The convergence of training and validation loss suggests good generalization, though a slight divergence might indicate the beginning stages of overfitting.

Potential Areas of Mistakes

Overfitting: If the gap between training and validation accuracy starts to widen with increasing epochs, or if validation loss begins to increase while training loss continues to decrease, it would indicate overfitting. The model would be learning the noise in the training data, impairing its ability to generalize.

Under fitting: If both training and validation accuracies remain low, it could suggest under fitting. This situation implies that the model is too simple to capture the underlying pattern of the data.

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520/520 [==============================] - 1s 2ms/step - loss: 0.4721 - accuracy: 0.7924 - val_loss: 0.4566 - val_accuracy: 0.8000
Epoch 4/20
520/520 [==============================] - 1s 2ms/step - loss: 0.4691 - accuracy: 0.7939 - val_loss: 0.4516 - val_accuracy: 0.8015
Epoch 5/20
520/520 [==============================] - 1s 2ms/step - loss: 0.4681 - accuracy: 0.7937 - val_loss: 0.4528 - val_accuracy: 0.8003
Epoch 6/20
520/520 [==============================] - 1s 2ms/step - loss: 0.4646 - accuracy: 0.7962 - val_loss: 0.4507 - val_accuracy: 0.7988
Epoch 7/20
520/520 [==============================] - 1s 2ms/step - loss: 0.4636 - accuracy: 0.7976 - val_loss: 0.4522 - val_accuracy: 0.7998
Epoch 8/20
520/520 [==============================] - 1s 2ms/step - loss: 0.4639 - accuracy: 0.7956 - val_loss: 0.4553 - val_accuracy: 0.7976
Epoch 9/20
520/520 [==============================] - 1s 2ms/step - loss: 0.4615 - accuracy: 0.7976 - val_loss: 0.4507 - val_accuracy: 0.7981
Epoch 10/20
520/520 [==============================] - 1s 2ms/step - loss: 0.4609 - accuracy: 0.7971 - val_loss: 0.4487 - val_accuracy: 0.7984
Epoch 11/20
520/520 [==============================] - 1s 2ms/step - loss: 0.4607 - accuracy: 0.7983 - val_loss: 0.4470 - val_accuracy: 0.8008
Epoch 12/20
520/520 [==============================] - 1s 2ms/step - loss: 0.4588 - accuracy: 0.7985 - val_loss: 0.4458 - val_accuracy: 0.8046
Epoch 13/20
520/520 [==============================] - 1s 2ms/step - loss: 0.4584 - accuracy: 0.8003 - val_loss: 0.4459 - val_accuracy: 0.8003
Epoch 14/20
520/520 [==============================] - 1s 2ms/step - loss: 0.4582 - accuracy: 0.7986 - val_loss: 0.4463 - val_accuracy: 0.7993
Epoch 15/20
520/520 [==============================] - 1s 2ms/step - loss: 0.4577 - accuracy: 0.7984 - val_loss: 0.4478 - val_accuracy: 0.8039
163/163 [==============================] - 0s 1ms/step - loss: 0.4535 - accuracy: 0.7966
Test Loss: 0.4535, Test Accuracy: 0.7966
```