Personal Project_04_v10_test1_4conv-layer_run69_very advanced control 3_autorun

May 7, 2025

```python
[1]: from tensorflow.keras.callbacks import LearningRateScheduler
     from sklearn.metrics import classification_report, confusion_matrix
     import pandas as pd
     import numpy as np
     import matplotlib.pyplot as plt
     %matplotlib inline
     import matplotlib.image as mpimg
     import tensorflow as tf
     import os

     class EarlyStoppingCallback(tf.keras.callbacks.Callback):
         def on_epoch_end(self, epoch, logs=None):
             train_accuracy = logs.get('accuracy')
             val_accuracy = logs.get('val_accuracy')
             if train_accuracy >= desired_train_accuracy and val_accuracy >=␣
      ↪desired_val_accuracy:
                 self.model.stop_training = True
                 print("Reached desired accuracy so cancelling training!")


     # target accuracy values:
     desired_train_accuracy = 0.91
     desired_val_accuracy = 0.91

     # maximum trial number:
     trial_num = 50

     # maximum possible epoch:
     epochs = 40


     TRAIN_ACC=0.1
     VAL_ACC=0.1
     try_num = 1
     condition = True
```

```python
while (try_num<trial_num and condition==True):

    # DOE factors:
    learning_rate = 0.0005
    dropout_value = 0.5
    # n-conv_layers = 4
    n_units_last_layer = 4096
    n_filters_l1 = 32
    n_filters_l2 = 16


    # other factors:
    img_size = 130
    batch_size = 32
    validation_split = 0.1  # 10% for validation
    test_split = 0.00  # 0% for testing
    shuffle_buffer_size = 1000
    seed_num = 101
    desired_accuracy = 0.99  # it should be active if EarlyStoppingCallback is
↪activated
    loss = 'binary_crossentropy'
    #optimizer = tf.keras.optimizers.RMSprop(learning_rate=learning_rate)
    optimizer = tf.keras.optimizers.Adam(learning_rate=learning_rate)
    metrics = ['accuracy']
    f_mode = 'nearest'  # fill_mode in image augmentation

    #DATA_DIR = "D:\\CS online courses\\Free DataSets\\Free Images\\Easier
↪portrait images_GPU_03"
    DATA_DIR = "/Users/hossein/Downloads/Easier portrait images_GPU_03"

    # Subdirectories for each class
    data_dir_woman = os.path.join(DATA_DIR, 'woman')
    data_dir_man = os.path.join(DATA_DIR, 'man')

    image_size = (img_size, img_size)  # Resize images to this size

    # Load train dataset (excluding validation & test set):
    train_dataset = tf.keras.utils.image_dataset_from_directory(
        directory = DATA_DIR,
        image_size = image_size,
        batch_size = batch_size,
        label_mode='binary',
        validation_split = validation_split + test_split,  # Total split for
↪val + test
        subset = "training",
        seed = seed_num
    )
```

```python
    # Load validation dataset
    val_dataset = tf.keras.utils.image_dataset_from_directory(
        directory = DATA_DIR,
        image_size = image_size,
        batch_size = batch_size,
        label_mode='binary',
        validation_split = validation_split + test_split,
        subset = "validation",
        seed = seed_num
    )

    # Further manually split validation dataset to extract test dataset
    val_batches = tf.data.experimental.cardinality(val_dataset)
    # Compute test dataset size (number of batches)
    test_size = round(val_batches.numpy() * (test_split / (validation_split +␣
↪test_split)))
    # Split validation dataset into validation and test subsets
    test_dataset = val_dataset.take(test_size)
    val_dataset = val_dataset.skip(test_size)

    # Optimize for performance
    AUTOTUNE = tf.data.AUTOTUNE
    training_dataset = train_dataset.cache().shuffle(shuffle_buffer_size).
↪prefetch(buffer_size = AUTOTUNE)
    validation_dataset = val_dataset.cache().prefetch(buffer_size = AUTOTUNE)
    test_dataset = test_dataset.cache().prefetch(buffer_size = AUTOTUNE)

    # Get the first batch of images and labels
    for images, labels in training_dataset.take(1):
            example_batch_images = images
            example_batch_labels = labels

    max_pixel = np.max(example_batch_images)

    def scheduler(epoch, lr):
        if epoch < 10:
            if epoch % 5 == 0 and epoch > 0:
                return lr / 1
            return lr
        elif epoch < 15:
            if epoch % 5 == 0 and epoch > 0:
                return lr / 2
            return lr
        elif epoch < 30:
            if epoch % 5 == 0 and epoch > 0:
                return lr / 1
            return lr
```

```python
        return lr
    lr_callback = LearningRateScheduler(scheduler)

    # augmentation_model
    def augment_model():
        augmentation_model = tf.keras.Sequential([
            # Specify the input shape.
            tf.keras.Input(shape = (img_size, img_size, 3)),
            tf.keras.layers.RandomFlip("horizontal"),
            tf.keras.layers.RandomRotation(0.1, fill_mode = f_mode),
            #tf.keras.layers.RandomTranslation(0.1, 0.1, fill_mode = f_mode),
            #tf.keras.layers.RandomZoom(0.1, fill_mode=f_mode)
            ])
        return augmentation_model

    def create_and_compile_model():
        augmentation_layers = augment_model()
        model = tf.keras.Sequential([
            # Note: the input shape is the desired size of the image: 150x150␣
↪with 3 bytes for color
            tf.keras.layers.InputLayer(shape = (img_size, img_size, 3)),
            augmentation_layers,
            tf.keras.layers.Rescaling(1./255),
            #####    CONV_LAYER_1:     #####
            tf.keras.layers.Conv2D(n_filters_l1, (4, 4), activation = 'linear'),
            tf.keras.layers.MaxPooling2D(2, 2),
            #####    CONV_LAYER_2:     #####
            tf.keras.layers.Conv2D(n_filters_l2, (3, 3), activation = 'relu'),
            tf.keras.layers.MaxPooling2D(2, 2),
            #####    CONV_LAYER_3:     #####
            tf.keras.layers.Conv2D(64, (3, 3), activation = 'relu'),
            tf.keras.layers.MaxPooling2D(2, 2),
            #####    CONV_LAYER_4:     #####
            tf.keras.layers.Conv2D(64, (3, 3), activation = 'relu'),
            tf.keras.layers.MaxPooling2D(2, 2),
            tf.keras.layers.Flatten(),
            tf.keras.layers.Dropout(dropout_value),
            #####    BEFORE_LAST_LAYER:     #####
            tf.keras.layers.Dense(n_units_last_layer, activation = 'relu'),
            # It will contain a value from 0-1 where 0 for the class 'female'␣
↪and 1 for the 'male'
            tf.keras.layers.Dense(1, activation = 'sigmoid')])
        model.compile(
            loss = loss,
            optimizer = optimizer,
            metrics = metrics
        )
```

```python
        return model


    # Create the compiled but untrained model
    def reset_weights(model):
        for layer in model.layers:
            if hasattr(layer, 'kernel_initializer'):
                layer.kernel.assign(layer.kernel_initializer(layer.kernel.
  ↪shape))

            if hasattr(layer, 'bias_initializer'):
                layer.bias.assign(layer.bias_initializer(layer.bias.shape))

    model = create_and_compile_model()
    reset_weights(model)  # Reset all layer weights
    training_history = model.fit(training_dataset,
                                 epochs=epochs,
                                 validation_data=validation_dataset,
                                 callbacks=[lr_callback,␣
  ↪EarlyStoppingCallback()],
                                 verbose=1)
    result_history = pd.DataFrame(model.history.history)
    TRAIN_ACC = result_history['accuracy'].iloc[-1]
    print(f"Current training accuracy: {TRAIN_ACC}")
    VAL_ACC = result_history['val_accuracy'].iloc[-1]
    print(f"Current validation accuracy: {VAL_ACC}")
    # Restart script
    print("Reseting all weights...")
    print(f'Current number of trials: {try_num}')
    try_num += 1
    result_history[['loss', 'val_loss']].plot(figsize=(5, 3))
    result_history[['accuracy', 'val_accuracy']].plot(figsize=(5, 3))
    plt.show()
    print(model.metrics_names)
    print(model.evaluate(validation_dataset))
    y_true = np.concatenate([y.numpy() for _, y in validation_dataset])
    y_pred_prob = model.predict(validation_dataset)
    # Convert probabilities to class labels (0:Female or 1:Male)
    y_pred = (y_pred_prob > 0.5).astype(int).flatten()
    print("Classification Report:\n", classification_report(y_true, y_pred,␣
  ↪target_names=['Female', 'Male']))

    if (TRAIN_ACC>=desired_train_accuracy and VAL_ACC>=desired_val_accuracy):
        condition = False
        model.save('trained_model_run69_very_advanced_control.h5')


result_history.head(15)
```

```
Found 943 files belonging to 2 classes.
Using 849 files for training.
Found 943 files belonging to 2 classes.
Using 94 files for validation.
Epoch 1/40

2025-05-07 09:47:45.771323: I tensorflow/core/framework/local_rendezvous.cc:405]
Local rendezvous is aborting with status: OUT_OF_RANGE: End of sequence

27/27          3s 72ms/step -
accuracy: 0.5214 - loss: 0.7073 - val_accuracy: 0.6383 - val_loss: 0.6592 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27          2s 71ms/step -
accuracy: 0.6664 - loss: 0.6004 - val_accuracy: 0.6915 - val_loss: 0.5753 -
learning_rate: 5.0000e-04
Epoch 3/40
27/27          2s 68ms/step -
accuracy: 0.7203 - loss: 0.5699 - val_accuracy: 0.8085 - val_loss: 0.4672 -
learning_rate: 5.0000e-04
Epoch 4/40
27/27          2s 68ms/step -
accuracy: 0.7284 - loss: 0.5102 - val_accuracy: 0.7979 - val_loss: 0.4984 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27          2s 68ms/step -
accuracy: 0.7806 - loss: 0.4897 - val_accuracy: 0.6809 - val_loss: 0.7000 -
learning_rate: 5.0000e-04
Epoch 6/40
27/27          2s 67ms/step -
accuracy: 0.7166 - loss: 0.5440 - val_accuracy: 0.8191 - val_loss: 0.4879 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27          2s 68ms/step -
accuracy: 0.7989 - loss: 0.4508 - val_accuracy: 0.8085 - val_loss: 0.4093 -
learning_rate: 5.0000e-04
Epoch 8/40
27/27          2s 68ms/step -
accuracy: 0.7819 - loss: 0.4399 - val_accuracy: 0.8085 - val_loss: 0.5104 -
learning_rate: 5.0000e-04
Epoch 9/40
27/27          2s 68ms/step -
accuracy: 0.7936 - loss: 0.4287 - val_accuracy: 0.7872 - val_loss: 0.5322 -
learning_rate: 5.0000e-04
Epoch 10/40
27/27          2s 68ms/step -
accuracy: 0.7735 - loss: 0.4502 - val_accuracy: 0.7766 - val_loss: 0.4611 -
learning_rate: 5.0000e-04
Epoch 11/40
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27/27             2s 70ms/step -
accuracy: 0.8009 - loss: 0.4194 - val_accuracy: 0.8617 - val_loss: 0.3553 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27             2s 69ms/step -
accuracy: 0.8461 - loss: 0.3681 - val_accuracy: 0.8617 - val_loss: 0.3576 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27             2s 68ms/step -
accuracy: 0.8264 - loss: 0.3602 - val_accuracy: 0.8191 - val_loss: 0.3672 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27             2s 68ms/step -
accuracy: 0.8341 - loss: 0.3476 - val_accuracy: 0.8617 - val_loss: 0.4011 -
learning_rate: 2.5000e-04
Epoch 15/40
27/27             2s 69ms/step -
accuracy: 0.8374 - loss: 0.3621 - val_accuracy: 0.8298 - val_loss: 0.3715 -
learning_rate: 2.5000e-04
Epoch 16/40
27/27             2s 68ms/step -
accuracy: 0.8362 - loss: 0.3472 - val_accuracy: 0.8298 - val_loss: 0.3158 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27             2s 72ms/step -
accuracy: 0.8589 - loss: 0.3143 - val_accuracy: 0.8085 - val_loss: 0.3363 -
learning_rate: 2.5000e-04
Epoch 18/40
27/27             2s 68ms/step -
accuracy: 0.8715 - loss: 0.3207 - val_accuracy: 0.8191 - val_loss: 0.3281 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27             2s 69ms/step -
accuracy: 0.8746 - loss: 0.3116 - val_accuracy: 0.8404 - val_loss: 0.4139 -
learning_rate: 2.5000e-04
Epoch 20/40
27/27             2s 70ms/step -
accuracy: 0.8744 - loss: 0.2870 - val_accuracy: 0.8511 - val_loss: 0.4144 -
learning_rate: 2.5000e-04
Epoch 21/40
27/27             2s 68ms/step -
accuracy: 0.8569 - loss: 0.3104 - val_accuracy: 0.7979 - val_loss: 0.3313 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27             2s 69ms/step -
accuracy: 0.8839 - loss: 0.2605 - val_accuracy: 0.8085 - val_loss: 0.4301 -
learning_rate: 2.5000e-04
Epoch 23/40
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27/27              2s 69ms/step -
accuracy: 0.8799 - loss: 0.2553 - val_accuracy: 0.8404 - val_loss: 0.4107 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27              2s 69ms/step -
accuracy: 0.8857 - loss: 0.2575 - val_accuracy: 0.8085 - val_loss: 0.3802 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27              2s 69ms/step -
accuracy: 0.8641 - loss: 0.2966 - val_accuracy: 0.8191 - val_loss: 0.3502 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27              2s 70ms/step -
accuracy: 0.8772 - loss: 0.2911 - val_accuracy: 0.8085 - val_loss: 0.4430 -
learning_rate: 2.5000e-04
Epoch 27/40
27/27              2s 69ms/step -
accuracy: 0.8902 - loss: 0.2528 - val_accuracy: 0.8404 - val_loss: 0.4313 -
learning_rate: 2.5000e-04
Epoch 28/40
27/27              2s 71ms/step -
accuracy: 0.8747 - loss: 0.2994 - val_accuracy: 0.8298 - val_loss: 0.3596 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27              2s 70ms/step -
accuracy: 0.8840 - loss: 0.2651 - val_accuracy: 0.8404 - val_loss: 0.4359 -
learning_rate: 2.5000e-04
Epoch 30/40
27/27              2s 69ms/step -
accuracy: 0.9086 - loss: 0.2360 - val_accuracy: 0.7979 - val_loss: 0.4561 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27              2s 69ms/step -
accuracy: 0.8884 - loss: 0.2608 - val_accuracy: 0.8404 - val_loss: 0.3755 -
learning_rate: 2.5000e-04
Epoch 32/40
27/27              2s 69ms/step -
accuracy: 0.9056 - loss: 0.2299 - val_accuracy: 0.8404 - val_loss: 0.4698 -
learning_rate: 2.5000e-04
Epoch 33/40
27/27              2s 69ms/step -
accuracy: 0.9103 - loss: 0.2331 - val_accuracy: 0.8511 - val_loss: 0.3770 -
learning_rate: 2.5000e-04
Epoch 34/40
27/27              2s 69ms/step -
accuracy: 0.9152 - loss: 0.2259 - val_accuracy: 0.8404 - val_loss: 0.4509 -
learning_rate: 2.5000e-04
Epoch 35/40
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27/27                2s 69ms/step -
accuracy: 0.9185 - loss: 0.1918 - val_accuracy: 0.8191 - val_loss: 0.3592 -
learning_rate: 2.5000e-04
Epoch 36/40
27/27                2s 69ms/step -
accuracy: 0.9221 - loss: 0.2123 - val_accuracy: 0.8511 - val_loss: 0.3957 -
learning_rate: 2.5000e-04
Epoch 37/40
27/27                2s 71ms/step -
accuracy: 0.8946 - loss: 0.2327 - val_accuracy: 0.8723 - val_loss: 0.2973 -
learning_rate: 2.5000e-04
Epoch 38/40
27/27                2s 69ms/step -
accuracy: 0.9040 - loss: 0.2331 - val_accuracy: 0.8404 - val_loss: 0.3830 -
learning_rate: 2.5000e-04
Epoch 39/40
27/27                2s 69ms/step -
accuracy: 0.9046 - loss: 0.2068 - val_accuracy: 0.8298 - val_loss: 0.3417 -
learning_rate: 2.5000e-04
Epoch 40/40
27/27                2s 69ms/step -
accuracy: 0.9014 - loss: 0.2277 - val_accuracy: 0.8404 - val_loss: 0.4251 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9034157991409302
Current validation accuracy: 0.8404255509376526
Reseting all weights…
Current number of trials: 1
```
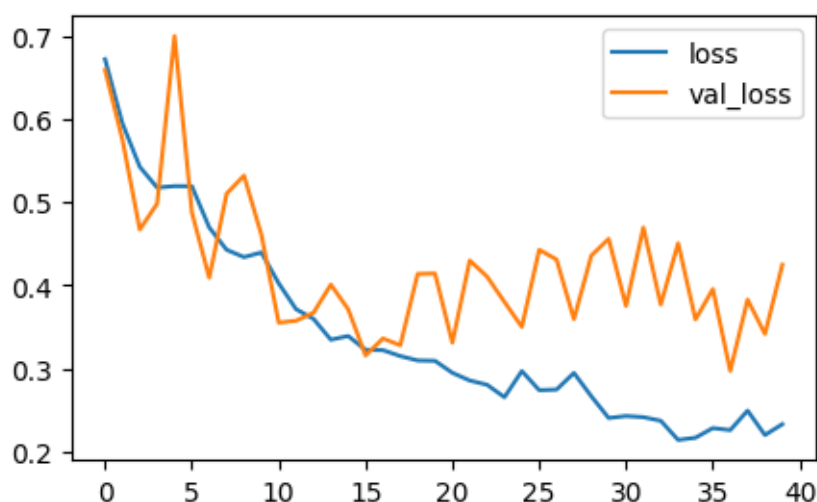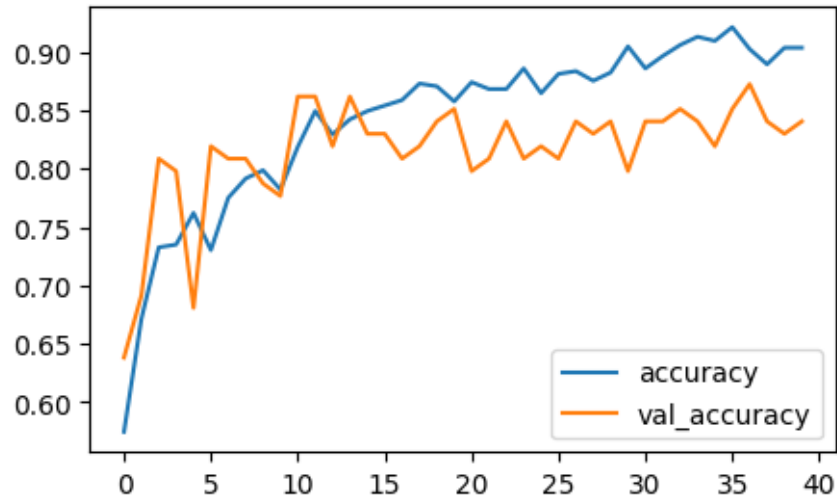
```
['loss', 'compile_metrics']
3/3                0s 16ms/step -
accuracy: 0.8304 - loss: 0.4579
[0.42505553364753723, 0.8404255509376526]
3/3                0s 29ms/step
Classification Report:
              precision    recall  f1-score   support

      Female       0.78      0.88      0.83        41
        Male       0.90      0.81      0.85        53

    accuracy                           0.84        94
   macro avg       0.84      0.84      0.84        94
weighted avg       0.85      0.84      0.84        94


Found 943 files belonging to 2 classes.
Using 849 files for training.
Found 943 files belonging to 2 classes.
Using 94 files for validation.

2025-05-07 09:49:01.076515: I tensorflow/core/framework/local_rendezvous.cc:405]
Local rendezvous is aborting with status: OUT_OF_RANGE: End of sequence

Epoch 1/40
27/27                3s 72ms/step -
accuracy: 0.4955 - loss: 0.7014 - val_accuracy: 0.5851 - val_loss: 0.6573 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27                2s 70ms/step -
accuracy: 0.6291 - loss: 0.6401 - val_accuracy: 0.6489 - val_loss: 0.6132 -
learning_rate: 5.0000e-04
```

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Epoch 3/40
27/27            2s 69ms/step -
accuracy: 0.6976 - loss: 0.5827 - val_accuracy: 0.7447 - val_loss: 0.5717 -
learning_rate: 5.0000e-04
Epoch 4/40
27/27            2s 69ms/step -
accuracy: 0.7343 - loss: 0.5198 - val_accuracy: 0.7553 - val_loss: 0.6115 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27            2s 70ms/step -
accuracy: 0.7514 - loss: 0.5007 - val_accuracy: 0.7234 - val_loss: 0.6165 -
learning_rate: 5.0000e-04
Epoch 6/40
27/27            2s 69ms/step -
accuracy: 0.7881 - loss: 0.4716 - val_accuracy: 0.8085 - val_loss: 0.4882 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27            2s 69ms/step -
accuracy: 0.7898 - loss: 0.4730 - val_accuracy: 0.8085 - val_loss: 0.5132 -
learning_rate: 5.0000e-04
Epoch 8/40
27/27            2s 69ms/step -
accuracy: 0.7899 - loss: 0.4712 - val_accuracy: 0.7979 - val_loss: 0.5273 -
learning_rate: 5.0000e-04
Epoch 9/40
27/27            2s 69ms/step -
accuracy: 0.8093 - loss: 0.4411 - val_accuracy: 0.8404 - val_loss: 0.4363 -
learning_rate: 5.0000e-04
Epoch 10/40
27/27            2s 69ms/step -
accuracy: 0.8250 - loss: 0.4182 - val_accuracy: 0.7979 - val_loss: 0.4517 -
learning_rate: 5.0000e-04
Epoch 11/40
27/27            2s 70ms/step -
accuracy: 0.8218 - loss: 0.3758 - val_accuracy: 0.8404 - val_loss: 0.4542 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27            2s 70ms/step -
accuracy: 0.8490 - loss: 0.3493 - val_accuracy: 0.8191 - val_loss: 0.4364 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27            2s 71ms/step -
accuracy: 0.8497 - loss: 0.3583 - val_accuracy: 0.8511 - val_loss: 0.4006 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27            2s 69ms/step -
accuracy: 0.8348 - loss: 0.3594 - val_accuracy: 0.8085 - val_loss: 0.4057 -
learning_rate: 2.5000e-04
```

```
Epoch 15/40
27/27               2s 70ms/step -
accuracy: 0.8472 - loss: 0.3413 - val_accuracy: 0.8085 - val_loss: 0.5019 -
learning_rate: 2.5000e-04
Epoch 16/40
27/27               2s 70ms/step -
accuracy: 0.8498 - loss: 0.3646 - val_accuracy: 0.8511 - val_loss: 0.3497 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27               2s 70ms/step -
accuracy: 0.8640 - loss: 0.3131 - val_accuracy: 0.8511 - val_loss: 0.4354 -
learning_rate: 2.5000e-04
Epoch 18/40
27/27               2s 70ms/step -
accuracy: 0.8654 - loss: 0.3033 - val_accuracy: 0.8617 - val_loss: 0.3480 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27               2s 69ms/step -
accuracy: 0.8653 - loss: 0.2968 - val_accuracy: 0.8404 - val_loss: 0.3251 -
learning_rate: 2.5000e-04
Epoch 20/40
27/27               2s 69ms/step -
accuracy: 0.8582 - loss: 0.3160 - val_accuracy: 0.8511 - val_loss: 0.3964 -
learning_rate: 2.5000e-04
Epoch 21/40
27/27               2s 70ms/step -
accuracy: 0.8898 - loss: 0.2668 - val_accuracy: 0.8511 - val_loss: 0.3905 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27               2s 71ms/step -
accuracy: 0.8971 - loss: 0.2669 - val_accuracy: 0.8511 - val_loss: 0.3225 -
learning_rate: 2.5000e-04
Epoch 23/40
27/27               2s 70ms/step -
accuracy: 0.9032 - loss: 0.2298 - val_accuracy: 0.8617 - val_loss: 0.3818 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27               2s 70ms/step -
accuracy: 0.8689 - loss: 0.2951 - val_accuracy: 0.8617 - val_loss: 0.3889 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27               2s 69ms/step -
accuracy: 0.8842 - loss: 0.2402 - val_accuracy: 0.8723 - val_loss: 0.3233 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27               2s 70ms/step -
accuracy: 0.9028 - loss: 0.2505 - val_accuracy: 0.8511 - val_loss: 0.3914 -
learning_rate: 2.5000e-04
```

