Heart Disease Prediction using Neural Network

This project predicts the likelihood of heart disease using a Neural Network trained on the Kaggle 'Heart Failure Prediction' dataset. The model is built using TensorFlow and scikit-learn and evaluated using accuracy, confusion matrix, and performance metrics.

Project Code and Outputs


```
···   Using Colab cache for faster access to the 'heart-failure-prediction' dataset.
      ✅ Dataset downloaded at: /kaggle/input/heart-failure-prediction

      === Dataset Preview ===
        Age Sex ChestPainType  RestingBP  Cholesterol  FastingBS RestingECG  MaxHR  \
      0   40   M           ATA        140          289          0     Normal    172
      1   49   F           NAP        160          180          0     Normal    156
      2   37   M           ATA        130          283          0         ST     98
      3   48   F           ASY        138          214          0     Normal    108
      4   54   M           NAP        150          195          0     Normal    122

        ExerciseAngina  Oldpeak ST_Slope  HeartDisease
      0              N      0.0       Up             0
      1              N      1.0     Flat             1
      2              N      0.0       Up             0
      3              Y      1.5     Flat             1
      4              N      0.0       Up             0

      Columns:
       Index(['Age', 'Sex', 'ChestPainType', 'RestingBP', 'Cholesterol', 'FastingBS',
              'RestingECG', 'MaxHR', 'ExerciseAngina', 'Oldpeak', 'ST_Slope',
              'HeartDisease'],
             dtype='object')
```

```
Missing values:
 Age              0
Sex              0
ChestPainType    0
RestingBP        0
Cholesterol      0
FastingBS        0
RestingECG       0
MaxHR            0
ExerciseAngina   0
Oldpeak          0
ST_Slope         0
HeartDisease     0
dtype: int64
```
Model: "sequential"

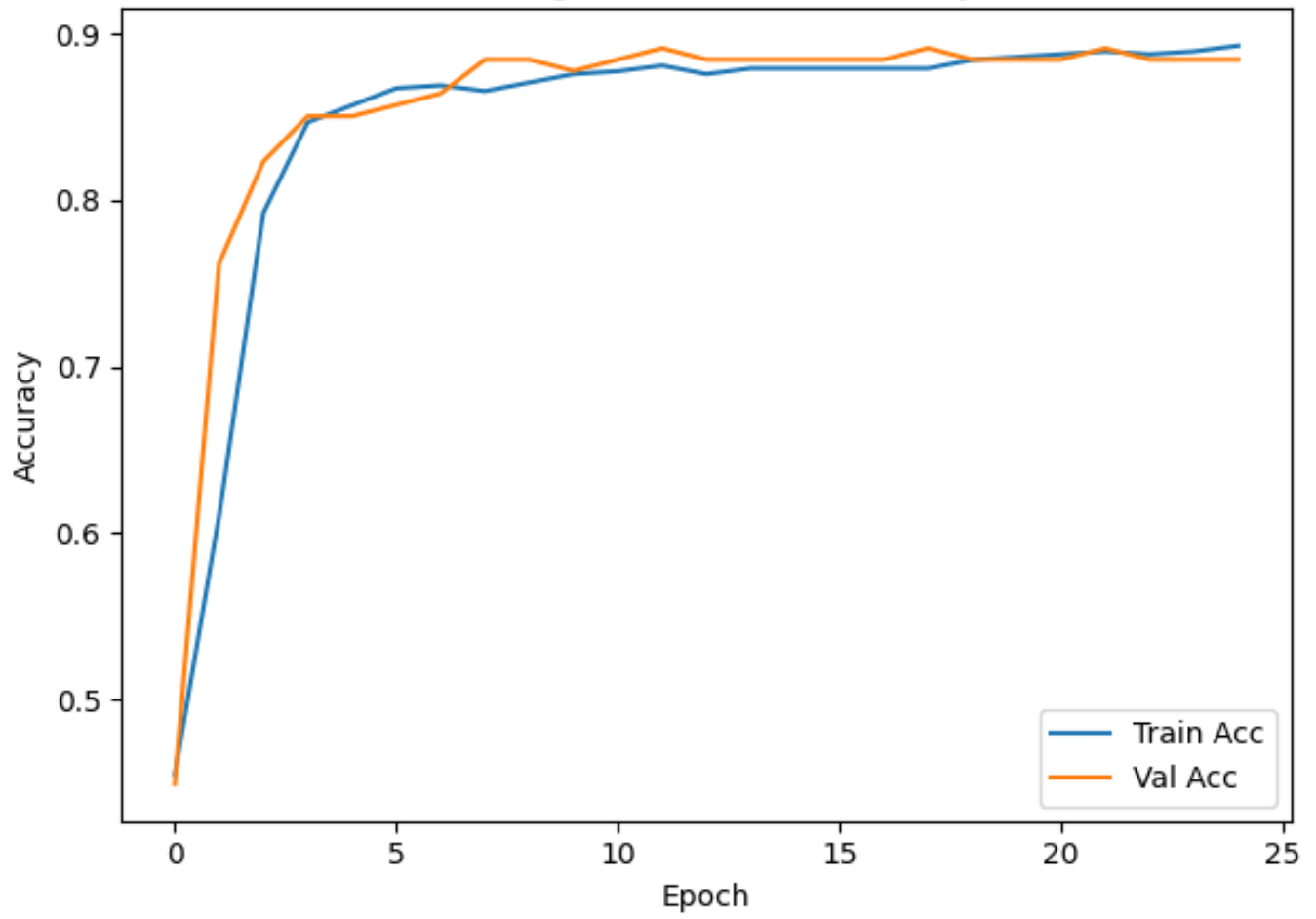| Layer (type)	Output Shape	Param #
dense (Dense)	(None, 32)	512
dense_1 (Dense)	(None, 16)	528
dense_2 (Dense)	(None, 1)	17

Total params: 1,057 (4.13 KB)
Trainable params: 1,057 (4.13 KB)
Non-trainable params: 0 (0.00 B)

✅ FINAL TEST ACCURACY: 0.8587

```
Classification Report:
              precision    recall  f1-score   support

           0     0.8590    0.8171    0.8375        82
           1     0.8585    0.8922    0.8750       102

    accuracy                         0.8587       184
   macro avg     0.8587    0.8546    0.8562       184
weighted avg     0.8587    0.8587    0.8583       184
```

Training vs Validation Accuracy

Confusion Matrix — Heart Disease Detection