```
Epoch 27/40
27/27              2s 71ms/step -
accuracy: 0.8937 - loss: 0.2392 - val_accuracy: 0.8936 - val_loss: 0.3803 -
learning_rate: 2.5000e-04
Epoch 28/40
27/27              2s 70ms/step -
accuracy: 0.9043 - loss: 0.2361 - val_accuracy: 0.8723 - val_loss: 0.3592 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27              2s 71ms/step -
accuracy: 0.8992 - loss: 0.2282 - val_accuracy: 0.8617 - val_loss: 0.3453 -
learning_rate: 2.5000e-04
Epoch 30/40
27/27              2s 72ms/step -
accuracy: 0.8937 - loss: 0.2599 - val_accuracy: 0.8617 - val_loss: 0.3839 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27              2s 71ms/step -
accuracy: 0.9173 - loss: 0.2315 - val_accuracy: 0.8617 - val_loss: 0.3525 -
learning_rate: 2.5000e-04
Epoch 32/40
27/27              2s 71ms/step -
accuracy: 0.9061 - loss: 0.2616 - val_accuracy: 0.8830 - val_loss: 0.3709 -
learning_rate: 2.5000e-04
Epoch 33/40
27/27              2s 71ms/step -
accuracy: 0.9057 - loss: 0.2158 - val_accuracy: 0.8723 - val_loss: 0.3963 -
learning_rate: 2.5000e-04
Epoch 34/40
27/27              2s 70ms/step -
accuracy: 0.9073 - loss: 0.2039 - val_accuracy: 0.9043 - val_loss: 0.3593 -
learning_rate: 2.5000e-04
Epoch 35/40
27/27              2s 71ms/step -
accuracy: 0.9176 - loss: 0.2165 - val_accuracy: 0.8617 - val_loss: 0.4293 -
learning_rate: 2.5000e-04
Epoch 36/40
27/27              2s 71ms/step -
accuracy: 0.9115 - loss: 0.2240 - val_accuracy: 0.8723 - val_loss: 0.3662 -
learning_rate: 2.5000e-04
Epoch 37/40
27/27              2s 71ms/step -
accuracy: 0.9128 - loss: 0.2069 - val_accuracy: 0.8404 - val_loss: 0.3932 -
learning_rate: 2.5000e-04
Epoch 38/40
27/27              2s 71ms/step -
accuracy: 0.9322 - loss: 0.1603 - val_accuracy: 0.8511 - val_loss: 0.3248 -
learning_rate: 2.5000e-04
```

```
Epoch 39/40
27/27                2s 71ms/step -
accuracy: 0.9308 - loss: 0.1633 - val_accuracy: 0.9043 - val_loss: 0.3613 -
learning_rate: 2.5000e-04
Epoch 40/40
27/27                2s 71ms/step -
accuracy: 0.9214 - loss: 0.2026 - val_accuracy: 0.8617 - val_loss: 0.4085 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9187279343605042
Current validation accuracy: 0.8617021441459656
Reseting all weights…
Current number of trials: 2
```
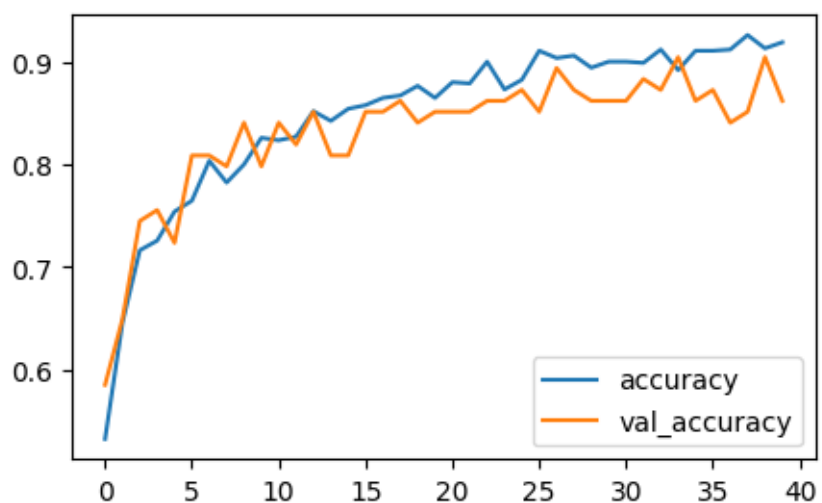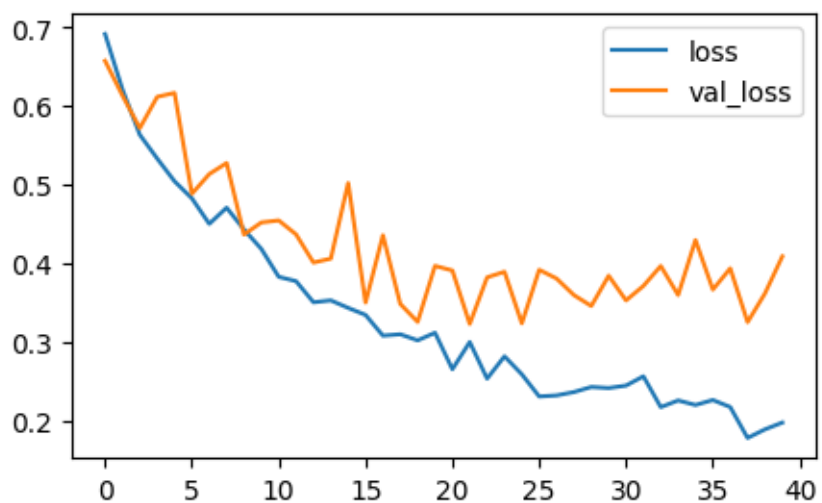
```
['loss', 'compile_metrics']
3/3               0s 18ms/step -
accuracy: 0.8566 - loss: 0.4847
[0.40849608182907104, 0.8617021441459656]
3/3               0s 29ms/step
Classification Report:
              precision    recall  f1-score   support

      Female       0.82      0.88      0.85        41
        Male       0.90      0.85      0.87        53

    accuracy                           0.86        94
   macro avg       0.86      0.86      0.86        94
weighted avg       0.86      0.86      0.86        94


Found 943 files belonging to 2 classes.
Using 849 files for training.
Found 943 files belonging to 2 classes.
Using 94 files for validation.

2025-05-07 09:50:17.906733: I tensorflow/core/framework/local_rendezvous.cc:405]
Local rendezvous is aborting with status: OUT_OF_RANGE: End of sequence

Epoch 1/40
27/27             3s 75ms/step -
accuracy: 0.4928 - loss: 0.7366 - val_accuracy: 0.6383 - val_loss: 0.6600 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27             2s 70ms/step -
accuracy: 0.6275 - loss: 0.6403 - val_accuracy: 0.6277 - val_loss: 0.6125 -
learning_rate: 5.0000e-04
Epoch 3/40
27/27             2s 70ms/step -
accuracy: 0.6643 - loss: 0.6015 - val_accuracy: 0.6702 - val_loss: 0.5827 -
learning_rate: 5.0000e-04
Epoch 4/40
27/27             2s 70ms/step -
accuracy: 0.7202 - loss: 0.5531 - val_accuracy: 0.7447 - val_loss: 0.5577 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27             2s 70ms/step -
accuracy: 0.7371 - loss: 0.5269 - val_accuracy: 0.7021 - val_loss: 0.5760 -
learning_rate: 5.0000e-04
Epoch 6/40
27/27             2s 72ms/step -
accuracy: 0.7194 - loss: 0.5725 - val_accuracy: 0.7660 - val_loss: 0.5054 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27             2s 70ms/step -
```

```
accuracy: 0.7811 - loss: 0.4948 - val_accuracy: 0.7979 - val_loss: 0.5379 -
learning_rate: 5.0000e-04
Epoch 8/40
27/27                2s 70ms/step -
accuracy: 0.7380 - loss: 0.5057 - val_accuracy: 0.8085 - val_loss: 0.4503 -
learning_rate: 5.0000e-04
Epoch 9/40
27/27                2s 70ms/step -
accuracy: 0.8177 - loss: 0.4067 - val_accuracy: 0.8617 - val_loss: 0.3862 -
learning_rate: 5.0000e-04
Epoch 10/40
27/27                2s 71ms/step -
accuracy: 0.7933 - loss: 0.4645 - val_accuracy: 0.8511 - val_loss: 0.5199 -
learning_rate: 5.0000e-04
Epoch 11/40
27/27                2s 70ms/step -
accuracy: 0.8070 - loss: 0.4150 - val_accuracy: 0.8723 - val_loss: 0.4452 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27                2s 71ms/step -
accuracy: 0.8019 - loss: 0.4235 - val_accuracy: 0.8404 - val_loss: 0.4095 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27                2s 71ms/step -
accuracy: 0.8198 - loss: 0.3934 - val_accuracy: 0.8617 - val_loss: 0.4093 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27                2s 70ms/step -
accuracy: 0.8081 - loss: 0.4095 - val_accuracy: 0.8617 - val_loss: 0.3985 -
learning_rate: 2.5000e-04
Epoch 15/40
27/27                2s 73ms/step -
accuracy: 0.8376 - loss: 0.3840 - val_accuracy: 0.8298 - val_loss: 0.4049 -
learning_rate: 2.5000e-04
Epoch 16/40
27/27                2s 71ms/step -
accuracy: 0.8652 - loss: 0.3142 - val_accuracy: 0.8404 - val_loss: 0.3421 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27                2s 71ms/step -
accuracy: 0.8430 - loss: 0.3540 - val_accuracy: 0.8404 - val_loss: 0.3188 -
learning_rate: 2.5000e-04
Epoch 18/40
27/27                2s 71ms/step -
accuracy: 0.8439 - loss: 0.3527 - val_accuracy: 0.8617 - val_loss: 0.3575 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27                2s 71ms/step -
```

```
accuracy: 0.8548 - loss: 0.3202 - val_accuracy: 0.8404 - val_loss: 0.3701 -
learning_rate: 2.5000e-04
Epoch 20/40
27/27                2s 71ms/step -
accuracy: 0.8482 - loss: 0.3411 - val_accuracy: 0.8617 - val_loss: 0.4019 -
learning_rate: 2.5000e-04
Epoch 21/40
27/27                2s 71ms/step -
accuracy: 0.8679 - loss: 0.3317 - val_accuracy: 0.8511 - val_loss: 0.3480 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27                2s 71ms/step -
accuracy: 0.8492 - loss: 0.3434 - val_accuracy: 0.8617 - val_loss: 0.3748 -
learning_rate: 2.5000e-04
Epoch 23/40
27/27                2s 73ms/step -
accuracy: 0.8659 - loss: 0.2924 - val_accuracy: 0.8617 - val_loss: 0.3970 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27                2s 71ms/step -
accuracy: 0.8580 - loss: 0.3065 - val_accuracy: 0.8511 - val_loss: 0.3596 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27                2s 71ms/step -
accuracy: 0.8530 - loss: 0.2926 - val_accuracy: 0.8404 - val_loss: 0.4040 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27                2s 71ms/step -
accuracy: 0.8907 - loss: 0.2522 - val_accuracy: 0.8191 - val_loss: 0.3934 -
learning_rate: 2.5000e-04
Epoch 27/40
27/27                2s 71ms/step -
accuracy: 0.8891 - loss: 0.2478 - val_accuracy: 0.8191 - val_loss: 0.4114 -
learning_rate: 2.5000e-04
Epoch 28/40
27/27                2s 71ms/step -
accuracy: 0.8707 - loss: 0.2856 - val_accuracy: 0.8298 - val_loss: 0.4412 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27                2s 71ms/step -
accuracy: 0.8842 - loss: 0.2819 - val_accuracy: 0.8617 - val_loss: 0.4465 -
learning_rate: 2.5000e-04
Epoch 30/40
27/27                2s 71ms/step -
accuracy: 0.8772 - loss: 0.2923 - val_accuracy: 0.8617 - val_loss: 0.3774 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27                2s 73ms/step -
```

```
accuracy: 0.8726 - loss: 0.2679 - val_accuracy: 0.8723 - val_loss: 0.3676 -
learning_rate: 2.5000e-04
Epoch 32/40
27/27              2s 71ms/step -
accuracy: 0.8914 - loss: 0.2760 - val_accuracy: 0.8511 - val_loss: 0.3413 -
learning_rate: 2.5000e-04
Epoch 33/40
27/27              2s 71ms/step -
accuracy: 0.9182 - loss: 0.2021 - val_accuracy: 0.8404 - val_loss: 0.4429 -
learning_rate: 2.5000e-04
Epoch 34/40
27/27              2s 72ms/step -
accuracy: 0.9099 - loss: 0.2297 - val_accuracy: 0.8511 - val_loss: 0.4619 -
learning_rate: 2.5000e-04
Epoch 35/40
27/27              2s 71ms/step -
accuracy: 0.8692 - loss: 0.2795 - val_accuracy: 0.8936 - val_loss: 0.3162 -
learning_rate: 2.5000e-04
Epoch 36/40
27/27              2s 72ms/step -
accuracy: 0.8910 - loss: 0.2336 - val_accuracy: 0.8511 - val_loss: 0.4484 -
learning_rate: 2.5000e-04
Epoch 37/40
27/27              2s 71ms/step -
accuracy: 0.9260 - loss: 0.2149 - val_accuracy: 0.8617 - val_loss: 0.4552 -
learning_rate: 2.5000e-04
Epoch 38/40
27/27              2s 71ms/step -
accuracy: 0.9154 - loss: 0.2159 - val_accuracy: 0.8404 - val_loss: 0.4037 -
learning_rate: 2.5000e-04
Epoch 39/40
27/27              2s 71ms/step -
accuracy: 0.9061 - loss: 0.2428 - val_accuracy: 0.8723 - val_loss: 0.3671 -
learning_rate: 2.5000e-04
Epoch 40/40
27/27              2s 73ms/step -
accuracy: 0.9327 - loss: 0.1851 - val_accuracy: 0.8617 - val_loss: 0.5512 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9257950782775879
Current validation accuracy: 0.8617021441459656
Reseting all weights…
Current number of trials: 3
```
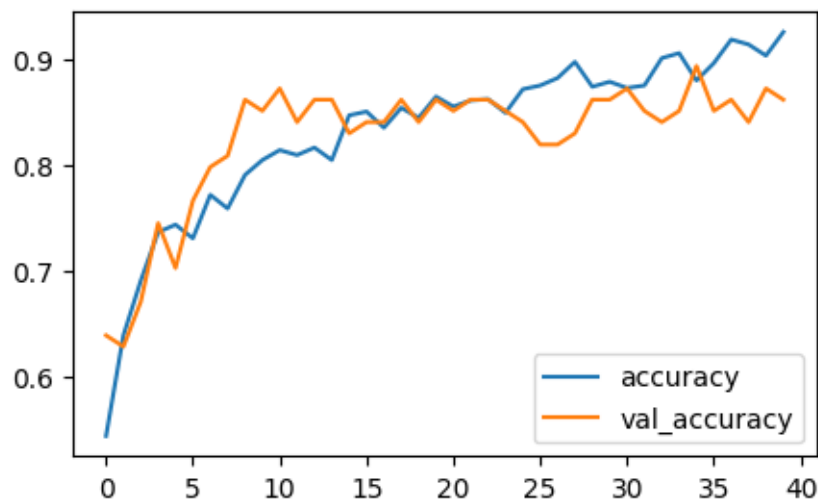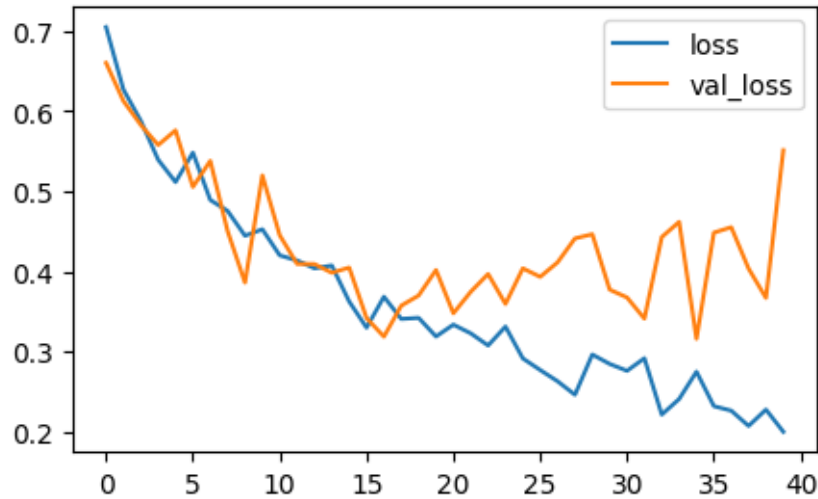
```
['loss', 'compile_metrics']
3/3                 0s 18ms/step -
accuracy: 0.8644 - loss: 0.5815
[0.5512164235115051, 0.8617021441459656]
WARNING:tensorflow:5 out of the last 7 calls to <function
TensorFlowTrainer.make_predict_function.<locals>.one_step_on_data_distributed at
0x157e7d1c0> triggered tf.function retracing. Tracing is expensive and the
excessive number of tracings could be due to (1) creating @tf.function
repeatedly in a loop, (2) passing tensors with different shapes, (3) passing
Python objects instead of tensors. For (1), please define your @tf.function
outside of the loop. For (2), @tf.function has reduce_retracing=True option that
can avoid unnecessary retracing. For (3), please refer to
```

```
https://www.tensorflow.org/guide/function#controlling_retracing and
https://www.tensorflow.org/api_docs/python/tf/function for  more details.
1/3            0s
39ms/stepWARNING:tensorflow:6 out of the last 9 calls to <function
TensorFlowTrainer.make_predict_function.<locals>.one_step_on_data_distributed at
0x157e7d1c0> triggered tf.function retracing. Tracing is expensive and the
excessive number of tracings could be due to (1) creating @tf.function
repeatedly in a loop, (2) passing tensors with different shapes, (3) passing
Python objects instead of tensors. For (1), please define your @tf.function
outside of the loop. For (2), @tf.function has reduce_retracing=True option that
can avoid unnecessary retracing. For (3), please refer to
https://www.tensorflow.org/guide/function#controlling_retracing and
https://www.tensorflow.org/api_docs/python/tf/function for  more details.
3/3            0s 29ms/step
Classification Report:
              precision    recall  f1-score   support

      Female       0.78      0.95      0.86        41
        Male       0.95      0.79      0.87        53

    accuracy                           0.86        94
   macro avg       0.87      0.87      0.86        94
weighted avg       0.88      0.86      0.86        94


Found 943 files belonging to 2 classes.
Using 849 files for training.
Found 943 files belonging to 2 classes.
Using 94 files for validation.
Epoch 1/40
27/27            3s 73ms/step -
accuracy: 0.5092 - loss: 0.6932 - val_accuracy: 0.5957 - val_loss: 0.6599 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27            2s 70ms/step -
accuracy: 0.6556 - loss: 0.6372 - val_accuracy: 0.7340 - val_loss: 0.5815 -
learning_rate: 5.0000e-04
Epoch 3/40
27/27            2s 70ms/step -
accuracy: 0.7460 - loss: 0.5476 - val_accuracy: 0.7872 - val_loss: 0.4872 -
learning_rate: 5.0000e-04
Epoch 4/40
27/27            2s 70ms/step -
accuracy: 0.7554 - loss: 0.5101 - val_accuracy: 0.8404 - val_loss: 0.4590 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27            2s 70ms/step -
accuracy: 0.7500 - loss: 0.4973 - val_accuracy: 0.7979 - val_loss: 0.4970 -
learning_rate: 5.0000e-04
```

```
Epoch 6/40
27/27               2s 71ms/step -
accuracy: 0.7883 - loss: 0.4464 - val_accuracy: 0.7340 - val_loss: 0.5845 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27               2s 72ms/step -
accuracy: 0.7945 - loss: 0.4686 - val_accuracy: 0.8085 - val_loss: 0.4535 -
learning_rate: 5.0000e-04
Epoch 8/40
27/27               2s 70ms/step -
accuracy: 0.8184 - loss: 0.4372 - val_accuracy: 0.8191 - val_loss: 0.3420 -
learning_rate: 5.0000e-04
Epoch 9/40
27/27               2s 70ms/step -
accuracy: 0.8181 - loss: 0.4237 - val_accuracy: 0.8298 - val_loss: 0.4833 -
learning_rate: 5.0000e-04
Epoch 10/40
27/27               2s 70ms/step -
accuracy: 0.7885 - loss: 0.4565 - val_accuracy: 0.8617 - val_loss: 0.4151 -
learning_rate: 5.0000e-04
Epoch 11/40
27/27               2s 70ms/step -
accuracy: 0.8424 - loss: 0.3830 - val_accuracy: 0.8511 - val_loss: 0.3567 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27               2s 70ms/step -
accuracy: 0.8630 - loss: 0.3346 - val_accuracy: 0.8404 - val_loss: 0.3576 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27               2s 70ms/step -
accuracy: 0.8585 - loss: 0.3270 - val_accuracy: 0.8511 - val_loss: 0.3258 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27               2s 71ms/step -
accuracy: 0.8567 - loss: 0.3368 - val_accuracy: 0.8404 - val_loss: 0.3468 -
learning_rate: 2.5000e-04
Epoch 15/40
27/27               2s 70ms/step -
accuracy: 0.8514 - loss: 0.3576 - val_accuracy: 0.8404 - val_loss: 0.3652 -
learning_rate: 2.5000e-04
Epoch 16/40
27/27               2s 72ms/step -
accuracy: 0.8682 - loss: 0.2943 - val_accuracy: 0.7766 - val_loss: 0.3728 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27               2s 71ms/step -
accuracy: 0.8560 - loss: 0.3441 - val_accuracy: 0.8511 - val_loss: 0.3477 -
learning_rate: 2.5000e-04
```

```
Epoch 18/40
27/27              2s 71ms/step -
accuracy: 0.8314 - loss: 0.3502 - val_accuracy: 0.8511 - val_loss: 0.3598 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27              2s 70ms/step -
accuracy: 0.8666 - loss: 0.3077 - val_accuracy: 0.8511 - val_loss: 0.3291 -
learning_rate: 2.5000e-04
Epoch 20/40
27/27              2s 70ms/step -
accuracy: 0.8361 - loss: 0.3442 - val_accuracy: 0.8830 - val_loss: 0.3305 -
learning_rate: 2.5000e-04
Epoch 21/40
27/27              2s 71ms/step -
accuracy: 0.9076 - loss: 0.2442 - val_accuracy: 0.8404 - val_loss: 0.2815 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27              2s 71ms/step -
accuracy: 0.9040 - loss: 0.2459 - val_accuracy: 0.8298 - val_loss: 0.3119 -
learning_rate: 2.5000e-04
Epoch 23/40
27/27              2s 70ms/step -
accuracy: 0.8763 - loss: 0.2916 - val_accuracy: 0.8617 - val_loss: 0.3379 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27              2s 73ms/step -
accuracy: 0.8969 - loss: 0.2358 - val_accuracy: 0.8085 - val_loss: 0.3367 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27              2s 71ms/step -
accuracy: 0.8547 - loss: 0.3179 - val_accuracy: 0.8617 - val_loss: 0.2834 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27              2s 70ms/step -
accuracy: 0.9198 - loss: 0.2133 - val_accuracy: 0.8723 - val_loss: 0.3308 -
learning_rate: 2.5000e-04
Epoch 27/40
27/27              2s 70ms/step -
accuracy: 0.9215 - loss: 0.2297 - val_accuracy: 0.8191 - val_loss: 0.3262 -
learning_rate: 2.5000e-04
Epoch 28/40
27/27              2s 71ms/step -
accuracy: 0.9088 - loss: 0.2518 - val_accuracy: 0.8830 - val_loss: 0.2936 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27              2s 71ms/step -
accuracy: 0.9244 - loss: 0.2022 - val_accuracy: 0.8723 - val_loss: 0.3272 -
learning_rate: 2.5000e-04
```

```
Epoch 30/40
27/27              2s 70ms/step -
accuracy: 0.8950 - loss: 0.2156 - val_accuracy: 0.8830 - val_loss: 0.2890 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27              2s 71ms/step -
accuracy: 0.9010 - loss: 0.2463 - val_accuracy: 0.8511 - val_loss: 0.2841 -
learning_rate: 2.5000e-04
Epoch 32/40
27/27              2s 72ms/step -
accuracy: 0.8959 - loss: 0.2492 - val_accuracy: 0.8404 - val_loss: 0.2713 -
learning_rate: 2.5000e-04
Epoch 33/40
27/27              2s 71ms/step -
accuracy: 0.8980 - loss: 0.2454 - val_accuracy: 0.8298 - val_loss: 0.3308 -
learning_rate: 2.5000e-04
Epoch 34/40
27/27              2s 71ms/step -
accuracy: 0.9059 - loss: 0.2433 - val_accuracy: 0.8511 - val_loss: 0.3321 -
learning_rate: 2.5000e-04
Epoch 35/40
27/27              2s 71ms/step -
accuracy: 0.9131 - loss: 0.2179 - val_accuracy: 0.8830 - val_loss: 0.2722 -
learning_rate: 2.5000e-04
Epoch 36/40
27/27              2s 71ms/step -
accuracy: 0.9003 - loss: 0.2107 - val_accuracy: 0.8617 - val_loss: 0.3078 -
learning_rate: 2.5000e-04
Epoch 37/40
27/27              2s 71ms/step -
accuracy: 0.9167 - loss: 0.2053 - val_accuracy: 0.8723 - val_loss: 0.3540 -
learning_rate: 2.5000e-04
Epoch 38/40
27/27              2s 71ms/step -
accuracy: 0.9051 - loss: 0.2381 - val_accuracy: 0.8617 - val_loss: 0.4187 -
learning_rate: 2.5000e-04
Epoch 39/40
27/27              2s 71ms/step -
accuracy: 0.9026 - loss: 0.2242 - val_accuracy: 0.8936 - val_loss: 0.3772 -
learning_rate: 2.5000e-04
Epoch 40/40
27/27              2s 70ms/step -
accuracy: 0.9261 - loss: 0.1881 - val_accuracy: 0.8723 - val_loss: 0.3500 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9210836291313171
Current validation accuracy: 0.8723404407501221
Reseting all weights…
Current number of trials: 4
```
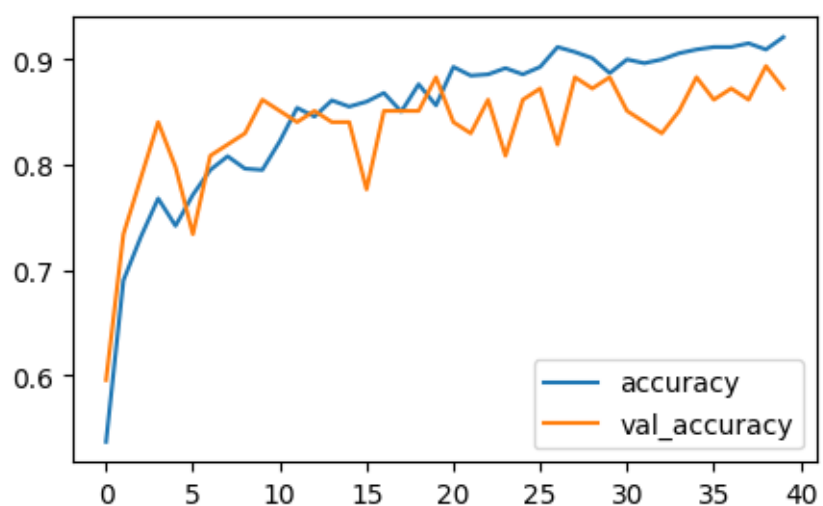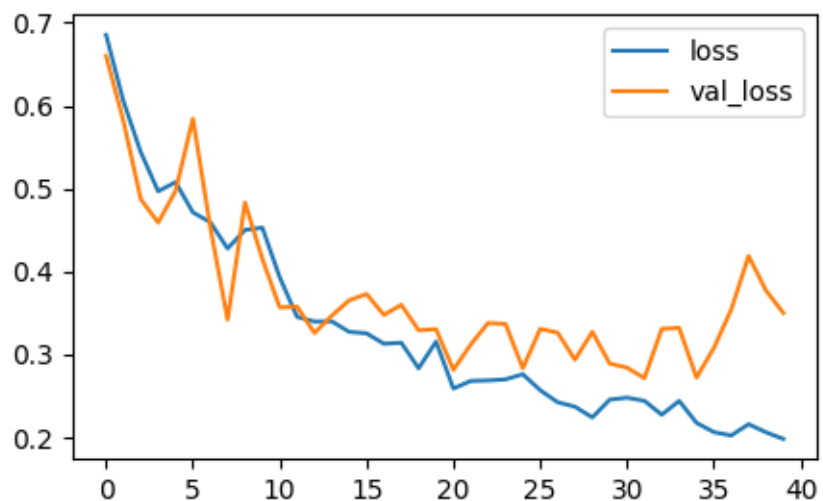
```
['loss', 'compile_metrics']
3/3              0s 19ms/step -
accuracy: 0.8737 - loss: 0.3578
[0.34995707869529724, 0.8723404407501221]
3/3              0s 30ms/step
Classification Report:
              precision    recall  f1-score   support

      Female       0.80      0.95      0.87        41
        Male       0.96      0.81      0.88        53

    accuracy                           0.87        94
```

```
  macro avg      0.88     0.88     0.87        94
weighted avg     0.89     0.87     0.87        94


Found 943 files belonging to 2 classes.
Using 849 files for training.
Found 943 files belonging to 2 classes.
Using 94 files for validation.

2025-05-07 09:52:53.424824: I tensorflow/core/framework/local_rendezvous.cc:405]
Local rendezvous is aborting with status: OUT_OF_RANGE: End of sequence

Epoch 1/40
27/27              3s 74ms/step -
accuracy: 0.4901 - loss: 0.7198 - val_accuracy: 0.4574 - val_loss: 0.6917 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27              2s 71ms/step -
accuracy: 0.5983 - loss: 0.6716 - val_accuracy: 0.5851 - val_loss: 0.7656 -
learning_rate: 5.0000e-04
Epoch 3/40
27/27              2s 70ms/step -
accuracy: 0.6383 - loss: 0.6533 - val_accuracy: 0.7021 - val_loss: 0.5711 -
learning_rate: 5.0000e-04
Epoch 4/40
27/27              2s 71ms/step -
accuracy: 0.7449 - loss: 0.5196 - val_accuracy: 0.7340 - val_loss: 0.5376 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27              2s 70ms/step -
accuracy: 0.7134 - loss: 0.5477 - val_accuracy: 0.7340 - val_loss: 0.5587 -
learning_rate: 5.0000e-04
Epoch 6/40
27/27              2s 71ms/step -
accuracy: 0.7108 - loss: 0.5359 - val_accuracy: 0.7872 - val_loss: 0.4689 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27              2s 70ms/step -
accuracy: 0.7953 - loss: 0.4809 - val_accuracy: 0.8085 - val_loss: 0.4910 -
learning_rate: 5.0000e-04
Epoch 8/40
27/27              2s 71ms/step -
accuracy: 0.8170 - loss: 0.4218 - val_accuracy: 0.8404 - val_loss: 0.4281 -
learning_rate: 5.0000e-04
Epoch 9/40
27/27              2s 72ms/step -
accuracy: 0.7928 - loss: 0.4468 - val_accuracy: 0.7766 - val_loss: 0.4779 -
learning_rate: 5.0000e-04
Epoch 10/40
27/27              2s 71ms/step -
```

```
accuracy: 0.8122 - loss: 0.3964 - val_accuracy: 0.8298 - val_loss: 0.4446 -
learning_rate: 5.0000e-04
Epoch 11/40
27/27              2s 71ms/step -
accuracy: 0.8379 - loss: 0.3763 - val_accuracy: 0.8404 - val_loss: 0.3970 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27              2s 70ms/step -
accuracy: 0.8183 - loss: 0.3878 - val_accuracy: 0.8404 - val_loss: 0.3938 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27              2s 71ms/step -
accuracy: 0.8602 - loss: 0.3327 - val_accuracy: 0.8298 - val_loss: 0.4295 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27              2s 71ms/step -
accuracy: 0.8390 - loss: 0.3710 - val_accuracy: 0.7979 - val_loss: 0.3589 -
learning_rate: 2.5000e-04
Epoch 15/40
27/27              2s 71ms/step -
accuracy: 0.8342 - loss: 0.4083 - val_accuracy: 0.8298 - val_loss: 0.4181 -
learning_rate: 2.5000e-04
Epoch 16/40
27/27              2s 70ms/step -
accuracy: 0.8794 - loss: 0.3200 - val_accuracy: 0.8298 - val_loss: 0.4177 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27              2s 72ms/step -
accuracy: 0.8263 - loss: 0.3728 - val_accuracy: 0.8404 - val_loss: 0.3967 -
learning_rate: 2.5000e-04
Epoch 18/40
27/27              2s 71ms/step -
accuracy: 0.8632 - loss: 0.3435 - val_accuracy: 0.8617 - val_loss: 0.3315 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27              2s 71ms/step -
accuracy: 0.8654 - loss: 0.3269 - val_accuracy: 0.8617 - val_loss: 0.3463 -
learning_rate: 2.5000e-04
Epoch 20/40
27/27              2s 71ms/step -
accuracy: 0.8806 - loss: 0.3098 - val_accuracy: 0.8191 - val_loss: 0.3877 -
learning_rate: 2.5000e-04
Epoch 21/40
27/27              2s 71ms/step -
accuracy: 0.8700 - loss: 0.3216 - val_accuracy: 0.8511 - val_loss: 0.3656 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27              2s 70ms/step -
```

```
accuracy: 0.9097 - loss: 0.2556 - val_accuracy: 0.8511 - val_loss: 0.3456 -
learning_rate: 2.5000e-04
Epoch 23/40
27/27                2s 75ms/step -
accuracy: 0.8946 - loss: 0.2690 - val_accuracy: 0.8191 - val_loss: 0.3570 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27                2s 72ms/step -
accuracy: 0.8949 - loss: 0.2464 - val_accuracy: 0.8511 - val_loss: 0.3569 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27                2s 73ms/step -
accuracy: 0.8822 - loss: 0.2969 - val_accuracy: 0.8298 - val_loss: 0.3742 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27                2s 72ms/step -
accuracy: 0.8962 - loss: 0.2859 - val_accuracy: 0.8298 - val_loss: 0.3235 -
learning_rate: 2.5000e-04
Epoch 27/40
27/27                2s 71ms/step -
accuracy: 0.8794 - loss: 0.2616 - val_accuracy: 0.8511 - val_loss: 0.3339 -
learning_rate: 2.5000e-04
Epoch 28/40
27/27                2s 72ms/step -
accuracy: 0.8887 - loss: 0.2531 - val_accuracy: 0.8511 - val_loss: 0.3133 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27                2s 72ms/step -
accuracy: 0.9012 - loss: 0.2370 - val_accuracy: 0.8404 - val_loss: 0.3773 -
learning_rate: 2.5000e-04
Epoch 30/40
27/27                2s 72ms/step -
accuracy: 0.9034 - loss: 0.2556 - val_accuracy: 0.8511 - val_loss: 0.4070 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27                2s 71ms/step -
accuracy: 0.9098 - loss: 0.2522 - val_accuracy: 0.8723 - val_loss: 0.3591 -
learning_rate: 2.5000e-04
Epoch 32/40
27/27                2s 71ms/step -
accuracy: 0.9142 - loss: 0.2217 - val_accuracy: 0.8936 - val_loss: 0.3340 -
learning_rate: 2.5000e-04
Epoch 33/40
27/27                2s 73ms/step -
accuracy: 0.9082 - loss: 0.2423 - val_accuracy: 0.8511 - val_loss: 0.3264 -
learning_rate: 2.5000e-04
Epoch 34/40
27/27                2s 72ms/step -
```

```
accuracy: 0.9014 - loss: 0.2322 - val_accuracy: 0.8723 - val_loss: 0.3131 -
learning_rate: 2.5000e-04
Epoch 35/40
27/27                2s 72ms/step -
accuracy: 0.9134 - loss: 0.2225 - val_accuracy: 0.8511 - val_loss: 0.3793 -
learning_rate: 2.5000e-04
Epoch 36/40
27/27                2s 72ms/step -
accuracy: 0.9318 - loss: 0.1993 - val_accuracy: 0.8617 - val_loss: 0.3642 -
learning_rate: 2.5000e-04
Epoch 37/40
27/27                2s 72ms/step -
accuracy: 0.9187 - loss: 0.1989 - val_accuracy: 0.8511 - val_loss: 0.3956 -
learning_rate: 2.5000e-04
Epoch 38/40
27/27                2s 71ms/step -
accuracy: 0.8787 - loss: 0.2276 - val_accuracy: 0.8617 - val_loss: 0.3662 -
learning_rate: 2.5000e-04
Epoch 39/40
27/27                2s 71ms/step -
accuracy: 0.9210 - loss: 0.2070 - val_accuracy: 0.8723 - val_loss: 0.3157 -
learning_rate: 2.5000e-04
Epoch 40/40
27/27                2s 72ms/step -
accuracy: 0.9183 - loss: 0.2047 - val_accuracy: 0.8723 - val_loss: 0.3541 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9163721799850464
Current validation accuracy: 0.8723404407501221
Reseting all weights…
Current number of trials: 5
```
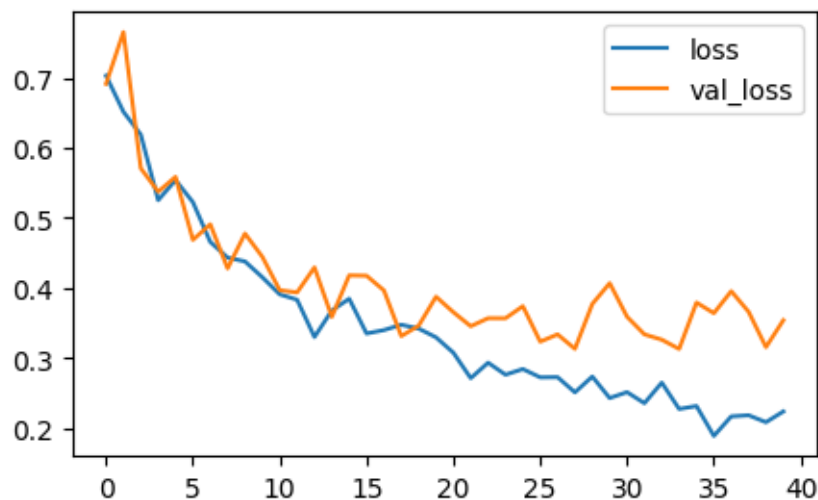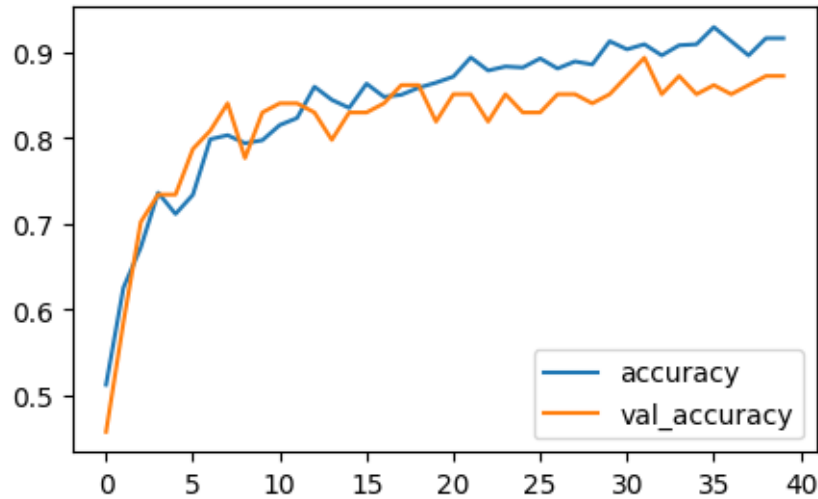
```
['loss', 'compile_metrics']
3/3              0s 18ms/step -
accuracy: 0.8620 - loss: 0.3825
[0.3541395366191864, 0.8723404407501221]
3/3              0s 30ms/step
Classification Report:
             precision    recall  f1-score   support

     Female       0.82      0.90      0.86        41
       Male       0.92      0.85      0.88        53

   accuracy                           0.87        94
  macro avg       0.87      0.88      0.87        94
weighted avg       0.88      0.87      0.87        94

Found 943 files belonging to 2 classes.
Using 849 files for training.
Found 943 files belonging to 2 classes.
Using 94 files for validation.
Epoch 1/40
27/27               3s 75ms/step -
accuracy: 0.5228 - loss: 0.7240 - val_accuracy: 0.5851 - val_loss: 0.6471 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27               2s 70ms/step -
accuracy: 0.6351 - loss: 0.6300 - val_accuracy: 0.6915 - val_loss: 0.6159 -
learning_rate: 5.0000e-04
Epoch 3/40
27/27               2s 70ms/step -
accuracy: 0.7126 - loss: 0.5757 - val_accuracy: 0.7553 - val_loss: 0.5255 -
```

```
learning_rate: 5.0000e-04
Epoch 4/40
27/27              2s 70ms/step -
accuracy: 0.7563 - loss: 0.5132 - val_accuracy: 0.7660 - val_loss: 0.5448 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27              2s 70ms/step -
accuracy: 0.7482 - loss: 0.5219 - val_accuracy: 0.7447 - val_loss: 0.5560 -
learning_rate: 5.0000e-04
Epoch 6/40
27/27              2s 71ms/step -
accuracy: 0.7766 - loss: 0.4733 - val_accuracy: 0.8404 - val_loss: 0.4440 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27              2s 70ms/step -
accuracy: 0.7618 - loss: 0.4926 - val_accuracy: 0.8404 - val_loss: 0.4331 -
learning_rate: 5.0000e-04
Epoch 8/40
27/27              2s 70ms/step -
accuracy: 0.7905 - loss: 0.4584 - val_accuracy: 0.8085 - val_loss: 0.4490 -
learning_rate: 5.0000e-04
Epoch 9/40
27/27              2s 71ms/step -
accuracy: 0.7943 - loss: 0.4445 - val_accuracy: 0.8617 - val_loss: 0.3745 -
learning_rate: 5.0000e-04
Epoch 10/40
27/27              2s 72ms/step -
accuracy: 0.7993 - loss: 0.4458 - val_accuracy: 0.8404 - val_loss: 0.3756 -
learning_rate: 5.0000e-04
Epoch 11/40
27/27              2s 71ms/step -
accuracy: 0.8388 - loss: 0.3744 - val_accuracy: 0.8511 - val_loss: 0.3615 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27              2s 71ms/step -
accuracy: 0.8392 - loss: 0.3742 - val_accuracy: 0.8723 - val_loss: 0.3416 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27              2s 70ms/step -
accuracy: 0.8345 - loss: 0.3565 - val_accuracy: 0.8511 - val_loss: 0.3884 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27              2s 71ms/step -
accuracy: 0.8397 - loss: 0.3508 - val_accuracy: 0.8511 - val_loss: 0.3809 -
learning_rate: 2.5000e-04
Epoch 15/40
27/27              2s 71ms/step -
accuracy: 0.8414 - loss: 0.3583 - val_accuracy: 0.8511 - val_loss: 0.3551 -
```

```
learning_rate: 2.5000e-04
Epoch 16/40
27/27              2s 71ms/step -
accuracy: 0.8663 - loss: 0.3177 - val_accuracy: 0.8511 - val_loss: 0.3678 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27              2s 70ms/step -
accuracy: 0.8257 - loss: 0.3590 - val_accuracy: 0.8511 - val_loss: 0.3569 -
learning_rate: 2.5000e-04
Epoch 18/40
27/27              2s 72ms/step -
accuracy: 0.8770 - loss: 0.3241 - val_accuracy: 0.8298 - val_loss: 0.3624 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27              2s 71ms/step -
accuracy: 0.8492 - loss: 0.3309 - val_accuracy: 0.8617 - val_loss: 0.3421 -
learning_rate: 2.5000e-04
Epoch 20/40
27/27              2s 71ms/step -
accuracy: 0.8751 - loss: 0.2943 - val_accuracy: 0.8404 - val_loss: 0.3282 -
learning_rate: 2.5000e-04
Epoch 21/40
27/27              2s 71ms/step -
accuracy: 0.8690 - loss: 0.3058 - val_accuracy: 0.8617 - val_loss: 0.3188 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27              2s 71ms/step -
accuracy: 0.8750 - loss: 0.2915 - val_accuracy: 0.8404 - val_loss: 0.3448 -
learning_rate: 2.5000e-04
Epoch 23/40
27/27              2s 70ms/step -
accuracy: 0.8808 - loss: 0.2744 - val_accuracy: 0.8511 - val_loss: 0.3240 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27              2s 71ms/step -
accuracy: 0.8859 - loss: 0.2665 - val_accuracy: 0.8404 - val_loss: 0.3482 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27              2s 70ms/step -
accuracy: 0.8784 - loss: 0.2733 - val_accuracy: 0.8298 - val_loss: 0.3054 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27              2s 72ms/step -
accuracy: 0.8587 - loss: 0.2880 - val_accuracy: 0.8723 - val_loss: 0.3546 -
learning_rate: 2.5000e-04
Epoch 27/40
27/27              2s 71ms/step -
accuracy: 0.8839 - loss: 0.2716 - val_accuracy: 0.8511 - val_loss: 0.3136 -
```

```
learning_rate: 2.5000e-04
Epoch 28/40
27/27            2s 70ms/step -
accuracy: 0.9052 - loss: 0.2403 - val_accuracy: 0.8830 - val_loss: 0.3194 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27            2s 70ms/step -
accuracy: 0.8991 - loss: 0.2460 - val_accuracy: 0.8191 - val_loss: 0.3253 -
learning_rate: 2.5000e-04
Epoch 30/40
27/27            2s 71ms/step -
accuracy: 0.8661 - loss: 0.3167 - val_accuracy: 0.8191 - val_loss: 0.2952 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27            2s 70ms/step -
accuracy: 0.8980 - loss: 0.2475 - val_accuracy: 0.8511 - val_loss: 0.3556 -
learning_rate: 2.5000e-04
Epoch 32/40
27/27            2s 70ms/step -
accuracy: 0.8852 - loss: 0.2597 - val_accuracy: 0.8404 - val_loss: 0.3716 -
learning_rate: 2.5000e-04
Epoch 33/40
27/27            2s 70ms/step -
accuracy: 0.8925 - loss: 0.2514 - val_accuracy: 0.8723 - val_loss: 0.2912 -
learning_rate: 2.5000e-04
Epoch 34/40
27/27            2s 72ms/step -
accuracy: 0.9226 - loss: 0.2049 - val_accuracy: 0.8085 - val_loss: 0.3275 -
learning_rate: 2.5000e-04
Epoch 35/40
27/27            2s 72ms/step -
accuracy: 0.9131 - loss: 0.2151 - val_accuracy: 0.8617 - val_loss: 0.3382 -
learning_rate: 2.5000e-04
Epoch 36/40
27/27            2s 71ms/step -
accuracy: 0.9148 - loss: 0.2324 - val_accuracy: 0.8617 - val_loss: 0.3093 -
learning_rate: 2.5000e-04
Epoch 37/40
27/27            2s 71ms/step -
accuracy: 0.9097 - loss: 0.2074 - val_accuracy: 0.8511 - val_loss: 0.3270 -
learning_rate: 2.5000e-04
Epoch 38/40
27/27            2s 70ms/step -
accuracy: 0.9363 - loss: 0.1911 - val_accuracy: 0.8723 - val_loss: 0.3538 -
learning_rate: 2.5000e-04
Epoch 39/40
27/27            2s 71ms/step -
accuracy: 0.9125 - loss: 0.2284 - val_accuracy: 0.8830 - val_loss: 0.3302 -
```

```
learning_rate: 2.5000e-04
Epoch 40/40
27/27                2s 71ms/step -
accuracy: 0.9109 - loss: 0.2090 - val_accuracy: 0.8830 - val_loss: 0.3694 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9116607904434204
Current validation accuracy: 0.8829787373542786
Reseting all weights…
Current number of trials: 6
```
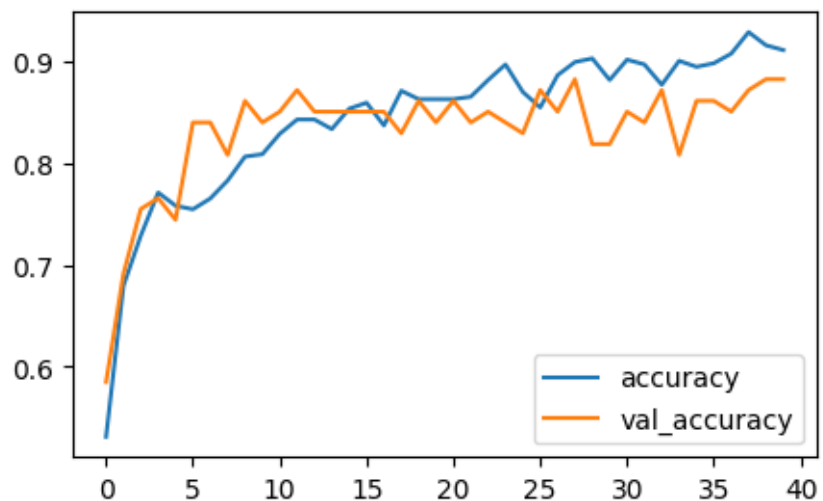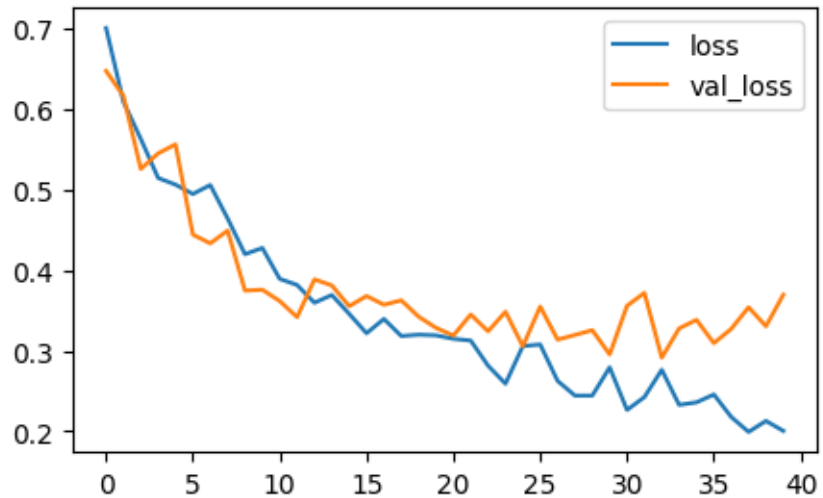


```
['loss', 'compile_metrics']
3/3                0s 18ms/step -
```

```
accuracy: 0.8790 - loss: 0.3915
[0.3694157004356384, 0.8829787373542786]
3/3              0s 30ms/step
Classification Report:
              precision   recall  f1-score   support

      Female      0.83      0.93      0.87        41
        Male      0.94      0.85      0.89        53

    accuracy                          0.88        94
   macro avg      0.88      0.89      0.88        94
weighted avg      0.89      0.88      0.88        94


Found 943 files belonging to 2 classes.
Using 849 files for training.
Found 943 files belonging to 2 classes.
Using 94 files for validation.
Epoch 1/40
27/27             3s 76ms/step -
accuracy: 0.5833 - loss: 0.6825 - val_accuracy: 0.7340 - val_loss: 0.5928 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27             2s 74ms/step -
accuracy: 0.6980 - loss: 0.5890 - val_accuracy: 0.7021 - val_loss: 0.5787 -
learning_rate: 5.0000e-04
Epoch 3/40
27/27             2s 72ms/step -
accuracy: 0.7103 - loss: 0.5545 - val_accuracy: 0.8085 - val_loss: 0.5173 -
learning_rate: 5.0000e-04
Epoch 4/40
27/27             2s 71ms/step -
accuracy: 0.7447 - loss: 0.4889 - val_accuracy: 0.7872 - val_loss: 0.5119 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27             2s 72ms/step -
accuracy: 0.7961 - loss: 0.4797 - val_accuracy: 0.7872 - val_loss: 0.5441 -
learning_rate: 5.0000e-04
Epoch 6/40
27/27             2s 71ms/step -
accuracy: 0.8035 - loss: 0.4413 - val_accuracy: 0.8404 - val_loss: 0.4199 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27             2s 72ms/step -
accuracy: 0.8131 - loss: 0.4131 - val_accuracy: 0.8298 - val_loss: 0.3781 -
learning_rate: 5.0000e-04
Epoch 8/40
27/27             2s 71ms/step -
accuracy: 0.7970 - loss: 0.4031 - val_accuracy: 0.8085 - val_loss: 0.5104 -
```

```
learning_rate: 5.0000e-04
Epoch 9/40
27/27              2s 72ms/step -
accuracy: 0.7807 - loss: 0.4557 - val_accuracy: 0.8404 - val_loss: 0.3975 -
learning_rate: 5.0000e-04
Epoch 10/40
27/27              2s 72ms/step -
accuracy: 0.8235 - loss: 0.3749 - val_accuracy: 0.8298 - val_loss: 0.3918 -
learning_rate: 5.0000e-04
Epoch 11/40
27/27              2s 71ms/step -
accuracy: 0.8556 - loss: 0.3465 - val_accuracy: 0.8511 - val_loss: 0.3037 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27              2s 71ms/step -
accuracy: 0.8640 - loss: 0.3165 - val_accuracy: 0.8511 - val_loss: 0.3236 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27              2s 71ms/step -
accuracy: 0.8529 - loss: 0.3352 - val_accuracy: 0.8511 - val_loss: 0.3400 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27              2s 72ms/step -
accuracy: 0.8217 - loss: 0.3669 - val_accuracy: 0.8511 - val_loss: 0.3621 -
learning_rate: 2.5000e-04
Epoch 15/40
27/27              2s 71ms/step -
accuracy: 0.8892 - loss: 0.2797 - val_accuracy: 0.8404 - val_loss: 0.3700 -
learning_rate: 2.5000e-04
Epoch 16/40
27/27              2s 72ms/step -
accuracy: 0.8910 - loss: 0.2775 - val_accuracy: 0.8404 - val_loss: 0.4155 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27              2s 72ms/step -
accuracy: 0.8658 - loss: 0.3155 - val_accuracy: 0.8511 - val_loss: 0.3325 -
learning_rate: 2.5000e-04
Epoch 18/40
27/27              2s 72ms/step -
accuracy: 0.8609 - loss: 0.3350 - val_accuracy: 0.8617 - val_loss: 0.3754 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27              2s 74ms/step -
accuracy: 0.8638 - loss: 0.3227 - val_accuracy: 0.8617 - val_loss: 0.3833 -
learning_rate: 2.5000e-04
Epoch 20/40
27/27              2s 71ms/step -
accuracy: 0.8816 - loss: 0.2591 - val_accuracy: 0.8511 - val_loss: 0.4174 -
```

```
learning_rate: 2.5000e-04
Epoch 21/40
27/27              2s 72ms/step -
accuracy: 0.8744 - loss: 0.2980 - val_accuracy: 0.8404 - val_loss: 0.3797 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27              2s 71ms/step -
accuracy: 0.8987 - loss: 0.2570 - val_accuracy: 0.8404 - val_loss: 0.4631 -
learning_rate: 2.5000e-04
Epoch 23/40
27/27              2s 71ms/step -
accuracy: 0.8605 - loss: 0.2935 - val_accuracy: 0.8404 - val_loss: 0.3511 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27              2s 72ms/step -
accuracy: 0.9022 - loss: 0.2540 - val_accuracy: 0.8617 - val_loss: 0.3771 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27              2s 72ms/step -
accuracy: 0.8974 - loss: 0.2602 - val_accuracy: 0.8511 - val_loss: 0.3501 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27              2s 73ms/step -
accuracy: 0.8724 - loss: 0.2984 - val_accuracy: 0.8723 - val_loss: 0.3833 -
learning_rate: 2.5000e-04
Epoch 27/40
27/27              2s 73ms/step -
accuracy: 0.9000 - loss: 0.2439 - val_accuracy: 0.8936 - val_loss: 0.3520 -
learning_rate: 2.5000e-04
Epoch 28/40
27/27              2s 72ms/step -
accuracy: 0.9064 - loss: 0.2437 - val_accuracy: 0.8511 - val_loss: 0.3692 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27              2s 74ms/step -
accuracy: 0.9223 - loss: 0.2158 - val_accuracy: 0.8617 - val_loss: 0.3191 -
learning_rate: 2.5000e-04
Epoch 30/40
27/27              2s 71ms/step -
accuracy: 0.9104 - loss: 0.2112 - val_accuracy: 0.8723 - val_loss: 0.3845 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27              2s 72ms/step -
accuracy: 0.9034 - loss: 0.2140 - val_accuracy: 0.8617 - val_loss: 0.2818 -
learning_rate: 2.5000e-04
Epoch 32/40
27/27              2s 72ms/step -
accuracy: 0.8955 - loss: 0.2313 - val_accuracy: 0.8830 - val_loss: 0.3969 -
```

```
learning_rate: 2.5000e-04
Epoch 33/40
27/27                2s 73ms/step -
accuracy: 0.9105 - loss: 0.1952 - val_accuracy: 0.8617 - val_loss: 0.3224 -
learning_rate: 2.5000e-04
Epoch 34/40
27/27                2s 73ms/step -
accuracy: 0.9117 - loss: 0.2138 - val_accuracy: 0.8723 - val_loss: 0.4671 -
learning_rate: 2.5000e-04
Epoch 35/40
27/27                2s 74ms/step -
accuracy: 0.9074 - loss: 0.2059 - val_accuracy: 0.8617 - val_loss: 0.3366 -
learning_rate: 2.5000e-04
Epoch 36/40
27/27                2s 72ms/step -
accuracy: 0.8911 - loss: 0.2425 - val_accuracy: 0.8723 - val_loss: 0.3479 -
learning_rate: 2.5000e-04
Epoch 37/40
27/27                2s 72ms/step -
accuracy: 0.9446 - loss: 0.1882 - val_accuracy: 0.8723 - val_loss: 0.2966 -
learning_rate: 2.5000e-04
Epoch 38/40
27/27                2s 71ms/step -
accuracy: 0.9218 - loss: 0.1929 - val_accuracy: 0.9043 - val_loss: 0.3732 -
learning_rate: 2.5000e-04
Epoch 39/40
27/27                2s 72ms/step -
accuracy: 0.9289 - loss: 0.1803 - val_accuracy: 0.8723 - val_loss: 0.4873 -
learning_rate: 2.5000e-04
Epoch 40/40
27/27                2s 72ms/step -
accuracy: 0.9263 - loss: 0.1770 - val_accuracy: 0.8511 - val_loss: 0.4291 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9269729256629944
Current validation accuracy: 0.8510638475418091
Reseting all weights…
Current number of trials: 7
```
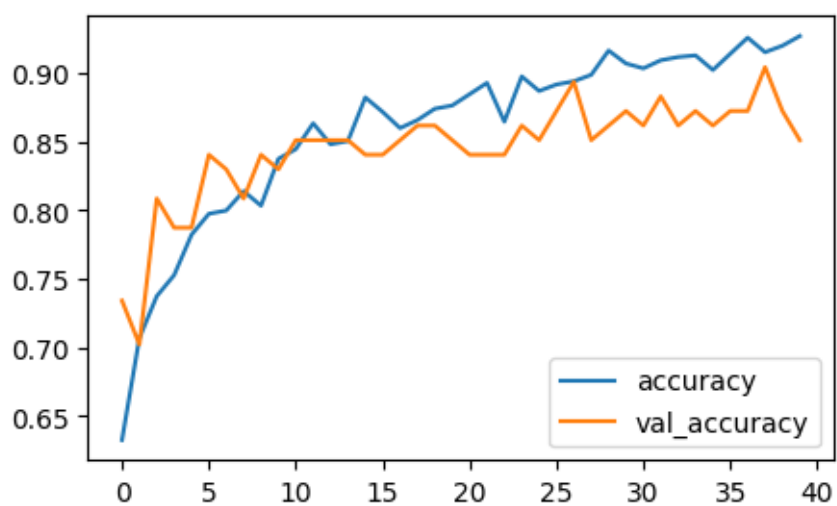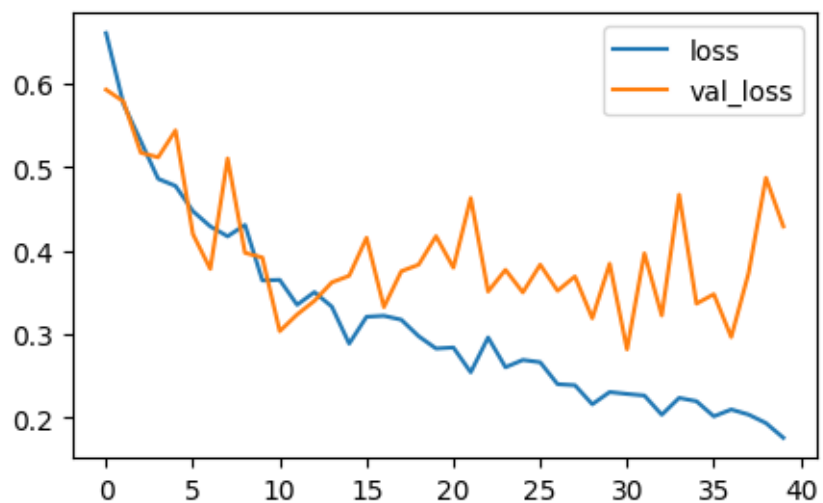
```
['loss', 'compile_metrics']
3/3              0s 19ms/step -
accuracy: 0.8474 - loss: 0.4764
[0.4291384816169739, 0.8510638475418091]
3/3              0s 30ms/step
Classification Report:
              precision    recall  f1-score   support

      Female       0.81      0.85      0.83        41
        Male       0.88      0.85      0.87        53

    accuracy                          0.85        94
```

```
    macro avg          0.85          0.85          0.85          94
weighted avg           0.85          0.85          0.85          94


Found 943 files belonging to 2 classes.
Using 849 files for training.
Found 943 files belonging to 2 classes.
Using 94 files for validation.
Epoch 1/40
27/27              3s 74ms/step -
accuracy: 0.5293 - loss: 0.6891 - val_accuracy: 0.6170 - val_loss: 0.6379 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27              2s 71ms/step -
accuracy: 0.6720 - loss: 0.6001 - val_accuracy: 0.7128 - val_loss: 0.5723 -
learning_rate: 5.0000e-04
Epoch 3/40
27/27              2s 73ms/step -
accuracy: 0.7415 - loss: 0.5590 - val_accuracy: 0.7447 - val_loss: 0.5504 -
learning_rate: 5.0000e-04
Epoch 4/40
27/27              2s 71ms/step -
accuracy: 0.7448 - loss: 0.5066 - val_accuracy: 0.8085 - val_loss: 0.4506 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27              2s 72ms/step -
accuracy: 0.7839 - loss: 0.4590 - val_accuracy: 0.7766 - val_loss: 0.4800 -
learning_rate: 5.0000e-04
Epoch 6/40
27/27              2s 71ms/step -
accuracy: 0.7859 - loss: 0.4727 - val_accuracy: 0.8298 - val_loss: 0.4352 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27              2s 72ms/step -
accuracy: 0.7823 - loss: 0.4421 - val_accuracy: 0.8298 - val_loss: 0.4063 -
learning_rate: 5.0000e-04
Epoch 8/40
27/27              2s 72ms/step -
accuracy: 0.7982 - loss: 0.4256 - val_accuracy: 0.7979 - val_loss: 0.4451 -
learning_rate: 5.0000e-04
Epoch 9/40
27/27              2s 70ms/step -
accuracy: 0.8232 - loss: 0.3885 - val_accuracy: 0.8191 - val_loss: 0.4616 -
learning_rate: 5.0000e-04
Epoch 10/40
27/27              2s 71ms/step -
accuracy: 0.8525 - loss: 0.3728 - val_accuracy: 0.8404 - val_loss: 0.4018 -
learning_rate: 5.0000e-04
Epoch 11/40
```

```
27/27              2s 73ms/step -
accuracy: 0.8350 - loss: 0.3454 - val_accuracy: 0.8191 - val_loss: 0.3978 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27              2s 71ms/step -
accuracy: 0.8383 - loss: 0.3540 - val_accuracy: 0.8404 - val_loss: 0.3844 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27              2s 71ms/step -
accuracy: 0.8425 - loss: 0.3582 - val_accuracy: 0.8404 - val_loss: 0.3870 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27              2s 71ms/step -
accuracy: 0.8897 - loss: 0.3009 - val_accuracy: 0.8404 - val_loss: 0.4833 -
learning_rate: 2.5000e-04
Epoch 15/40
27/27              2s 71ms/step -
accuracy: 0.8470 - loss: 0.3323 - val_accuracy: 0.8511 - val_loss: 0.4393 -
learning_rate: 2.5000e-04
Epoch 16/40
27/27              2s 71ms/step -
accuracy: 0.8749 - loss: 0.2915 - val_accuracy: 0.8085 - val_loss: 0.3041 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27              2s 71ms/step -
accuracy: 0.8688 - loss: 0.3213 - val_accuracy: 0.8723 - val_loss: 0.3631 -
learning_rate: 2.5000e-04
Epoch 18/40
27/27              2s 71ms/step -
accuracy: 0.8768 - loss: 0.3137 - val_accuracy: 0.8511 - val_loss: 0.4824 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27              2s 73ms/step -
accuracy: 0.8879 - loss: 0.2698 - val_accuracy: 0.8404 - val_loss: 0.2985 -
learning_rate: 2.5000e-04
Epoch 20/40
27/27              2s 71ms/step -
accuracy: 0.8621 - loss: 0.2848 - val_accuracy: 0.8191 - val_loss: 0.3613 -
learning_rate: 2.5000e-04
Epoch 21/40
27/27              2s 72ms/step -
accuracy: 0.8917 - loss: 0.2590 - val_accuracy: 0.8511 - val_loss: 0.3741 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27              2s 71ms/step -
accuracy: 0.8718 - loss: 0.3117 - val_accuracy: 0.8298 - val_loss: 0.4899 -
learning_rate: 2.5000e-04
Epoch 23/40
```

```
27/27                2s 72ms/step -
accuracy: 0.8966 - loss: 0.2371 - val_accuracy: 0.8404 - val_loss: 0.3599 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27                2s 72ms/step -
accuracy: 0.8689 - loss: 0.3004 - val_accuracy: 0.8617 - val_loss: 0.3986 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27                2s 72ms/step -
accuracy: 0.8916 - loss: 0.2555 - val_accuracy: 0.8617 - val_loss: 0.3779 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27                2s 71ms/step -
accuracy: 0.8772 - loss: 0.2586 - val_accuracy: 0.8511 - val_loss: 0.4082 -
learning_rate: 2.5000e-04
Epoch 27/40
27/27                2s 72ms/step -
accuracy: 0.8918 - loss: 0.2267 - val_accuracy: 0.8298 - val_loss: 0.3733 -
learning_rate: 2.5000e-04
Epoch 28/40
27/27                2s 72ms/step -
accuracy: 0.9017 - loss: 0.2247 - val_accuracy: 0.8617 - val_loss: 0.3601 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27                2s 71ms/step -
accuracy: 0.9158 - loss: 0.2149 - val_accuracy: 0.8936 - val_loss: 0.2852 -
learning_rate: 2.5000e-04
Epoch 30/40
27/27                2s 71ms/step -
accuracy: 0.9065 - loss: 0.2441 - val_accuracy: 0.8617 - val_loss: 0.3508 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27                2s 71ms/step -
accuracy: 0.9259 - loss: 0.1917 - val_accuracy: 0.8936 - val_loss: 0.2891 -
learning_rate: 2.5000e-04
Epoch 32/40
27/27                2s 72ms/step -
accuracy: 0.9082 - loss: 0.2309 - val_accuracy: 0.8511 - val_loss: 0.3320 -
learning_rate: 2.5000e-04
Epoch 33/40
27/27                2s 72ms/step -
accuracy: 0.9075 - loss: 0.2226 - val_accuracy: 0.8298 - val_loss: 0.3453 -
learning_rate: 2.5000e-04
Epoch 34/40
27/27                2s 72ms/step -
accuracy: 0.8808 - loss: 0.2502 - val_accuracy: 0.8191 - val_loss: 0.5805 -
learning_rate: 2.5000e-04
Epoch 35/40
```

```
27/27                2s 71ms/step -
accuracy: 0.9127 - loss: 0.2141 - val_accuracy: 0.8511 - val_loss: 0.3780 -
learning_rate: 2.5000e-04
Epoch 36/40
27/27                2s 72ms/step -
accuracy: 0.9085 - loss: 0.2237 - val_accuracy: 0.8511 - val_loss: 0.4387 -
learning_rate: 2.5000e-04
Epoch 37/40
27/27                2s 71ms/step -
accuracy: 0.9111 - loss: 0.2115 - val_accuracy: 0.8404 - val_loss: 0.3759 -
learning_rate: 2.5000e-04
Epoch 38/40
27/27                2s 72ms/step -
accuracy: 0.8884 - loss: 0.2520 - val_accuracy: 0.9043 - val_loss: 0.3562 -
learning_rate: 2.5000e-04
Epoch 39/40
27/27                2s 72ms/step -
accuracy: 0.9088 - loss: 0.2120 - val_accuracy: 0.8936 - val_loss: 0.3872 -
learning_rate: 2.5000e-04
Epoch 40/40
27/27                2s 72ms/step -
accuracy: 0.9177 - loss: 0.2144 - val_accuracy: 0.8617 - val_loss: 0.4887 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9151943325996399
Current validation accuracy: 0.8617021441459656
Reseting all weights…
Current number of trials: 8
```
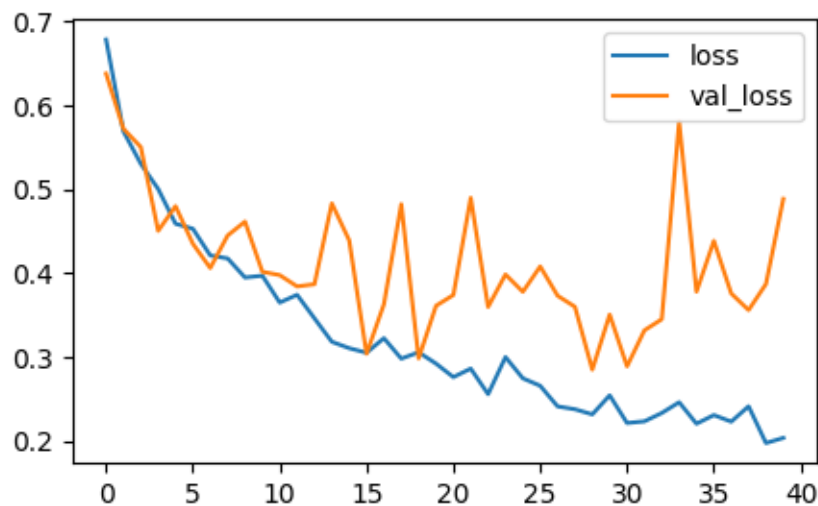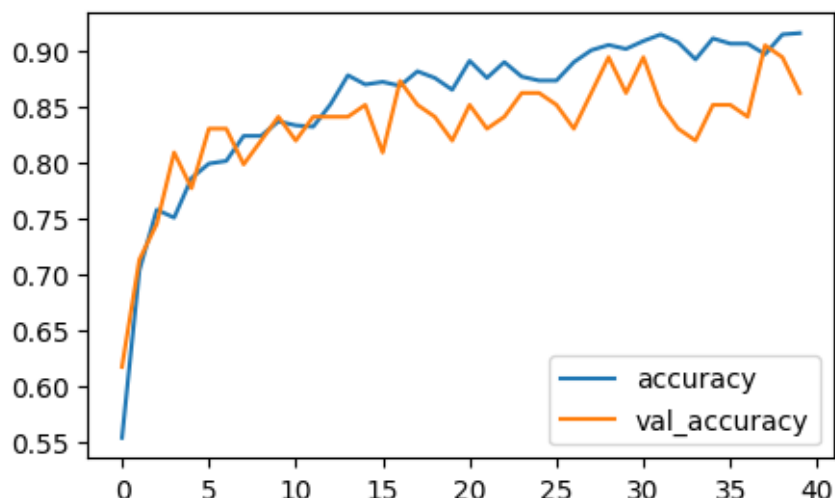
```
['loss', 'compile_metrics']
3/3                0s 19ms/step -
accuracy: 0.8684 - loss: 0.5099
[0.4886617064476013, 0.8617021441459656]
3/3                0s 31ms/step
Classification Report:
              precision    recall  f1-score   support

      Female       0.79      0.93      0.85        41
        Male       0.93      0.81      0.87        53

    accuracy                           0.86        94
   macro avg       0.86      0.87      0.86        94
weighted avg       0.87      0.86      0.86        94


Found 943 files belonging to 2 classes.
Using 849 files for training.

2025-05-07 09:58:06.785724: I tensorflow/core/framework/local_rendezvous.cc:405]
Local rendezvous is aborting with status: OUT_OF_RANGE: End of sequence

Found 943 files belonging to 2 classes.
Using 94 files for validation.
Epoch 1/40
27/27                3s 74ms/step -
accuracy: 0.5137 - loss: 0.6918 - val_accuracy: 0.4894 - val_loss: 0.6993 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27                2s 71ms/step -
accuracy: 0.6525 - loss: 0.6167 - val_accuracy: 0.6702 - val_loss: 0.6151 -
learning_rate: 5.0000e-04
```

```
Epoch 3/40
27/27              2s 72ms/step -
accuracy: 0.7121 - loss: 0.5571 - val_accuracy: 0.6915 - val_loss: 0.6417 -
learning_rate: 5.0000e-04
Epoch 4/40
27/27              2s 72ms/step -
accuracy: 0.7444 - loss: 0.5029 - val_accuracy: 0.7234 - val_loss: 0.5294 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27              2s 71ms/step -
accuracy: 0.7611 - loss: 0.4949 - val_accuracy: 0.7766 - val_loss: 0.4920 -
learning_rate: 5.0000e-04
Epoch 6/40
27/27              2s 72ms/step -
accuracy: 0.7747 - loss: 0.4557 - val_accuracy: 0.7340 - val_loss: 0.5228 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27              2s 71ms/step -
accuracy: 0.7801 - loss: 0.4776 - val_accuracy: 0.7979 - val_loss: 0.4677 -
learning_rate: 5.0000e-04
Epoch 8/40
27/27              2s 71ms/step -
accuracy: 0.8055 - loss: 0.4318 - val_accuracy: 0.7979 - val_loss: 0.4285 -
learning_rate: 5.0000e-04
Epoch 9/40
27/27              2s 71ms/step -
accuracy: 0.7900 - loss: 0.4312 - val_accuracy: 0.7660 - val_loss: 0.4695 -
learning_rate: 5.0000e-04
Epoch 10/40
27/27              2s 71ms/step -
accuracy: 0.8179 - loss: 0.3981 - val_accuracy: 0.7979 - val_loss: 0.4422 -
learning_rate: 5.0000e-04
Epoch 11/40
27/27              2s 71ms/step -
accuracy: 0.8478 - loss: 0.3812 - val_accuracy: 0.8191 - val_loss: 0.3685 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27              2s 71ms/step -
accuracy: 0.8439 - loss: 0.3710 - val_accuracy: 0.7979 - val_loss: 0.4148 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27              2s 70ms/step -
accuracy: 0.8361 - loss: 0.3605 - val_accuracy: 0.7872 - val_loss: 0.3839 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27              2s 70ms/step -
accuracy: 0.8540 - loss: 0.3293 - val_accuracy: 0.8404 - val_loss: 0.3502 -
learning_rate: 2.5000e-04
```

```
Epoch 15/40
27/27              2s 70ms/step -
accuracy: 0.8396 - loss: 0.3677 - val_accuracy: 0.8298 - val_loss: 0.4189 -
learning_rate: 2.5000e-04
Epoch 16/40
27/27              2s 71ms/step -
accuracy: 0.8657 - loss: 0.3161 - val_accuracy: 0.8298 - val_loss: 0.4705 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27              2s 71ms/step -
accuracy: 0.8512 - loss: 0.3311 - val_accuracy: 0.8191 - val_loss: 0.3517 -
learning_rate: 2.5000e-04
Epoch 18/40
27/27              2s 70ms/step -
accuracy: 0.8704 - loss: 0.3167 - val_accuracy: 0.8511 - val_loss: 0.3988 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27              2s 70ms/step -
accuracy: 0.8978 - loss: 0.2659 - val_accuracy: 0.8404 - val_loss: 0.4024 -
learning_rate: 2.5000e-04
Epoch 20/40
27/27              2s 72ms/step -
accuracy: 0.8800 - loss: 0.3041 - val_accuracy: 0.8404 - val_loss: 0.4290 -
learning_rate: 2.5000e-04
Epoch 21/40
27/27              2s 70ms/step -
accuracy: 0.8644 - loss: 0.3218 - val_accuracy: 0.8298 - val_loss: 0.4953 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27              2s 70ms/step -
accuracy: 0.9015 - loss: 0.2442 - val_accuracy: 0.8298 - val_loss: 0.4089 -
learning_rate: 2.5000e-04
Epoch 23/40
27/27              2s 71ms/step -
accuracy: 0.8600 - loss: 0.3127 - val_accuracy: 0.8298 - val_loss: 0.4298 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27              2s 70ms/step -
accuracy: 0.8784 - loss: 0.2821 - val_accuracy: 0.8404 - val_loss: 0.4132 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27              2s 70ms/step -
accuracy: 0.8457 - loss: 0.3153 - val_accuracy: 0.8617 - val_loss: 0.4048 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27              2s 72ms/step -
accuracy: 0.8783 - loss: 0.2904 - val_accuracy: 0.8298 - val_loss: 0.4140 -
learning_rate: 2.5000e-04
```

```
Epoch 27/40
27/27              2s 70ms/step -
accuracy: 0.9013 - loss: 0.2510 - val_accuracy: 0.8511 - val_loss: 0.4177 -
learning_rate: 2.5000e-04
Epoch 28/40
27/27              2s 70ms/step -
accuracy: 0.8921 - loss: 0.2450 - val_accuracy: 0.8404 - val_loss: 0.4054 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27              2s 73ms/step -
accuracy: 0.8889 - loss: 0.2610 - val_accuracy: 0.8617 - val_loss: 0.3883 -
learning_rate: 2.5000e-04
Epoch 30/40
27/27              2s 71ms/step -
accuracy: 0.9105 - loss: 0.2326 - val_accuracy: 0.8617 - val_loss: 0.4086 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27              2s 71ms/step -
accuracy: 0.8908 - loss: 0.2877 - val_accuracy: 0.8723 - val_loss: 0.3957 -
learning_rate: 2.5000e-04
Epoch 32/40
27/27              2s 71ms/step -
accuracy: 0.9105 - loss: 0.2350 - val_accuracy: 0.8298 - val_loss: 0.4361 -
learning_rate: 2.5000e-04
Epoch 33/40
27/27              2s 71ms/step -
accuracy: 0.8856 - loss: 0.2848 - val_accuracy: 0.8617 - val_loss: 0.4605 -
learning_rate: 2.5000e-04
Epoch 34/40
27/27              2s 70ms/step -
accuracy: 0.8932 - loss: 0.2736 - val_accuracy: 0.8511 - val_loss: 0.4397 -
learning_rate: 2.5000e-04
Epoch 35/40
27/27              2s 70ms/step -
accuracy: 0.9203 - loss: 0.2111 - val_accuracy: 0.8723 - val_loss: 0.3643 -
learning_rate: 2.5000e-04
Epoch 36/40
27/27              2s 70ms/step -
accuracy: 0.9172 - loss: 0.2096 - val_accuracy: 0.8617 - val_loss: 0.3798 -
learning_rate: 2.5000e-04
Epoch 37/40
27/27              2s 72ms/step -
accuracy: 0.8887 - loss: 0.2624 - val_accuracy: 0.8617 - val_loss: 0.4674 -
learning_rate: 2.5000e-04
Epoch 38/40
27/27              2s 70ms/step -
accuracy: 0.9106 - loss: 0.2034 - val_accuracy: 0.8617 - val_loss: 0.4104 -
learning_rate: 2.5000e-04
```

```
Epoch 39/40
27/27                  2s 70ms/step -
accuracy: 0.9200 - loss: 0.2050 - val_accuracy: 0.8723 - val_loss: 0.3440 -
learning_rate: 2.5000e-04
Epoch 40/40
27/27                  2s 71ms/step -
accuracy: 0.9106 - loss: 0.2274 - val_accuracy: 0.8830 - val_loss: 0.3584 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9175500869750977
Current validation accuracy: 0.8829787373542786
Reseting all weights…
Current number of trials: 9
```
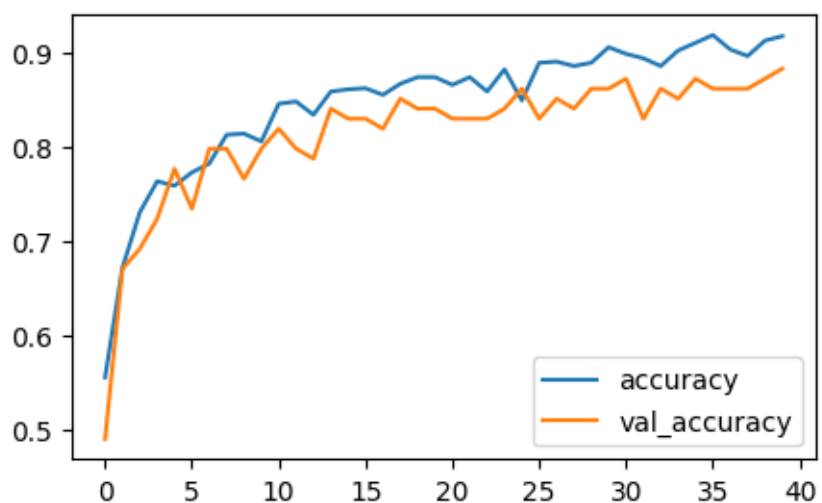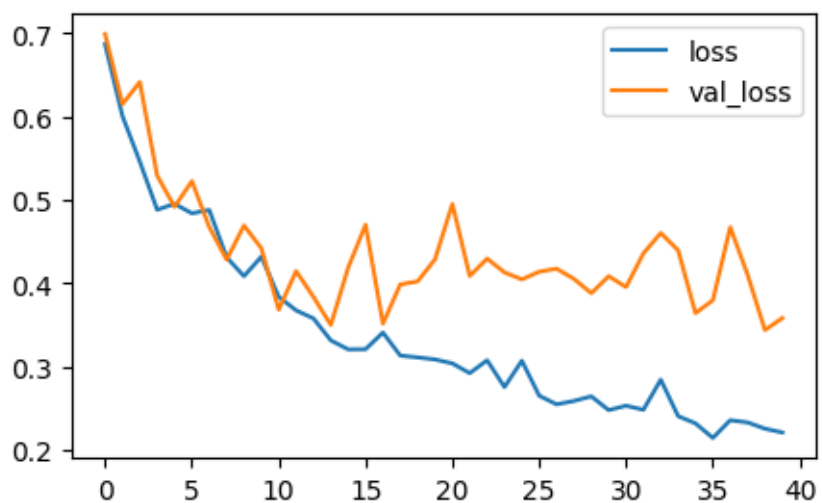
```
['loss', 'compile_metrics']
3/3              0s 17ms/step -
accuracy: 0.8829 - loss: 0.3773
[0.358394056558609, 0.8829787373542786]
3/3              0s 30ms/step
Classification Report:
            precision   recall  f1-score   support

     Female      0.83     0.93     0.87       41
       Male      0.94     0.85     0.89       53

   accuracy                        0.88       94
  macro avg      0.88     0.89     0.88       94
weighted avg      0.89     0.88     0.88       94


Found 943 files belonging to 2 classes.
Using 849 files for training.
Found 943 files belonging to 2 classes.
Using 94 files for validation.
Epoch 1/40
27/27            3s 73ms/step -
accuracy: 0.5206 - loss: 0.7240 - val_accuracy: 0.6383 - val_loss: 0.6671 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27            2s 70ms/step -
accuracy: 0.6649 - loss: 0.6092 - val_accuracy: 0.7340 - val_loss: 0.5552 -
learning_rate: 5.0000e-04
Epoch 3/40
27/27            2s 71ms/step -
accuracy: 0.7154 - loss: 0.5582 - val_accuracy: 0.7234 - val_loss: 0.5802 -
learning_rate: 5.0000e-04
Epoch 4/40
27/27            2s 71ms/step -
accuracy: 0.7408 - loss: 0.5193 - val_accuracy: 0.7447 - val_loss: 0.5220 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27            2s 72ms/step -
accuracy: 0.7625 - loss: 0.4885 - val_accuracy: 0.7872 - val_loss: 0.5213 -
learning_rate: 5.0000e-04
Epoch 6/40
27/27            2s 71ms/step -
accuracy: 0.7988 - loss: 0.4618 - val_accuracy: 0.8511 - val_loss: 0.4323 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27            2s 70ms/step -
accuracy: 0.7834 - loss: 0.4463 - val_accuracy: 0.8404 - val_loss: 0.3761 -
learning_rate: 5.0000e-04
Epoch 8/40
```

```
27/27              2s 71ms/step -
accuracy: 0.8008 - loss: 0.4205 - val_accuracy: 0.7872 - val_loss: 0.4566 -
learning_rate: 5.0000e-04
Epoch 9/40
27/27              2s 70ms/step -
accuracy: 0.7779 - loss: 0.4408 - val_accuracy: 0.8723 - val_loss: 0.3781 -
learning_rate: 5.0000e-04
Epoch 10/40
27/27              2s 72ms/step -
accuracy: 0.8259 - loss: 0.4037 - val_accuracy: 0.8511 - val_loss: 0.3438 -
learning_rate: 5.0000e-04
Epoch 11/40
27/27              2s 71ms/step -
accuracy: 0.8477 - loss: 0.3590 - val_accuracy: 0.8617 - val_loss: 0.4251 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27              2s 71ms/step -
accuracy: 0.8658 - loss: 0.3253 - val_accuracy: 0.8830 - val_loss: 0.3270 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27              2s 72ms/step -
accuracy: 0.8727 - loss: 0.3328 - val_accuracy: 0.8617 - val_loss: 0.3813 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27              2s 71ms/step -
accuracy: 0.8615 - loss: 0.3458 - val_accuracy: 0.8511 - val_loss: 0.3054 -
learning_rate: 2.5000e-04
Epoch 15/40
27/27              2s 70ms/step -
accuracy: 0.8610 - loss: 0.3176 - val_accuracy: 0.8936 - val_loss: 0.3262 -
learning_rate: 2.5000e-04
Epoch 16/40
27/27              2s 71ms/step -
accuracy: 0.8700 - loss: 0.2862 - val_accuracy: 0.9043 - val_loss: 0.3018 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27              2s 71ms/step -
accuracy: 0.8941 - loss: 0.2691 - val_accuracy: 0.8830 - val_loss: 0.3500 -
learning_rate: 2.5000e-04
Epoch 18/40
27/27              2s 71ms/step -
accuracy: 0.8566 - loss: 0.3111 - val_accuracy: 0.8511 - val_loss: 0.3080 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27              2s 71ms/step -
accuracy: 0.8875 - loss: 0.2701 - val_accuracy: 0.8511 - val_loss: 0.3034 -
learning_rate: 2.5000e-04
Epoch 20/40
```

```
27/27                2s 72ms/step -
accuracy: 0.8977 - loss: 0.2761 - val_accuracy: 0.8404 - val_loss: 0.3451 -
learning_rate: 2.5000e-04
Epoch 21/40
27/27                2s 71ms/step -
accuracy: 0.8615 - loss: 0.3039 - val_accuracy: 0.8830 - val_loss: 0.3908 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27                2s 71ms/step -
accuracy: 0.8782 - loss: 0.3002 - val_accuracy: 0.8723 - val_loss: 0.2860 -
learning_rate: 2.5000e-04
Epoch 23/40
27/27                2s 70ms/step -
accuracy: 0.8968 - loss: 0.2588 - val_accuracy: 0.8723 - val_loss: 0.3067 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27                2s 71ms/step -
accuracy: 0.8909 - loss: 0.2678 - val_accuracy: 0.8830 - val_loss: 0.2672 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27                2s 71ms/step -
accuracy: 0.9100 - loss: 0.2361 - val_accuracy: 0.8511 - val_loss: 0.3236 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27                2s 70ms/step -
accuracy: 0.8921 - loss: 0.2386 - val_accuracy: 0.8723 - val_loss: 0.3332 -
learning_rate: 2.5000e-04
Epoch 27/40
27/27                2s 71ms/step -
accuracy: 0.9160 - loss: 0.2419 - val_accuracy: 0.8404 - val_loss: 0.2765 -
learning_rate: 2.5000e-04
Epoch 28/40
27/27                2s 71ms/step -
accuracy: 0.9094 - loss: 0.2225 - val_accuracy: 0.8617 - val_loss: 0.3315 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27                2s 70ms/step -
accuracy: 0.9163 - loss: 0.2267 - val_accuracy: 0.8936 - val_loss: 0.3253 -
learning_rate: 2.5000e-04
Epoch 30/40
27/27                2s 72ms/step -
accuracy: 0.9269 - loss: 0.1732 - val_accuracy: 0.8936 - val_loss: 0.2665 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27                2s 71ms/step -
accuracy: 0.9154 - loss: 0.2209 - val_accuracy: 0.8298 - val_loss: 0.3578 -
learning_rate: 2.5000e-04
Epoch 32/40
```

```
27/27                2s 71ms/step -
accuracy: 0.9044 - loss: 0.2382 - val_accuracy: 0.8511 - val_loss: 0.2891 -
learning_rate: 2.5000e-04
Epoch 33/40
27/27                2s 70ms/step -
accuracy: 0.9180 - loss: 0.2392 - val_accuracy: 0.8617 - val_loss: 0.3842 -
learning_rate: 2.5000e-04
Epoch 34/40
27/27                2s 72ms/step -
accuracy: 0.9054 - loss: 0.2525 - val_accuracy: 0.8830 - val_loss: 0.3049 -
learning_rate: 2.5000e-04
Epoch 35/40
27/27                2s 71ms/step -
accuracy: 0.9224 - loss: 0.2001 - val_accuracy: 0.8617 - val_loss: 0.3409 -
learning_rate: 2.5000e-04
Epoch 36/40
27/27                2s 70ms/step -
accuracy: 0.9061 - loss: 0.2139 - val_accuracy: 0.8404 - val_loss: 0.3102 -
learning_rate: 2.5000e-04
Epoch 37/40
27/27                2s 71ms/step -
accuracy: 0.9118 - loss: 0.2314 - val_accuracy: 0.8723 - val_loss: 0.3373 -
learning_rate: 2.5000e-04
Epoch 38/40
27/27                2s 72ms/step -
accuracy: 0.9279 - loss: 0.1933 - val_accuracy: 0.8936 - val_loss: 0.3026 -
learning_rate: 2.5000e-04
Epoch 39/40
27/27                2s 71ms/step -
accuracy: 0.9106 - loss: 0.2197 - val_accuracy: 0.8617 - val_loss: 0.3561 -
learning_rate: 2.5000e-04
Epoch 40/40
27/27                2s 71ms/step -
accuracy: 0.9318 - loss: 0.1651 - val_accuracy: 0.8511 - val_loss: 0.4019 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9328621625900269
Current validation accuracy: 0.8510638475418091
Reseting all weights…
Current number of trials: 10
```
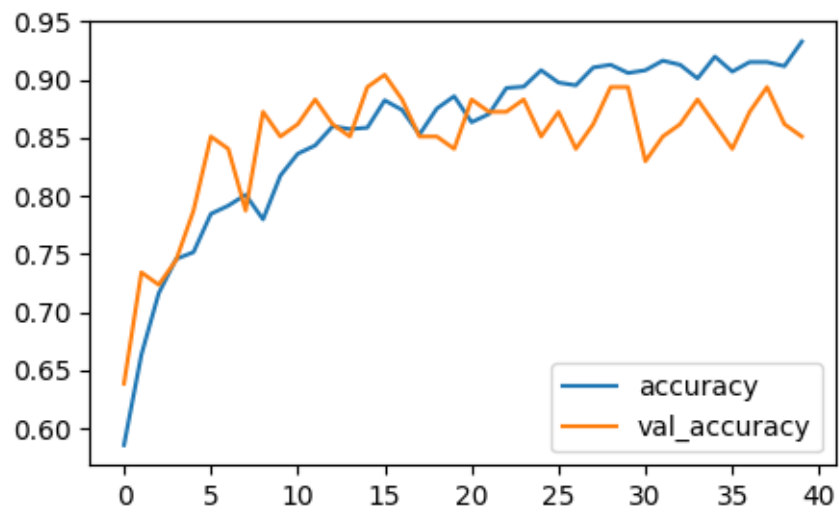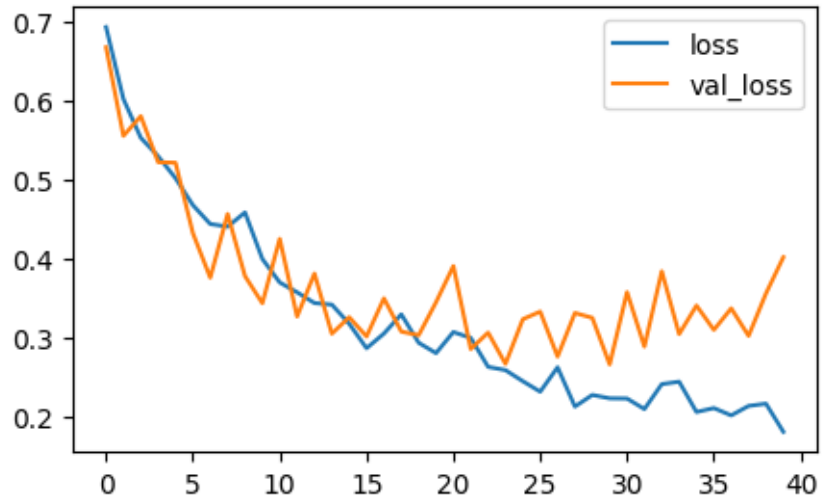
```
['loss', 'compile_metrics']
3/3                 0s 18ms/step -
accuracy: 0.8279 - loss: 0.4516
[0.4019261598587036, 0.8510638475418091]
3/3                 0s 30ms/step
Classification Report:
              precision    recall  f1-score   support

      Female       0.81      0.85      0.83        41
        Male       0.88      0.85      0.87        53

    accuracy                           0.85        94
```

```
  macro avg        0.85      0.85      0.85          94
weighted avg       0.85      0.85      0.85          94


Found 943 files belonging to 2 classes.
Using 849 files for training.
Found 943 files belonging to 2 classes.
Using 94 files for validation.
Epoch 1/40
27/27            3s 74ms/step -
accuracy: 0.5416 - loss: 0.6850 - val_accuracy: 0.6064 - val_loss: 0.6578 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27            2s 70ms/step -
accuracy: 0.6702 - loss: 0.6049 - val_accuracy: 0.6596 - val_loss: 0.6246 -
learning_rate: 5.0000e-04
Epoch 3/40
27/27            2s 71ms/step -
accuracy: 0.7092 - loss: 0.5566 - val_accuracy: 0.7660 - val_loss: 0.5784 -
learning_rate: 5.0000e-04
Epoch 4/40
27/27            2s 71ms/step -
accuracy: 0.7616 - loss: 0.5173 - val_accuracy: 0.7553 - val_loss: 0.5198 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27            2s 71ms/step -
accuracy: 0.7588 - loss: 0.5040 - val_accuracy: 0.7128 - val_loss: 0.5220 -
learning_rate: 5.0000e-04
Epoch 6/40
27/27            2s 72ms/step -
accuracy: 0.7397 - loss: 0.5052 - val_accuracy: 0.7553 - val_loss: 0.5102 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27            2s 70ms/step -
accuracy: 0.7624 - loss: 0.4999 - val_accuracy: 0.7234 - val_loss: 0.6094 -
learning_rate: 5.0000e-04
Epoch 8/40
27/27            2s 70ms/step -
accuracy: 0.7610 - loss: 0.4925 - val_accuracy: 0.8511 - val_loss: 0.4339 -
learning_rate: 5.0000e-04
Epoch 9/40
27/27            2s 71ms/step -
accuracy: 0.7639 - loss: 0.4990 - val_accuracy: 0.7766 - val_loss: 0.5361 -
learning_rate: 5.0000e-04
Epoch 10/40
27/27            2s 71ms/step -
accuracy: 0.7821 - loss: 0.4416 - val_accuracy: 0.8085 - val_loss: 0.4074 -
learning_rate: 5.0000e-04
Epoch 11/40
```

```
27/27              2s 71ms/step -
accuracy: 0.7952 - loss: 0.4361 - val_accuracy: 0.8298 - val_loss: 0.4566 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27              2s 70ms/step -
accuracy: 0.8225 - loss: 0.3826 - val_accuracy: 0.8617 - val_loss: 0.3683 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27              2s 71ms/step -
accuracy: 0.8108 - loss: 0.3986 - val_accuracy: 0.8298 - val_loss: 0.4500 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27              2s 72ms/step -
accuracy: 0.8354 - loss: 0.3710 - val_accuracy: 0.8617 - val_loss: 0.3826 -
learning_rate: 2.5000e-04
Epoch 15/40
27/27              2s 72ms/step -
accuracy: 0.8559 - loss: 0.3516 - val_accuracy: 0.8617 - val_loss: 0.3667 -
learning_rate: 2.5000e-04
Epoch 16/40
27/27              2s 72ms/step -
accuracy: 0.8397 - loss: 0.3596 - val_accuracy: 0.8511 - val_loss: 0.4255 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27              2s 71ms/step -
accuracy: 0.8280 - loss: 0.3591 - val_accuracy: 0.8723 - val_loss: 0.3819 -
learning_rate: 2.5000e-04
Epoch 18/40
27/27              2s 70ms/step -
accuracy: 0.8755 - loss: 0.3168 - val_accuracy: 0.8617 - val_loss: 0.3956 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27              2s 71ms/step -
accuracy: 0.8350 - loss: 0.3672 - val_accuracy: 0.8404 - val_loss: 0.4167 -
learning_rate: 2.5000e-04
Epoch 20/40
27/27              2s 72ms/step -
accuracy: 0.8371 - loss: 0.3335 - val_accuracy: 0.8404 - val_loss: 0.3638 -
learning_rate: 2.5000e-04
Epoch 21/40
27/27              2s 71ms/step -
accuracy: 0.8720 - loss: 0.3090 - val_accuracy: 0.8511 - val_loss: 0.4505 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27              2s 71ms/step -
accuracy: 0.8667 - loss: 0.3198 - val_accuracy: 0.8191 - val_loss: 0.3470 -
learning_rate: 2.5000e-04
Epoch 23/40
```

```
27/27                2s 73ms/step -
accuracy: 0.8602 - loss: 0.3496 - val_accuracy: 0.8617 - val_loss: 0.3769 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27                2s 71ms/step -
accuracy: 0.8805 - loss: 0.2827 - val_accuracy: 0.8404 - val_loss: 0.3838 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27                2s 72ms/step -
accuracy: 0.8669 - loss: 0.3067 - val_accuracy: 0.8298 - val_loss: 0.4486 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27                2s 71ms/step -
accuracy: 0.8766 - loss: 0.2996 - val_accuracy: 0.8617 - val_loss: 0.3714 -
learning_rate: 2.5000e-04
Epoch 27/40
27/27                2s 72ms/step -
accuracy: 0.8932 - loss: 0.2885 - val_accuracy: 0.8511 - val_loss: 0.3335 -
learning_rate: 2.5000e-04
Epoch 28/40
27/27                2s 71ms/step -
accuracy: 0.8690 - loss: 0.2963 - val_accuracy: 0.8617 - val_loss: 0.4362 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27                2s 72ms/step -
accuracy: 0.8690 - loss: 0.2988 - val_accuracy: 0.8404 - val_loss: 0.4247 -
learning_rate: 2.5000e-04
Epoch 30/40
27/27                2s 71ms/step -
accuracy: 0.8860 - loss: 0.3000 - val_accuracy: 0.8723 - val_loss: 0.3310 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27                2s 72ms/step -
accuracy: 0.8747 - loss: 0.2987 - val_accuracy: 0.8298 - val_loss: 0.4035 -
learning_rate: 2.5000e-04
Epoch 32/40
27/27                2s 71ms/step -
accuracy: 0.9007 - loss: 0.2449 - val_accuracy: 0.8617 - val_loss: 0.4327 -
learning_rate: 2.5000e-04
Epoch 33/40
27/27                2s 72ms/step -
accuracy: 0.9029 - loss: 0.2426 - val_accuracy: 0.8298 - val_loss: 0.3354 -
learning_rate: 2.5000e-04
Epoch 34/40
27/27                2s 72ms/step -
accuracy: 0.9323 - loss: 0.2078 - val_accuracy: 0.8511 - val_loss: 0.3594 -
learning_rate: 2.5000e-04
Epoch 35/40
```

```
27/27                2s 71ms/step -
accuracy: 0.9160 - loss: 0.2052 - val_accuracy: 0.8404 - val_loss: 0.3802 -
learning_rate: 2.5000e-04
Epoch 36/40
27/27                2s 72ms/step -
accuracy: 0.9039 - loss: 0.2390 - val_accuracy: 0.8404 - val_loss: 0.4627 -
learning_rate: 2.5000e-04
Epoch 37/40
27/27                2s 71ms/step -
accuracy: 0.9213 - loss: 0.2072 - val_accuracy: 0.8723 - val_loss: 0.3504 -
learning_rate: 2.5000e-04
Epoch 38/40
27/27                2s 71ms/step -
accuracy: 0.9102 - loss: 0.2313 - val_accuracy: 0.8404 - val_loss: 0.4731 -
learning_rate: 2.5000e-04
Epoch 39/40
27/27                2s 72ms/step -
accuracy: 0.9244 - loss: 0.1971 - val_accuracy: 0.8511 - val_loss: 0.4407 -
learning_rate: 2.5000e-04
Epoch 40/40
27/27                2s 71ms/step -
accuracy: 0.9078 - loss: 0.2308 - val_accuracy: 0.8404 - val_loss: 0.6385 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9034157991409302
Current validation accuracy: 0.8404255509376526
Reseting all weights…
Current number of trials: 11
```
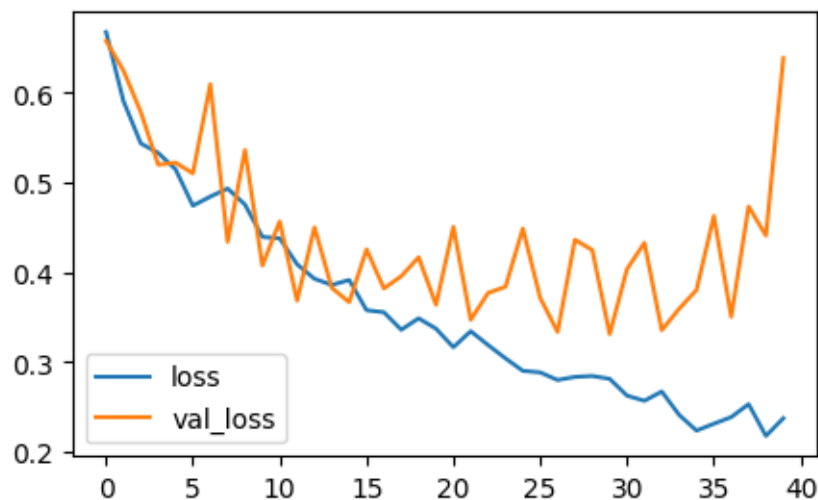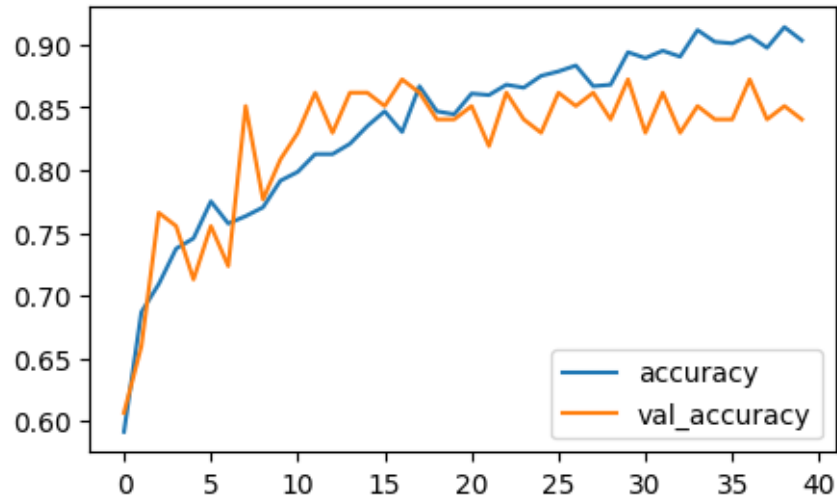
```
['loss', 'compile_metrics']
3/3                0s 18ms/step -
accuracy: 0.8226 - loss: 0.6854
[0.63847416639328, 0.8404255509376526]
3/3                0s 30ms/step
Classification Report:
              precision    recall  f1-score   support

      Female       0.76      0.93      0.84        41
        Male       0.93      0.77      0.85        53

    accuracy                           0.84        94
   macro avg       0.85      0.85      0.84        94
weighted avg       0.86      0.84      0.84        94

Found 943 files belonging to 2 classes.
Using 849 files for training.
Found 943 files belonging to 2 classes.
Using 94 files for validation.
Epoch 1/40
27/27              3s 74ms/step -
accuracy: 0.5644 - loss: 0.6782 - val_accuracy: 0.4574 - val_loss: 0.7221 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27              2s 70ms/step -
accuracy: 0.6004 - loss: 0.6509 - val_accuracy: 0.6489 - val_loss: 0.6164 -
learning_rate: 5.0000e-04
Epoch 3/40
27/27              2s 70ms/step -
accuracy: 0.6798 - loss: 0.5887 - val_accuracy: 0.7447 - val_loss: 0.5394 -
```

```
learning_rate: 5.0000e-04
Epoch 4/40
27/27              2s 71ms/step -
accuracy: 0.7443 - loss: 0.5311 - val_accuracy: 0.7128 - val_loss: 0.4998 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27              2s 70ms/step -
accuracy: 0.7586 - loss: 0.4950 - val_accuracy: 0.8085 - val_loss: 0.4651 -
learning_rate: 5.0000e-04
Epoch 6/40
27/27              2s 70ms/step -
accuracy: 0.7558 - loss: 0.5028 - val_accuracy: 0.8085 - val_loss: 0.4800 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27              2s 71ms/step -
accuracy: 0.7848 - loss: 0.4836 - val_accuracy: 0.8191 - val_loss: 0.4488 -
learning_rate: 5.0000e-04
Epoch 8/40
27/27              2s 70ms/step -
accuracy: 0.7936 - loss: 0.4446 - val_accuracy: 0.8191 - val_loss: 0.4777 -
learning_rate: 5.0000e-04
Epoch 9/40
27/27              2s 70ms/step -
accuracy: 0.8046 - loss: 0.4149 - val_accuracy: 0.7553 - val_loss: 0.5419 -
learning_rate: 5.0000e-04
Epoch 10/40
27/27              2s 70ms/step -
accuracy: 0.7772 - loss: 0.4767 - val_accuracy: 0.7979 - val_loss: 0.4775 -
learning_rate: 5.0000e-04
Epoch 11/40
27/27              2s 70ms/step -
accuracy: 0.8166 - loss: 0.3899 - val_accuracy: 0.8404 - val_loss: 0.3355 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27              2s 70ms/step -
accuracy: 0.8236 - loss: 0.3887 - val_accuracy: 0.8191 - val_loss: 0.3809 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27              2s 70ms/step -
accuracy: 0.8218 - loss: 0.3944 - val_accuracy: 0.8404 - val_loss: 0.3636 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27              2s 70ms/step -
accuracy: 0.8562 - loss: 0.3236 - val_accuracy: 0.8404 - val_loss: 0.3889 -
learning_rate: 2.5000e-04
Epoch 15/40
27/27              2s 71ms/step -
accuracy: 0.8763 - loss: 0.3205 - val_accuracy: 0.8511 - val_loss: 0.3890 -
```

```
learning_rate: 2.5000e-04
Epoch 16/40
27/27              2s 72ms/step -
accuracy: 0.8788 - loss: 0.3086 - val_accuracy: 0.8404 - val_loss: 0.3770 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27              2s 70ms/step -
accuracy: 0.8792 - loss: 0.3051 - val_accuracy: 0.8511 - val_loss: 0.3817 -
learning_rate: 2.5000e-04
Epoch 18/40
27/27              2s 71ms/step -
accuracy: 0.8809 - loss: 0.2944 - val_accuracy: 0.8298 - val_loss: 0.3717 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27              2s 71ms/step -
accuracy: 0.8744 - loss: 0.2878 - val_accuracy: 0.8617 - val_loss: 0.3135 -
learning_rate: 2.5000e-04
Epoch 20/40
27/27              2s 71ms/step -
accuracy: 0.8739 - loss: 0.3170 - val_accuracy: 0.8617 - val_loss: 0.3704 -
learning_rate: 2.5000e-04
Epoch 21/40
27/27              2s 70ms/step -
accuracy: 0.8802 - loss: 0.2828 - val_accuracy: 0.8511 - val_loss: 0.3783 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27              2s 70ms/step -
accuracy: 0.8545 - loss: 0.3234 - val_accuracy: 0.8617 - val_loss: 0.3692 -
learning_rate: 2.5000e-04
Epoch 23/40
27/27              2s 70ms/step -
accuracy: 0.8979 - loss: 0.2570 - val_accuracy: 0.8723 - val_loss: 0.2756 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27              2s 71ms/step -
accuracy: 0.8891 - loss: 0.2632 - val_accuracy: 0.8723 - val_loss: 0.3072 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27              2s 70ms/step -
accuracy: 0.8912 - loss: 0.2560 - val_accuracy: 0.8723 - val_loss: 0.2868 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27              2s 70ms/step -
accuracy: 0.8959 - loss: 0.2521 - val_accuracy: 0.8617 - val_loss: 0.3166 -
learning_rate: 2.5000e-04
Epoch 27/40
27/27              2s 70ms/step -
accuracy: 0.9066 - loss: 0.2358 - val_accuracy: 0.8617 - val_loss: 0.3268 -
```

```
learning_rate: 2.5000e-04
Epoch 28/40
27/27              2s 70ms/step -
accuracy: 0.9045 - loss: 0.2371 - val_accuracy: 0.8511 - val_loss: 0.3194 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27              2s 70ms/step -
accuracy: 0.8971 - loss: 0.2177 - val_accuracy: 0.8404 - val_loss: 0.2870 -
learning_rate: 2.5000e-04
Epoch 30/40
27/27              2s 70ms/step -
accuracy: 0.9057 - loss: 0.2261 - val_accuracy: 0.8617 - val_loss: 0.3505 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27              2s 70ms/step -
accuracy: 0.9044 - loss: 0.2325 - val_accuracy: 0.8404 - val_loss: 0.3064 -
learning_rate: 2.5000e-04
Epoch 32/40
27/27              2s 72ms/step -
accuracy: 0.9331 - loss: 0.2070 - val_accuracy: 0.8617 - val_loss: 0.4135 -
learning_rate: 2.5000e-04
Epoch 33/40
27/27              2s 71ms/step -
accuracy: 0.9199 - loss: 0.2139 - val_accuracy: 0.8404 - val_loss: 0.3870 -
learning_rate: 2.5000e-04
Epoch 34/40
27/27              2s 71ms/step -
accuracy: 0.9059 - loss: 0.2263 - val_accuracy: 0.8723 - val_loss: 0.3654 -
learning_rate: 2.5000e-04
Epoch 35/40
27/27              2s 71ms/step -
accuracy: 0.9171 - loss: 0.2033 - val_accuracy: 0.8085 - val_loss: 0.4066 -
learning_rate: 2.5000e-04
Epoch 36/40
27/27              2s 70ms/step -
accuracy: 0.8985 - loss: 0.2423 - val_accuracy: 0.8723 - val_loss: 0.3611 -
learning_rate: 2.5000e-04
Epoch 37/40
27/27              2s 70ms/step -
accuracy: 0.8894 - loss: 0.2357 - val_accuracy: 0.8723 - val_loss: 0.3089 -
learning_rate: 2.5000e-04
Epoch 38/40
27/27              2s 70ms/step -
accuracy: 0.8899 - loss: 0.2380 - val_accuracy: 0.8723 - val_loss: 0.4560 -
learning_rate: 2.5000e-04
Epoch 39/40
27/27              2s 70ms/step -
accuracy: 0.9197 - loss: 0.1917 - val_accuracy: 0.8298 - val_loss: 0.3367 -
```

```
learning_rate: 2.5000e-04
Epoch 40/40
27/27                 2s 70ms/step -
accuracy: 0.9188 - loss: 0.1812 - val_accuracy: 0.8617 - val_loss: 0.4265 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9151943325996399
Current validation accuracy: 0.8617021441459656
Reseting all weights…
Current number of trials: 12
```
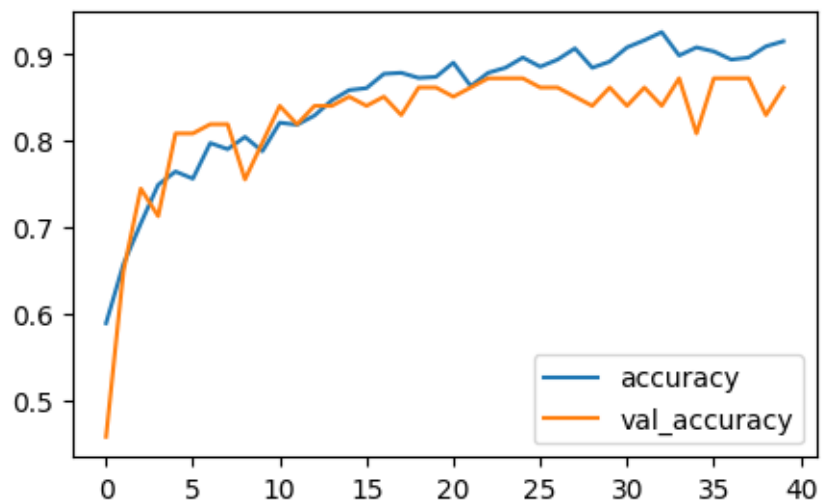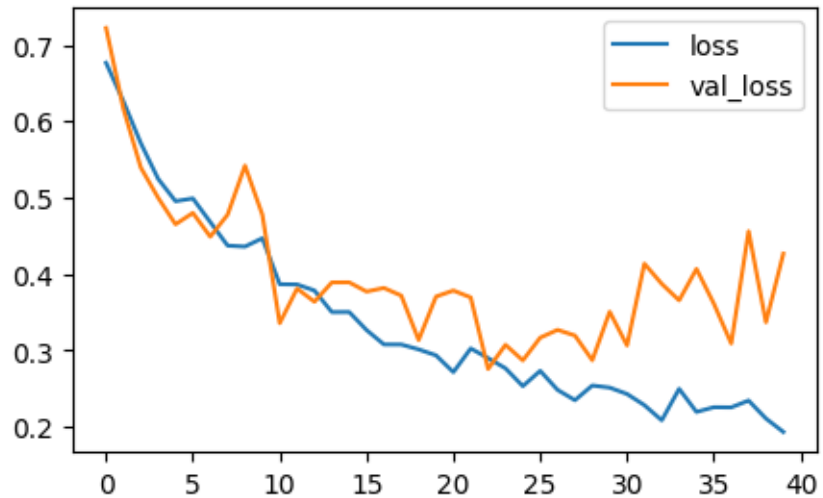


```
['loss', 'compile_metrics']
3/3                 0s 19ms/step -
```

```
accuracy: 0.8644 - loss: 0.4689
[0.4265498220920563, 0.8617021441459656]
3/3              0s 31ms/step
Classification Report:
              precision    recall  f1-score   support

      Female       0.80      0.90      0.85        41
        Male       0.92      0.83      0.87        53

    accuracy                           0.86        94
   macro avg       0.86      0.87      0.86        94
weighted avg       0.87      0.86      0.86        94


Found 943 files belonging to 2 classes.
Using 849 files for training.
Found 943 files belonging to 2 classes.
Using 94 files for validation.
Epoch 1/40
27/27              3s 73ms/step -
accuracy: 0.5146 - loss: 0.7398 - val_accuracy: 0.4362 - val_loss: 0.7297 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27              2s 71ms/step -
accuracy: 0.6071 - loss: 0.6597 - val_accuracy: 0.6809 - val_loss: 0.5994 -
learning_rate: 5.0000e-04
Epoch 3/40
27/27              2s 71ms/step -
accuracy: 0.7113 - loss: 0.5579 - val_accuracy: 0.7447 - val_loss: 0.5252 -
learning_rate: 5.0000e-04
Epoch 4/40
27/27              2s 71ms/step -
accuracy: 0.7599 - loss: 0.5054 - val_accuracy: 0.7766 - val_loss: 0.4619 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27              2s 70ms/step -
accuracy: 0.7314 - loss: 0.4989 - val_accuracy: 0.7447 - val_loss: 0.5446 -
learning_rate: 5.0000e-04
Epoch 6/40
27/27              2s 70ms/step -
accuracy: 0.7878 - loss: 0.4848 - val_accuracy: 0.8085 - val_loss: 0.4697 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27              2s 70ms/step -
accuracy: 0.8183 - loss: 0.4200 - val_accuracy: 0.7979 - val_loss: 0.4158 -
learning_rate: 5.0000e-04
Epoch 8/40
27/27              2s 72ms/step -
accuracy: 0.7837 - loss: 0.4611 - val_accuracy: 0.7766 - val_loss: 0.5294 -
```

```
learning_rate: 5.0000e-04
Epoch 9/40
27/27              2s 70ms/step -
accuracy: 0.8205 - loss: 0.4260 - val_accuracy: 0.7979 - val_loss: 0.4259 -
learning_rate: 5.0000e-04
Epoch 10/40
27/27              2s 70ms/step -
accuracy: 0.7850 - loss: 0.4708 - val_accuracy: 0.7872 - val_loss: 0.4595 -
learning_rate: 5.0000e-04
Epoch 11/40
27/27              2s 70ms/step -
accuracy: 0.8175 - loss: 0.4206 - val_accuracy: 0.8298 - val_loss: 0.3513 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27              2s 70ms/step -
accuracy: 0.8339 - loss: 0.3859 - val_accuracy: 0.8511 - val_loss: 0.3247 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27              2s 71ms/step -
accuracy: 0.8411 - loss: 0.3872 - val_accuracy: 0.8511 - val_loss: 0.3579 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27              2s 70ms/step -
accuracy: 0.8258 - loss: 0.3647 - val_accuracy: 0.8191 - val_loss: 0.3737 -
learning_rate: 2.5000e-04
Epoch 15/40
27/27              2s 71ms/step -
accuracy: 0.8539 - loss: 0.3407 - val_accuracy: 0.8404 - val_loss: 0.3551 -
learning_rate: 2.5000e-04
Epoch 16/40
27/27              2s 70ms/step -
accuracy: 0.8300 - loss: 0.3899 - val_accuracy: 0.8085 - val_loss: 0.3764 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27              2s 72ms/step -
accuracy: 0.8402 - loss: 0.3469 - val_accuracy: 0.8085 - val_loss: 0.3365 -
learning_rate: 2.5000e-04
Epoch 18/40
27/27              2s 70ms/step -
accuracy: 0.8555 - loss: 0.3306 - val_accuracy: 0.8404 - val_loss: 0.4302 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27              2s 70ms/step -
accuracy: 0.8302 - loss: 0.3497 - val_accuracy: 0.8191 - val_loss: 0.3404 -
learning_rate: 2.5000e-04
Epoch 20/40
27/27              2s 70ms/step -
accuracy: 0.8451 - loss: 0.3331 - val_accuracy: 0.8191 - val_loss: 0.3600 -
```

```
learning_rate: 2.5000e-04
Epoch 21/40
27/27              2s 71ms/step -
accuracy: 0.8715 - loss: 0.3132 - val_accuracy: 0.8617 - val_loss: 0.3658 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27              2s 70ms/step -
accuracy: 0.8678 - loss: 0.3155 - val_accuracy: 0.8404 - val_loss: 0.3345 -
learning_rate: 2.5000e-04
Epoch 23/40
27/27              2s 70ms/step -
accuracy: 0.8407 - loss: 0.3233 - val_accuracy: 0.8511 - val_loss: 0.3800 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27              2s 70ms/step -
accuracy: 0.8738 - loss: 0.2996 - val_accuracy: 0.8511 - val_loss: 0.3849 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27              2s 72ms/step -
accuracy: 0.8771 - loss: 0.3478 - val_accuracy: 0.8617 - val_loss: 0.2527 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27              2s 70ms/step -
accuracy: 0.8839 - loss: 0.2701 - val_accuracy: 0.8511 - val_loss: 0.3158 -
learning_rate: 2.5000e-04
Epoch 27/40
27/27              2s 70ms/step -
accuracy: 0.8988 - loss: 0.2842 - val_accuracy: 0.8404 - val_loss: 0.4452 -
learning_rate: 2.5000e-04
Epoch 28/40
27/27              2s 70ms/step -
accuracy: 0.8754 - loss: 0.2989 - val_accuracy: 0.8723 - val_loss: 0.3929 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27              2s 70ms/step -
accuracy: 0.8971 - loss: 0.2651 - val_accuracy: 0.8511 - val_loss: 0.2909 -
learning_rate: 2.5000e-04
Epoch 30/40
27/27              2s 70ms/step -
accuracy: 0.8697 - loss: 0.2743 - val_accuracy: 0.8830 - val_loss: 0.3079 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27              2s 71ms/step -
accuracy: 0.9042 - loss: 0.2518 - val_accuracy: 0.8723 - val_loss: 0.3558 -
learning_rate: 2.5000e-04
Epoch 32/40
27/27              2s 70ms/step -
accuracy: 0.8954 - loss: 0.2298 - val_accuracy: 0.8617 - val_loss: 0.3909 -
```

```
learning_rate: 2.5000e-04
Epoch 33/40
27/27              2s 70ms/step -
accuracy: 0.8902 - loss: 0.2491 - val_accuracy: 0.8617 - val_loss: 0.3829 -
learning_rate: 2.5000e-04
Epoch 34/40
27/27              2s 71ms/step -
accuracy: 0.8854 - loss: 0.2682 - val_accuracy: 0.8617 - val_loss: 0.3395 -
learning_rate: 2.5000e-04
Epoch 35/40
27/27              2s 70ms/step -
accuracy: 0.9298 - loss: 0.1817 - val_accuracy: 0.8723 - val_loss: 0.3015 -
learning_rate: 2.5000e-04
Epoch 36/40
27/27              2s 70ms/step -
accuracy: 0.9087 - loss: 0.2335 - val_accuracy: 0.8936 - val_loss: 0.3373 -
learning_rate: 2.5000e-04
Epoch 37/40
27/27              2s 70ms/step -
accuracy: 0.8989 - loss: 0.2338 - val_accuracy: 0.8723 - val_loss: 0.3421 -
learning_rate: 2.5000e-04
Epoch 38/40
27/27              2s 70ms/step -
accuracy: 0.9200 - loss: 0.2040 - val_accuracy: 0.9043 - val_loss: 0.3849 -
learning_rate: 2.5000e-04
Epoch 39/40
27/27              2s 70ms/step -
accuracy: 0.8932 - loss: 0.2567 - val_accuracy: 0.8830 - val_loss: 0.2935 -
learning_rate: 2.5000e-04
Epoch 40/40
27/27              2s 72ms/step -
accuracy: 0.9157 - loss: 0.2056 - val_accuracy: 0.8936 - val_loss: 0.3350 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9222614765167236
Current validation accuracy: 0.8936170339584351
Reseting all weights…
Current number of trials: 13
```
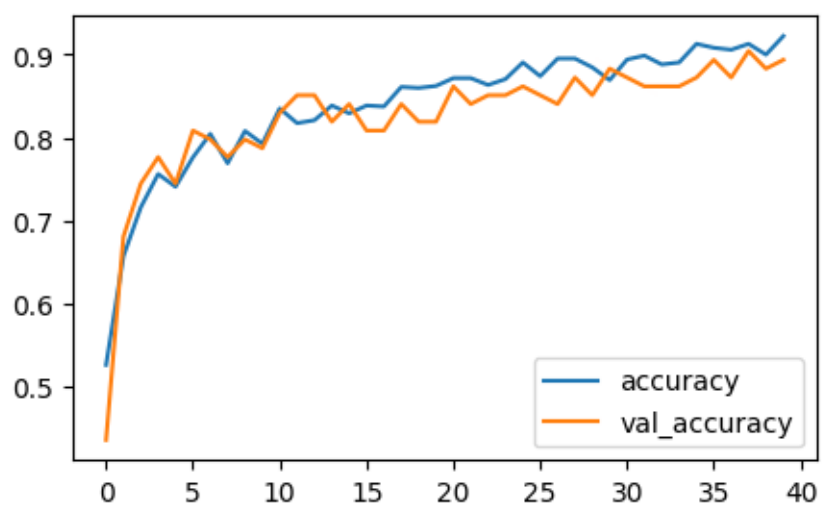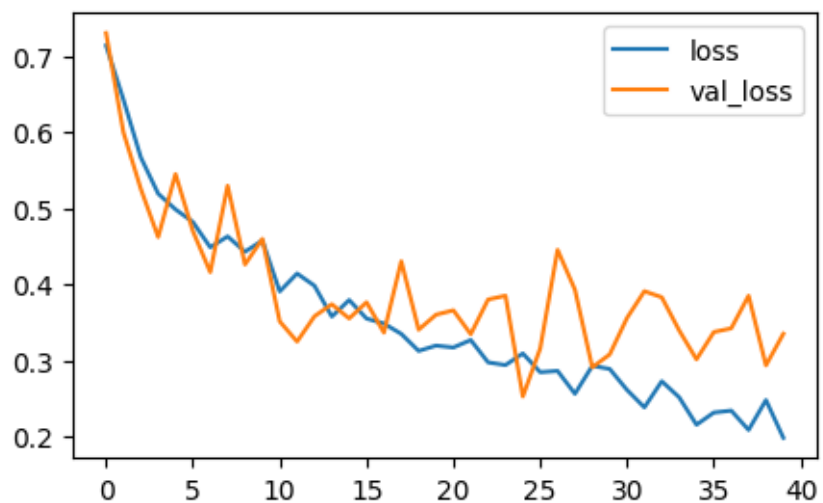
```
['loss', 'compile_metrics']
3/3                0s 18ms/step -
accuracy: 0.8882 - loss: 0.3429
[0.33498120307922363, 0.8936170339584351]
3/3                0s 29ms/step
Classification Report:
             precision    recall   f1-score    support

     Female       0.84      0.93       0.88         41
       Male       0.94      0.87       0.90         53

   accuracy                            0.89         94
```

```
    macro avg        0.89      0.90      0.89         94
weighted avg        0.90      0.89      0.89         94


Found 943 files belonging to 2 classes.
Using 849 files for training.
Found 943 files belonging to 2 classes.
Using 94 files for validation.
Epoch 1/40
27/27              3s 76ms/step -
accuracy: 0.5426 - loss: 0.7181 - val_accuracy: 0.5532 - val_loss: 0.6580 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27              2s 71ms/step -
accuracy: 0.6393 - loss: 0.6391 - val_accuracy: 0.7128 - val_loss: 0.6029 -
learning_rate: 5.0000e-04
Epoch 3/40
27/27              2s 71ms/step -
accuracy: 0.6961 - loss: 0.5923 - val_accuracy: 0.7340 - val_loss: 0.5530 -
learning_rate: 5.0000e-04
Epoch 4/40
27/27              2s 70ms/step -
accuracy: 0.7083 - loss: 0.5513 - val_accuracy: 0.7447 - val_loss: 0.5616 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27              2s 70ms/step -
accuracy: 0.7854 - loss: 0.5032 - val_accuracy: 0.7660 - val_loss: 0.5282 -
learning_rate: 5.0000e-04
Epoch 6/40
27/27              2s 71ms/step -
accuracy: 0.7592 - loss: 0.4984 - val_accuracy: 0.7447 - val_loss: 0.4864 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27              2s 70ms/step -
accuracy: 0.7706 - loss: 0.4872 - val_accuracy: 0.7553 - val_loss: 0.4677 -
learning_rate: 5.0000e-04
Epoch 8/40
27/27              2s 70ms/step -
accuracy: 0.7347 - loss: 0.5246 - val_accuracy: 0.7979 - val_loss: 0.4767 -
learning_rate: 5.0000e-04
Epoch 9/40
27/27              2s 70ms/step -
accuracy: 0.8141 - loss: 0.4392 - val_accuracy: 0.8191 - val_loss: 0.4087 -
learning_rate: 5.0000e-04
Epoch 10/40
27/27              2s 72ms/step -
accuracy: 0.7833 - loss: 0.4787 - val_accuracy: 0.8404 - val_loss: 0.4284 -
learning_rate: 5.0000e-04
Epoch 11/40
```

```
27/27                  2s 71ms/step -
accuracy: 0.8063 - loss: 0.4123 - val_accuracy: 0.8191 - val_loss: 0.4349 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27                  2s 71ms/step -
accuracy: 0.8124 - loss: 0.4113 - val_accuracy: 0.8617 - val_loss: 0.3964 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27                  2s 71ms/step -
accuracy: 0.8190 - loss: 0.4048 - val_accuracy: 0.8617 - val_loss: 0.3982 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27                  2s 71ms/step -
accuracy: 0.8051 - loss: 0.4143 - val_accuracy: 0.8723 - val_loss: 0.4263 -
learning_rate: 2.5000e-04
Epoch 15/40
27/27                  2s 71ms/step -
accuracy: 0.8326 - loss: 0.3861 - val_accuracy: 0.8511 - val_loss: 0.4061 -
learning_rate: 2.5000e-04
Epoch 16/40
27/27                  2s 71ms/step -
accuracy: 0.8392 - loss: 0.3690 - val_accuracy: 0.8617 - val_loss: 0.4002 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27                  2s 71ms/step -
accuracy: 0.8533 - loss: 0.3571 - val_accuracy: 0.8085 - val_loss: 0.4752 -
learning_rate: 2.5000e-04
Epoch 18/40
27/27                  2s 72ms/step -
accuracy: 0.8702 - loss: 0.3035 - val_accuracy: 0.8404 - val_loss: 0.3869 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27                  2s 71ms/step -
accuracy: 0.8720 - loss: 0.3146 - val_accuracy: 0.8298 - val_loss: 0.4251 -
learning_rate: 2.5000e-04
Epoch 20/40
27/27                  2s 71ms/step -
accuracy: 0.8589 - loss: 0.3238 - val_accuracy: 0.8191 - val_loss: 0.4986 -
learning_rate: 2.5000e-04
Epoch 21/40
27/27                  2s 71ms/step -
accuracy: 0.8384 - loss: 0.3348 - val_accuracy: 0.8404 - val_loss: 0.3982 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27                  2s 70ms/step -
accuracy: 0.8642 - loss: 0.3419 - val_accuracy: 0.8298 - val_loss: 0.4696 -
learning_rate: 2.5000e-04
Epoch 23/40
```

```
27/27              2s 70ms/step -
accuracy: 0.8673 - loss: 0.3140 - val_accuracy: 0.8617 - val_loss: 0.3310 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27              2s 71ms/step -
accuracy: 0.8764 - loss: 0.2873 - val_accuracy: 0.8404 - val_loss: 0.4276 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27              2s 71ms/step -
accuracy: 0.8724 - loss: 0.2860 - val_accuracy: 0.8191 - val_loss: 0.3333 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27              2s 72ms/step -
accuracy: 0.8736 - loss: 0.2912 - val_accuracy: 0.8404 - val_loss: 0.4262 -
learning_rate: 2.5000e-04
Epoch 27/40
27/27              2s 71ms/step -
accuracy: 0.8820 - loss: 0.2756 - val_accuracy: 0.8617 - val_loss: 0.4127 -
learning_rate: 2.5000e-04
Epoch 28/40
27/27              2s 70ms/step -
accuracy: 0.8883 - loss: 0.2793 - val_accuracy: 0.8617 - val_loss: 0.3777 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27              2s 70ms/step -
accuracy: 0.8665 - loss: 0.2910 - val_accuracy: 0.8511 - val_loss: 0.5101 -
learning_rate: 2.5000e-04
Epoch 30/40
27/27              2s 71ms/step -
accuracy: 0.8786 - loss: 0.2716 - val_accuracy: 0.8191 - val_loss: 0.4579 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27              2s 72ms/step -
accuracy: 0.8988 - loss: 0.2703 - val_accuracy: 0.8723 - val_loss: 0.4480 -
learning_rate: 2.5000e-04
Epoch 32/40
27/27              2s 71ms/step -
accuracy: 0.9125 - loss: 0.2323 - val_accuracy: 0.8511 - val_loss: 0.3715 -
learning_rate: 2.5000e-04
Epoch 33/40
27/27              2s 71ms/step -
accuracy: 0.8704 - loss: 0.3016 - val_accuracy: 0.8511 - val_loss: 0.4058 -
learning_rate: 2.5000e-04
Epoch 34/40
27/27              2s 72ms/step -
accuracy: 0.8753 - loss: 0.2847 - val_accuracy: 0.8511 - val_loss: 0.3579 -
learning_rate: 2.5000e-04
Epoch 35/40
```

```
27/27              2s 73ms/step -
accuracy: 0.8862 - loss: 0.2768 - val_accuracy: 0.8617 - val_loss: 0.3521 -
learning_rate: 2.5000e-04
Epoch 36/40
27/27              2s 71ms/step -
accuracy: 0.9022 - loss: 0.2315 - val_accuracy: 0.8617 - val_loss: 0.4199 -
learning_rate: 2.5000e-04
Epoch 37/40
27/27              2s 72ms/step -
accuracy: 0.9105 - loss: 0.1992 - val_accuracy: 0.8404 - val_loss: 0.4650 -
learning_rate: 2.5000e-04
Epoch 38/40
27/27              2s 71ms/step -
accuracy: 0.9045 - loss: 0.2496 - val_accuracy: 0.8511 - val_loss: 0.4949 -
learning_rate: 2.5000e-04
Epoch 39/40
27/27              2s 71ms/step -
accuracy: 0.9075 - loss: 0.2076 - val_accuracy: 0.8723 - val_loss: 0.3745 -
learning_rate: 2.5000e-04
Epoch 40/40
27/27              2s 72ms/step -
accuracy: 0.9042 - loss: 0.2428 - val_accuracy: 0.9043 - val_loss: 0.4018 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9010600447654724
Current validation accuracy: 0.9042553305625916
Reseting all weights…
Current number of trials: 14
```
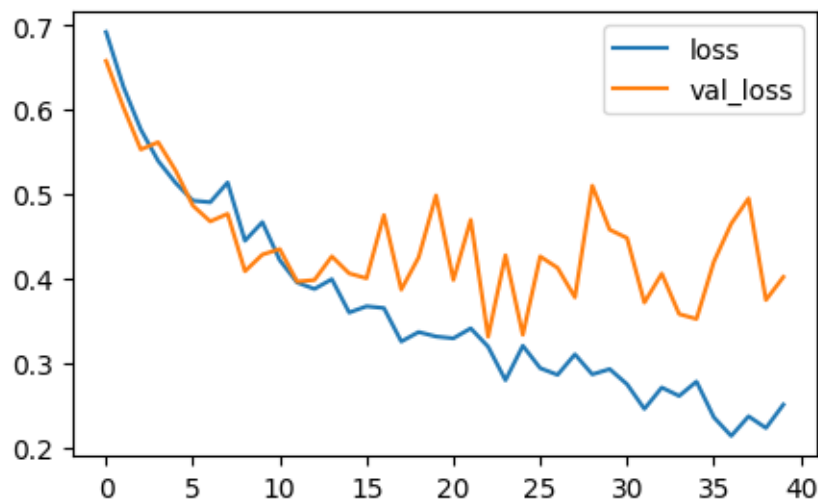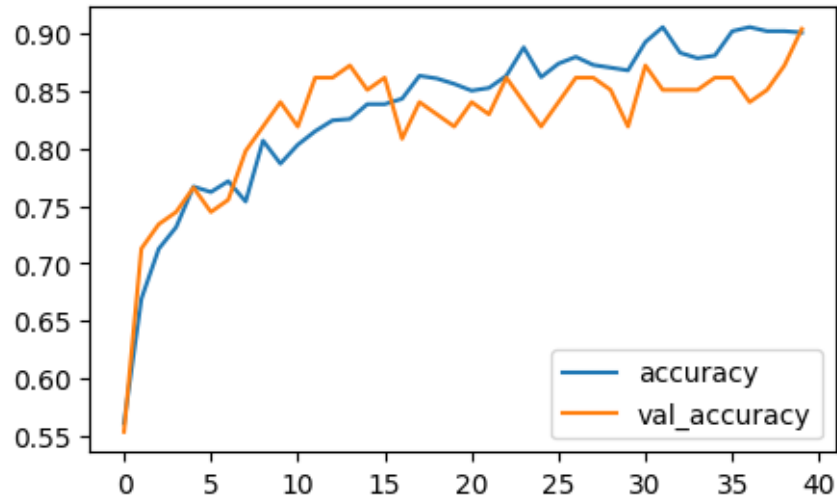
```
['loss', 'compile_metrics']
3/3               0s 18ms/step -
accuracy: 0.8935 - loss: 0.4482
[0.4018346965312958, 0.9042553305625916]
3/3               0s 32ms/step
Classification Report:
              precision    recall  f1-score   support

      Female       0.85      0.95      0.90        41
        Male       0.96      0.87      0.91        53

    accuracy                           0.90        94
   macro avg       0.90      0.91      0.90        94
weighted avg       0.91      0.90      0.90        94

Found 943 files belonging to 2 classes.
Using 849 files for training.
Found 943 files belonging to 2 classes.
Using 94 files for validation.
Epoch 1/40
27/27                3s 74ms/step -
accuracy: 0.4902 - loss: 0.7173 - val_accuracy: 0.5851 - val_loss: 0.6862 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27                2s 71ms/step -
accuracy: 0.6429 - loss: 0.6624 - val_accuracy: 0.6277 - val_loss: 0.6489 -
learning_rate: 5.0000e-04
Epoch 3/40
27/27                2s 70ms/step -
accuracy: 0.6768 - loss: 0.6061 - val_accuracy: 0.6383 - val_loss: 0.6937 -
```

```
learning_rate: 5.0000e-04
Epoch 4/40
27/27                2s 70ms/step -
accuracy: 0.7316 - loss: 0.5644 - val_accuracy: 0.7340 - val_loss: 0.5806 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27                2s 70ms/step -
accuracy: 0.7134 - loss: 0.5550 - val_accuracy: 0.7447 - val_loss: 0.5417 -
learning_rate: 5.0000e-04
Epoch 6/40
27/27                2s 70ms/step -
accuracy: 0.7559 - loss: 0.5026 - val_accuracy: 0.7553 - val_loss: 0.5978 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27                2s 70ms/step -
accuracy: 0.7402 - loss: 0.5216 - val_accuracy: 0.7553 - val_loss: 0.5578 -
learning_rate: 5.0000e-04
Epoch 8/40
27/27                2s 71ms/step -
accuracy: 0.7748 - loss: 0.4703 - val_accuracy: 0.7553 - val_loss: 0.5888 -
learning_rate: 5.0000e-04
Epoch 9/40
27/27                2s 70ms/step -
accuracy: 0.7840 - loss: 0.4800 - val_accuracy: 0.8085 - val_loss: 0.4639 -
learning_rate: 5.0000e-04
Epoch 10/40
27/27                2s 71ms/step -
accuracy: 0.7945 - loss: 0.4356 - val_accuracy: 0.7979 - val_loss: 0.4224 -
learning_rate: 5.0000e-04
Epoch 11/40
27/27                2s 72ms/step -
accuracy: 0.7786 - loss: 0.4368 - val_accuracy: 0.8191 - val_loss: 0.4322 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27                2s 70ms/step -
accuracy: 0.8298 - loss: 0.3542 - val_accuracy: 0.8191 - val_loss: 0.3848 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27                2s 70ms/step -
accuracy: 0.8551 - loss: 0.3670 - val_accuracy: 0.8404 - val_loss: 0.4485 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27                2s 70ms/step -
accuracy: 0.8333 - loss: 0.3674 - val_accuracy: 0.8404 - val_loss: 0.4623 -
learning_rate: 2.5000e-04
Epoch 15/40
27/27                2s 70ms/step -
accuracy: 0.8632 - loss: 0.3410 - val_accuracy: 0.8191 - val_loss: 0.5120 -
```

```
learning_rate: 2.5000e-04
Epoch 16/40
27/27              2s 70ms/step -
accuracy: 0.8240 - loss: 0.3892 - val_accuracy: 0.8085 - val_loss: 0.3726 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27              2s 71ms/step -
accuracy: 0.8780 - loss: 0.2994 - val_accuracy: 0.8404 - val_loss: 0.4238 -
learning_rate: 2.5000e-04
Epoch 18/40
27/27              2s 71ms/step -
accuracy: 0.8543 - loss: 0.3191 - val_accuracy: 0.8298 - val_loss: 0.4882 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27              2s 72ms/step -
accuracy: 0.8422 - loss: 0.3461 - val_accuracy: 0.7979 - val_loss: 0.4843 -
learning_rate: 2.5000e-04
Epoch 20/40
27/27              2s 71ms/step -
accuracy: 0.8261 - loss: 0.3572 - val_accuracy: 0.8191 - val_loss: 0.3235 -
learning_rate: 2.5000e-04
Epoch 21/40
27/27              2s 70ms/step -
accuracy: 0.8758 - loss: 0.2940 - val_accuracy: 0.7979 - val_loss: 0.3610 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27              2s 72ms/step -
accuracy: 0.8573 - loss: 0.3211 - val_accuracy: 0.7979 - val_loss: 0.3465 -
learning_rate: 2.5000e-04
Epoch 23/40
27/27              2s 70ms/step -
accuracy: 0.8653 - loss: 0.3042 - val_accuracy: 0.8511 - val_loss: 0.4360 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27              2s 71ms/step -
accuracy: 0.8740 - loss: 0.3229 - val_accuracy: 0.8404 - val_loss: 0.3739 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27              2s 70ms/step -
accuracy: 0.9046 - loss: 0.2532 - val_accuracy: 0.8298 - val_loss: 0.4017 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27              2s 71ms/step -
accuracy: 0.8758 - loss: 0.2730 - val_accuracy: 0.8191 - val_loss: 0.3766 -
learning_rate: 2.5000e-04
Epoch 27/40
27/27              2s 70ms/step -
accuracy: 0.8761 - loss: 0.2879 - val_accuracy: 0.8298 - val_loss: 0.4239 -
```

```
learning_rate: 2.5000e-04
Epoch 28/40
27/27              2s 72ms/step -
accuracy: 0.9094 - loss: 0.2278 - val_accuracy: 0.8298 - val_loss: 0.3853 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27              2s 70ms/step -
accuracy: 0.8768 - loss: 0.2874 - val_accuracy: 0.8511 - val_loss: 0.4098 -
learning_rate: 2.5000e-04
Epoch 30/40
27/27              2s 71ms/step -
accuracy: 0.9142 - loss: 0.2251 - val_accuracy: 0.8404 - val_loss: 0.4247 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27              2s 70ms/step -
accuracy: 0.9061 - loss: 0.2383 - val_accuracy: 0.8191 - val_loss: 0.4616 -
learning_rate: 2.5000e-04
Epoch 32/40
27/27              2s 70ms/step -
accuracy: 0.9123 - loss: 0.2377 - val_accuracy: 0.8404 - val_loss: 0.3889 -
learning_rate: 2.5000e-04
Epoch 33/40
27/27              2s 71ms/step -
accuracy: 0.9013 - loss: 0.2357 - val_accuracy: 0.8511 - val_loss: 0.5499 -
learning_rate: 2.5000e-04
Epoch 34/40
27/27              2s 70ms/step -
accuracy: 0.9137 - loss: 0.2250 - val_accuracy: 0.8404 - val_loss: 0.4309 -
learning_rate: 2.5000e-04
Epoch 35/40
27/27              2s 70ms/step -
accuracy: 0.9075 - loss: 0.2515 - val_accuracy: 0.8511 - val_loss: 0.3996 -
learning_rate: 2.5000e-04
Epoch 36/40
27/27              2s 72ms/step -
accuracy: 0.9182 - loss: 0.2062 - val_accuracy: 0.8298 - val_loss: 0.3271 -
learning_rate: 2.5000e-04
Epoch 37/40
27/27              2s 70ms/step -
accuracy: 0.9042 - loss: 0.2194 - val_accuracy: 0.8511 - val_loss: 0.3119 -
learning_rate: 2.5000e-04
Epoch 38/40
27/27              2s 70ms/step -
accuracy: 0.8972 - loss: 0.2456 - val_accuracy: 0.8617 - val_loss: 0.3615 -
learning_rate: 2.5000e-04
Epoch 39/40
27/27              2s 71ms/step -
accuracy: 0.8982 - loss: 0.2344 - val_accuracy: 0.8511 - val_loss: 0.4139 -
```

```
learning_rate: 2.5000e-04
Epoch 40/40
27/27                 2s 70ms/step -
accuracy: 0.9014 - loss: 0.2276 - val_accuracy: 0.8617 - val_loss: 0.3264 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9140164852142334
Current validation accuracy: 0.8617021441459656
Reseting all weights…
Current number of trials: 15
```
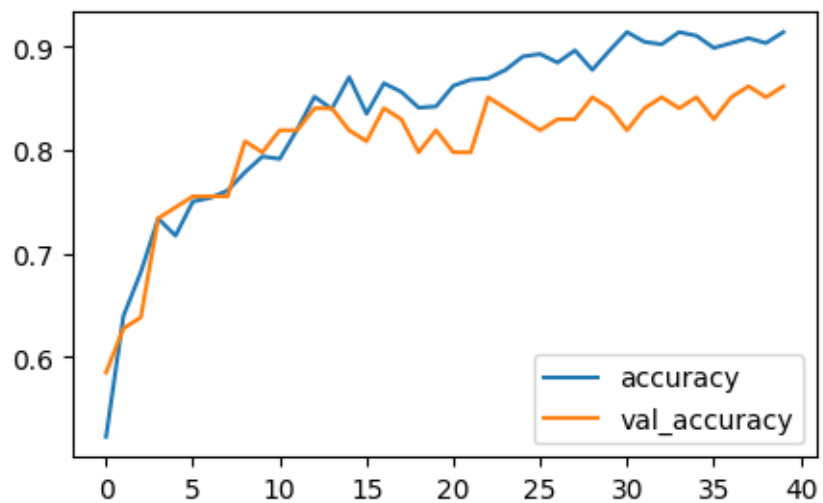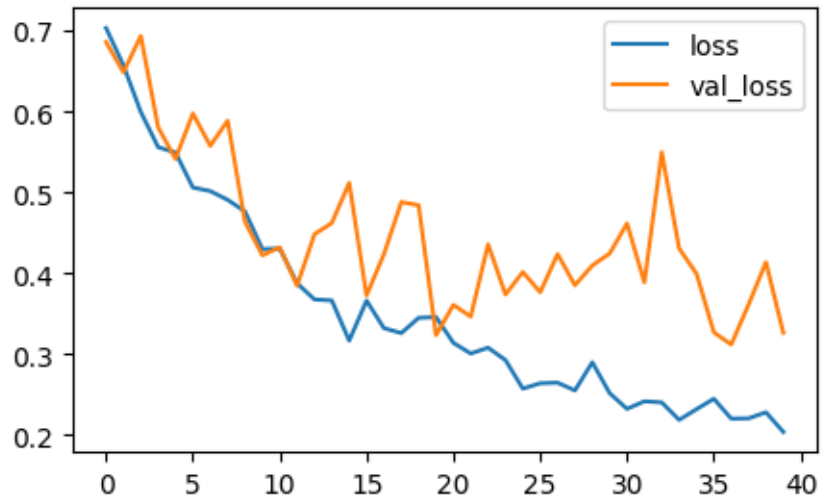


```
['loss', 'compile_metrics']
3/3                 0s 17ms/step -
```

```
accuracy: 0.8566 - loss: 0.3420
[0.3264363408088684, 0.8617021441459656]
3/3              0s 32ms/step
Classification Report:
              precision    recall  f1-score   support

      Female       0.79      0.93      0.85        41
        Male       0.93      0.81      0.87        53

    accuracy                           0.86        94
   macro avg       0.86      0.87      0.86        94
weighted avg       0.87      0.86      0.86        94


Found 943 files belonging to 2 classes.
Using 849 files for training.
Found 943 files belonging to 2 classes.
Using 94 files for validation.
Epoch 1/40
27/27              3s 74ms/step -
accuracy: 0.5429 - loss: 0.6869 - val_accuracy: 0.6489 - val_loss: 0.6378 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27              2s 70ms/step -
accuracy: 0.6648 - loss: 0.6219 - val_accuracy: 0.7340 - val_loss: 0.5454 -
learning_rate: 5.0000e-04
Epoch 3/40
27/27              2s 70ms/step -
accuracy: 0.7025 - loss: 0.5530 - val_accuracy: 0.7872 - val_loss: 0.4851 -
learning_rate: 5.0000e-04
Epoch 4/40
27/27              2s 71ms/step -
accuracy: 0.7723 - loss: 0.4833 - val_accuracy: 0.7872 - val_loss: 0.4875 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27              2s 70ms/step -
accuracy: 0.7593 - loss: 0.4837 - val_accuracy: 0.7660 - val_loss: 0.4101 -
learning_rate: 5.0000e-04
Epoch 6/40
27/27              2s 70ms/step -
accuracy: 0.7984 - loss: 0.4360 - val_accuracy: 0.8511 - val_loss: 0.3741 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27              2s 70ms/step -
accuracy: 0.8137 - loss: 0.4249 - val_accuracy: 0.8085 - val_loss: 0.4223 -
learning_rate: 5.0000e-04
Epoch 8/40
27/27              2s 70ms/step -
accuracy: 0.7830 - loss: 0.4406 - val_accuracy: 0.8511 - val_loss: 0.4245 -
```

```
learning_rate: 5.0000e-04
Epoch 9/40
27/27              2s 70ms/step -
accuracy: 0.8389 - loss: 0.4117 - val_accuracy: 0.8511 - val_loss: 0.4227 -
learning_rate: 5.0000e-04
Epoch 10/40
27/27              2s 70ms/step -
accuracy: 0.8492 - loss: 0.3560 - val_accuracy: 0.8511 - val_loss: 0.3538 -
learning_rate: 5.0000e-04
Epoch 11/40
27/27              2s 70ms/step -
accuracy: 0.8223 - loss: 0.4192 - val_accuracy: 0.8511 - val_loss: 0.3439 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27              2s 72ms/step -
accuracy: 0.8282 - loss: 0.3880 - val_accuracy: 0.8511 - val_loss: 0.3854 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27              2s 70ms/step -
accuracy: 0.8399 - loss: 0.3349 - val_accuracy: 0.8617 - val_loss: 0.3732 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27              2s 70ms/step -
accuracy: 0.8593 - loss: 0.3326 - val_accuracy: 0.8617 - val_loss: 0.3785 -
learning_rate: 2.5000e-04
Epoch 15/40
27/27              2s 70ms/step -
accuracy: 0.8442 - loss: 0.3368 - val_accuracy: 0.8617 - val_loss: 0.3792 -
learning_rate: 2.5000e-04
Epoch 16/40
27/27              2s 70ms/step -
accuracy: 0.8725 - loss: 0.3434 - val_accuracy: 0.8511 - val_loss: 0.3300 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27              2s 70ms/step -
accuracy: 0.8655 - loss: 0.3147 - val_accuracy: 0.8617 - val_loss: 0.2929 -
learning_rate: 2.5000e-04
Epoch 18/40
27/27              2s 70ms/step -
accuracy: 0.8688 - loss: 0.2910 - val_accuracy: 0.8617 - val_loss: 0.3819 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27              2s 70ms/step -
accuracy: 0.9107 - loss: 0.2702 - val_accuracy: 0.8617 - val_loss: 0.3318 -
learning_rate: 2.5000e-04
Epoch 20/40
27/27              2s 70ms/step -
accuracy: 0.9019 - loss: 0.2600 - val_accuracy: 0.8298 - val_loss: 0.3771 -
```

```
learning_rate: 2.5000e-04
Epoch 21/40
27/27              2s 71ms/step -
accuracy: 0.8765 - loss: 0.3000 - val_accuracy: 0.8617 - val_loss: 0.3452 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27              2s 70ms/step -
accuracy: 0.9115 - loss: 0.2326 - val_accuracy: 0.8723 - val_loss: 0.3212 -
learning_rate: 2.5000e-04
Epoch 23/40
27/27              2s 70ms/step -
accuracy: 0.8924 - loss: 0.2759 - val_accuracy: 0.8617 - val_loss: 0.3786 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27              2s 70ms/step -
accuracy: 0.9100 - loss: 0.2401 - val_accuracy: 0.8830 - val_loss: 0.3451 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27              2s 70ms/step -
accuracy: 0.8941 - loss: 0.2514 - val_accuracy: 0.8936 - val_loss: 0.3164 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27              2s 70ms/step -
accuracy: 0.9010 - loss: 0.2324 - val_accuracy: 0.8830 - val_loss: 0.4024 -
learning_rate: 2.5000e-04
Epoch 27/40
27/27              2s 70ms/step -
accuracy: 0.9138 - loss: 0.2180 - val_accuracy: 0.8404 - val_loss: 0.4792 -
learning_rate: 2.5000e-04
Epoch 28/40
27/27              2s 70ms/step -
accuracy: 0.8859 - loss: 0.2645 - val_accuracy: 0.8617 - val_loss: 0.3720 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27              2s 71ms/step -
accuracy: 0.9042 - loss: 0.2366 - val_accuracy: 0.8830 - val_loss: 0.4364 -
learning_rate: 2.5000e-04
Epoch 30/40
27/27              2s 70ms/step -
accuracy: 0.8829 - loss: 0.2300 - val_accuracy: 0.8723 - val_loss: 0.4177 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27              2s 70ms/step -
accuracy: 0.9175 - loss: 0.2075 - val_accuracy: 0.8723 - val_loss: 0.4446 -
learning_rate: 2.5000e-04
Epoch 32/40
27/27              2s 71ms/step -
accuracy: 0.9283 - loss: 0.1921 - val_accuracy: 0.8617 - val_loss: 0.3651 -
```

learning_rate: 2.5000e-04
Epoch 33/40
27/27   2s 70ms/step -
accuracy: 0.9260 - loss: 0.2014 - val_accuracy: 0.8830 - val_loss: 0.4131 -
learning_rate: 2.5000e-04
Epoch 34/40
27/27   2s 70ms/step -
accuracy: 0.9133 - loss: 0.2065 - val_accuracy: 0.8511 - val_loss: 0.3198 -
learning_rate: 2.5000e-04
Epoch 35/40
27/27   2s 70ms/step -
accuracy: 0.9187 - loss: 0.2304 - val_accuracy: 0.8511 - val_loss: 0.4739 -
learning_rate: 2.5000e-04
Epoch 36/40
27/27   2s 70ms/step -
accuracy: 0.9225 - loss: 0.1954 - val_accuracy: 0.8830 - val_loss: 0.3965 -
learning_rate: 2.5000e-04
Epoch 37/40
27/27   2s 70ms/step -
accuracy: 0.9397 - loss: 0.1784 - val_accuracy: 0.8723 - val_loss: 0.4604 -
learning_rate: 2.5000e-04
Epoch 38/40
27/27   2s 71ms/step -
accuracy: 0.9152 - loss: 0.1976 - val_accuracy: 0.8404 - val_loss: 0.4114 -
learning_rate: 2.5000e-04
Epoch 39/40
27/27   2s 70ms/step -
accuracy: 0.9366 - loss: 0.1658 - val_accuracy: 0.8830 - val_loss: 0.3788 -
learning_rate: 2.5000e-04
Epoch 40/40
27/27   2s 70ms/step -
accuracy: 0.9406 - loss: 0.1726 - val_accuracy: 0.8723 - val_loss: 0.4151 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9316843152046204
Current validation accuracy: 0.8723404407501221
Reseting all weights…
Current number of trials: 16
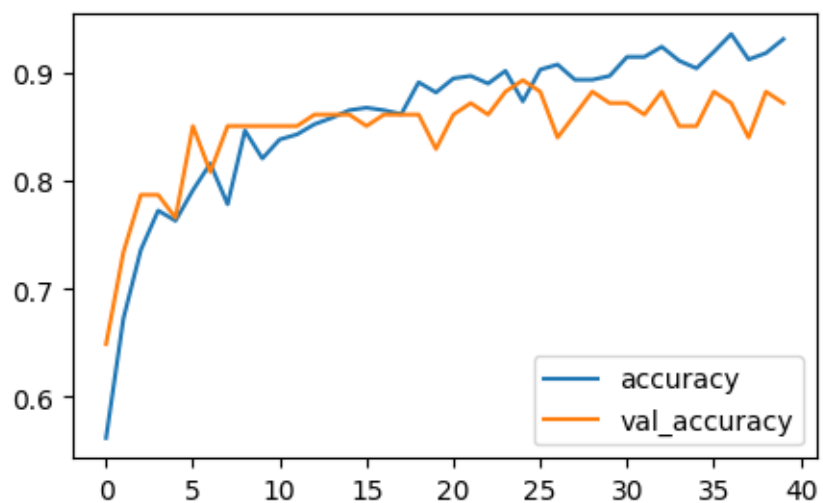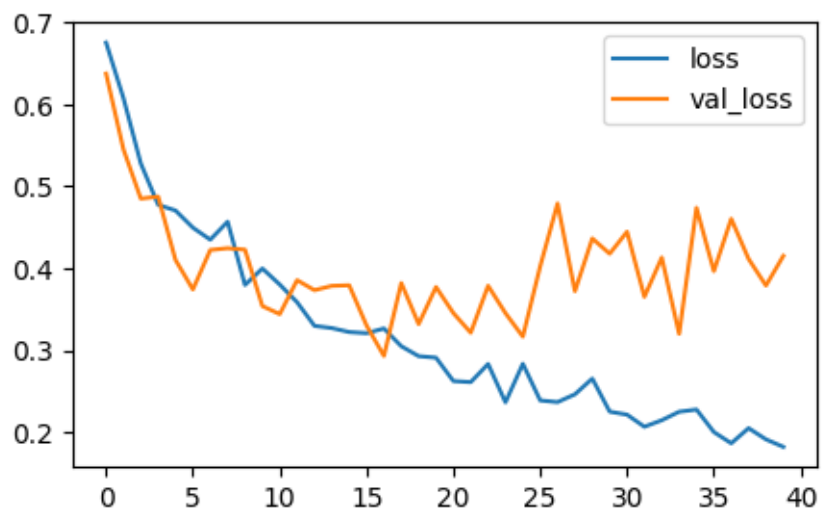
```
['loss', 'compile_metrics']
3/3              0s 19ms/step -
accuracy: 0.8698 - loss: 0.4463
[0.4151143431663513, 0.8723404407501221]
3/3              0s 30ms/step
Classification Report:
              precision    recall  f1-score   support

      Female       0.81      0.93      0.86        41
        Male       0.94      0.83      0.88        53

    accuracy                           0.87        94
```

```
    macro avg        0.87        0.88        0.87          94
weighted avg         0.88        0.87        0.87          94
```

Found 943 files belonging to 2 classes.
Using 849 files for training.
Found 943 files belonging to 2 classes.
Using 94 files for validation.

2025-05-07 10:08:27.437014: I tensorflow/core/framework/local_rendezvous.cc:405]
Local rendezvous is aborting with status: OUT_OF_RANGE: End of sequence

Epoch 1/40
27/27   3s 74ms/step -
accuracy: 0.4895 - loss: 0.7177 - val_accuracy: 0.6596 - val_loss: 0.6674 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27   2s 70ms/step -
accuracy: 0.6218 - loss: 0.6453 - val_accuracy: 0.7447 - val_loss: 0.5773 -
learning_rate: 5.0000e-04
Epoch 3/40
27/27   2s 70ms/step -
accuracy: 0.7037 - loss: 0.5647 - val_accuracy: 0.7128 - val_loss: 0.5377 -
learning_rate: 5.0000e-04
Epoch 4/40
27/27   2s 70ms/step -
accuracy: 0.6959 - loss: 0.5456 - val_accuracy: 0.7340 - val_loss: 0.4862 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27   2s 73ms/step -
accuracy: 0.7715 - loss: 0.4850 - val_accuracy: 0.8298 - val_loss: 0.4438 -
learning_rate: 5.0000e-04
Epoch 6/40
27/27   2s 70ms/step -
accuracy: 0.7580 - loss: 0.4811 - val_accuracy: 0.7872 - val_loss: 0.4506 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27   2s 70ms/step -
accuracy: 0.7925 - loss: 0.4513 - val_accuracy: 0.8511 - val_loss: 0.4057 -
learning_rate: 5.0000e-04
Epoch 8/40
27/27   2s 69ms/step -
accuracy: 0.7884 - loss: 0.4901 - val_accuracy: 0.7766 - val_loss: 0.5379 -
learning_rate: 5.0000e-04
Epoch 9/40
27/27   2s 70ms/step -
accuracy: 0.7839 - loss: 0.4650 - val_accuracy: 0.8085 - val_loss: 0.4736 -
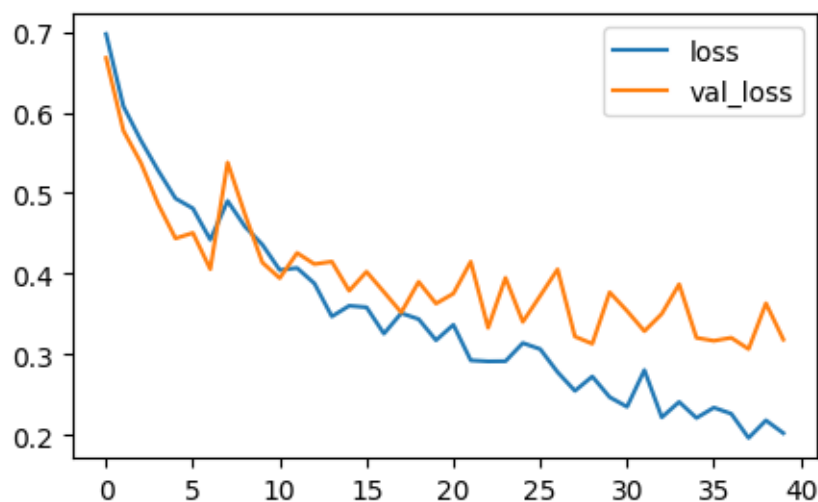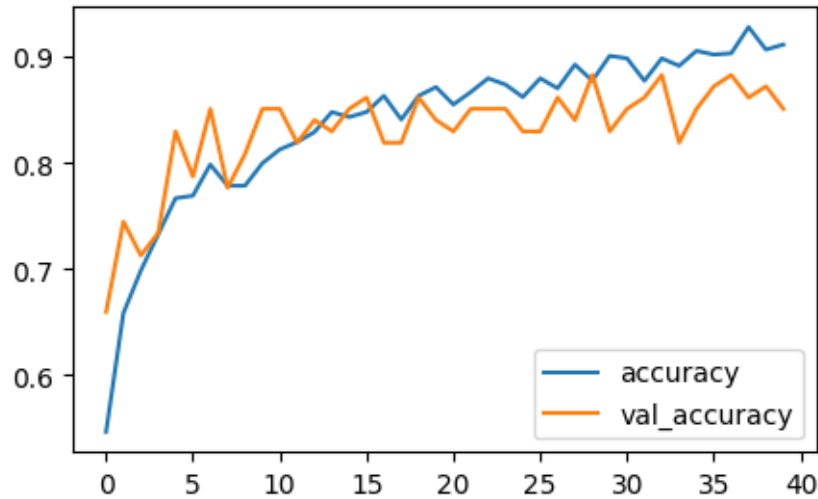learning_rate: 5.0000e-04
Epoch 10/40
27/27   2s 70ms/step -
```

```
accuracy: 0.7983 - loss: 0.4230 - val_accuracy: 0.8511 - val_loss: 0.4140 -
learning_rate: 5.0000e-04
Epoch 11/40
27/27              2s 70ms/step -
accuracy: 0.8301 - loss: 0.3929 - val_accuracy: 0.8511 - val_loss: 0.3945 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27              2s 70ms/step -
accuracy: 0.8272 - loss: 0.3939 - val_accuracy: 0.8191 - val_loss: 0.4258 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27              2s 70ms/step -
accuracy: 0.8325 - loss: 0.3884 - val_accuracy: 0.8404 - val_loss: 0.4120 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27              2s 71ms/step -
accuracy: 0.8356 - loss: 0.3683 - val_accuracy: 0.8298 - val_loss: 0.4150 -
learning_rate: 2.5000e-04
Epoch 15/40
27/27              2s 70ms/step -
accuracy: 0.8207 - loss: 0.4127 - val_accuracy: 0.8511 - val_loss: 0.3789 -
learning_rate: 2.5000e-04
Epoch 16/40
27/27              2s 70ms/step -
accuracy: 0.8369 - loss: 0.3698 - val_accuracy: 0.8617 - val_loss: 0.4025 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27              2s 71ms/step -
accuracy: 0.8582 - loss: 0.3372 - val_accuracy: 0.8191 - val_loss: 0.3775 -
learning_rate: 2.5000e-04
Epoch 18/40
27/27              2s 70ms/step -
accuracy: 0.8470 - loss: 0.3419 - val_accuracy: 0.8191 - val_loss: 0.3521 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27              2s 70ms/step -
accuracy: 0.8731 - loss: 0.3317 - val_accuracy: 0.8617 - val_loss: 0.3900 -
learning_rate: 2.5000e-04
Epoch 20/40
27/27              2s 70ms/step -
accuracy: 0.8741 - loss: 0.3122 - val_accuracy: 0.8404 - val_loss: 0.3630 -
learning_rate: 2.5000e-04
Epoch 21/40
27/27              2s 70ms/step -
accuracy: 0.8460 - loss: 0.3623 - val_accuracy: 0.8298 - val_loss: 0.3754 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27              2s 72ms/step -
```

```
accuracy: 0.8793 - loss: 0.2669 - val_accuracy: 0.8511 - val_loss: 0.4150 -
learning_rate: 2.5000e-04
Epoch 23/40
27/27              2s 70ms/step -
accuracy: 0.8685 - loss: 0.2926 - val_accuracy: 0.8511 - val_loss: 0.3331 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27              2s 71ms/step -
accuracy: 0.8874 - loss: 0.2566 - val_accuracy: 0.8511 - val_loss: 0.3950 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27              2s 70ms/step -
accuracy: 0.8658 - loss: 0.2860 - val_accuracy: 0.8298 - val_loss: 0.3405 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27              2s 70ms/step -
accuracy: 0.8823 - loss: 0.3106 - val_accuracy: 0.8298 - val_loss: 0.3727 -
learning_rate: 2.5000e-04
Epoch 27/40
27/27              2s 70ms/step -
accuracy: 0.8702 - loss: 0.2848 - val_accuracy: 0.8617 - val_loss: 0.4055 -
learning_rate: 2.5000e-04
Epoch 28/40
27/27              2s 70ms/step -
accuracy: 0.8891 - loss: 0.2532 - val_accuracy: 0.8404 - val_loss: 0.3222 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27              2s 70ms/step -
accuracy: 0.8798 - loss: 0.2608 - val_accuracy: 0.8830 - val_loss: 0.3133 -
learning_rate: 2.5000e-04
Epoch 30/40
27/27              2s 70ms/step -
accuracy: 0.9117 - loss: 0.2491 - val_accuracy: 0.8298 - val_loss: 0.3771 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27              2s 72ms/step -
accuracy: 0.8981 - loss: 0.2414 - val_accuracy: 0.8511 - val_loss: 0.3540 -
learning_rate: 2.5000e-04
Epoch 32/40
27/27              2s 70ms/step -
accuracy: 0.8668 - loss: 0.2985 - val_accuracy: 0.8617 - val_loss: 0.3289 -
learning_rate: 2.5000e-04
Epoch 33/40
27/27              2s 70ms/step -
accuracy: 0.8938 - loss: 0.2359 - val_accuracy: 0.8830 - val_loss: 0.3503 -
learning_rate: 2.5000e-04
Epoch 34/40
27/27              2s 72ms/step -
```

```
accuracy: 0.8964 - loss: 0.2189 - val_accuracy: 0.8191 - val_loss: 0.3870 -
learning_rate: 2.5000e-04
Epoch 35/40
27/27                2s 70ms/step -
accuracy: 0.9096 - loss: 0.2113 - val_accuracy: 0.8511 - val_loss: 0.3207 -
learning_rate: 2.5000e-04
Epoch 36/40
27/27                2s 70ms/step -
accuracy: 0.8993 - loss: 0.2363 - val_accuracy: 0.8723 - val_loss: 0.3169 -
learning_rate: 2.5000e-04
Epoch 37/40
27/27                2s 71ms/step -
accuracy: 0.9057 - loss: 0.2150 - val_accuracy: 0.8830 - val_loss: 0.3207 -
learning_rate: 2.5000e-04
Epoch 38/40
27/27                2s 70ms/step -
accuracy: 0.9317 - loss: 0.1852 - val_accuracy: 0.8617 - val_loss: 0.3067 -
learning_rate: 2.5000e-04
Epoch 39/40
27/27                2s 71ms/step -
accuracy: 0.8990 - loss: 0.2510 - val_accuracy: 0.8723 - val_loss: 0.3633 -
learning_rate: 2.5000e-04
Epoch 40/40
27/27                2s 70ms/step -
accuracy: 0.9363 - loss: 0.1732 - val_accuracy: 0.8511 - val_loss: 0.3185 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9116607904434204
Current validation accuracy: 0.8510638475418091
Reseting all weights…
Current number of trials: 17
```

```
['loss', 'compile_metrics']
3/3              0s 19ms/step -
accuracy: 0.8513 - loss: 0.3217
[0.31848853826522827, 0.8510638475418091]
3/3              0s 29ms/step
Classification Report:
              precision     recall  f1-score     support

      Female       0.79       0.90      0.84          41
        Male       0.91       0.81      0.86          53

    accuracy                           0.85          94
   macro avg       0.85       0.86      0.85          94
weighted avg       0.86       0.85      0.85          94

Found 943 files belonging to 2 classes.
Using 849 files for training.
Found 943 files belonging to 2 classes.
Using 94 files for validation.
Epoch 1/40
27/27              3s 74ms/step -
accuracy: 0.5801 - loss: 0.6743 - val_accuracy: 0.7128 - val_loss: 0.5900 -
learning_rate: 5.0000e-04
Epoch 2/40
27/27              2s 70ms/step -
accuracy: 0.7135 - loss: 0.5575 - val_accuracy: 0.8085 - val_loss: 0.5326 -
learning_rate: 5.0000e-04
Epoch 3/40
27/27              2s 70ms/step -
accuracy: 0.7425 - loss: 0.5152 - val_accuracy: 0.8511 - val_loss: 0.4444 -
```

```
learning_rate: 5.0000e-04
Epoch 4/40
27/27              2s 70ms/step -
accuracy: 0.7845 - loss: 0.4653 - val_accuracy: 0.8617 - val_loss: 0.3871 -
learning_rate: 5.0000e-04
Epoch 5/40
27/27              2s 70ms/step -
accuracy: 0.7741 - loss: 0.4633 - val_accuracy: 0.8191 - val_loss: 0.4674 -
learning_rate: 5.0000e-04
Epoch 6/40
27/27              2s 70ms/step -
accuracy: 0.7764 - loss: 0.4762 - val_accuracy: 0.7872 - val_loss: 0.4514 -
learning_rate: 5.0000e-04
Epoch 7/40
27/27              2s 72ms/step -
accuracy: 0.7898 - loss: 0.4694 - val_accuracy: 0.8191 - val_loss: 0.4762 -
learning_rate: 5.0000e-04
Epoch 8/40
27/27              2s 70ms/step -
accuracy: 0.8048 - loss: 0.4285 - val_accuracy: 0.8936 - val_loss: 0.3449 -
learning_rate: 5.0000e-04
Epoch 9/40
27/27              2s 70ms/step -
accuracy: 0.8114 - loss: 0.4056 - val_accuracy: 0.8191 - val_loss: 0.3358 -
learning_rate: 5.0000e-04
Epoch 10/40
27/27              2s 70ms/step -
accuracy: 0.8094 - loss: 0.4335 - val_accuracy: 0.8830 - val_loss: 0.3762 -
learning_rate: 5.0000e-04
Epoch 11/40
27/27              2s 70ms/step -
accuracy: 0.8127 - loss: 0.4080 - val_accuracy: 0.8723 - val_loss: 0.3181 -
learning_rate: 2.5000e-04
Epoch 12/40
27/27              2s 70ms/step -
accuracy: 0.8595 - loss: 0.3354 - val_accuracy: 0.8617 - val_loss: 0.2876 -
learning_rate: 2.5000e-04
Epoch 13/40
27/27              2s 70ms/step -
accuracy: 0.8558 - loss: 0.3217 - val_accuracy: 0.8511 - val_loss: 0.3644 -
learning_rate: 2.5000e-04
Epoch 14/40
27/27              2s 70ms/step -
accuracy: 0.8601 - loss: 0.3271 - val_accuracy: 0.8830 - val_loss: 0.2902 -
learning_rate: 2.5000e-04
Epoch 15/40
27/27              2s 71ms/step -
accuracy: 0.8520 - loss: 0.3286 - val_accuracy: 0.8830 - val_loss: 0.3613 -
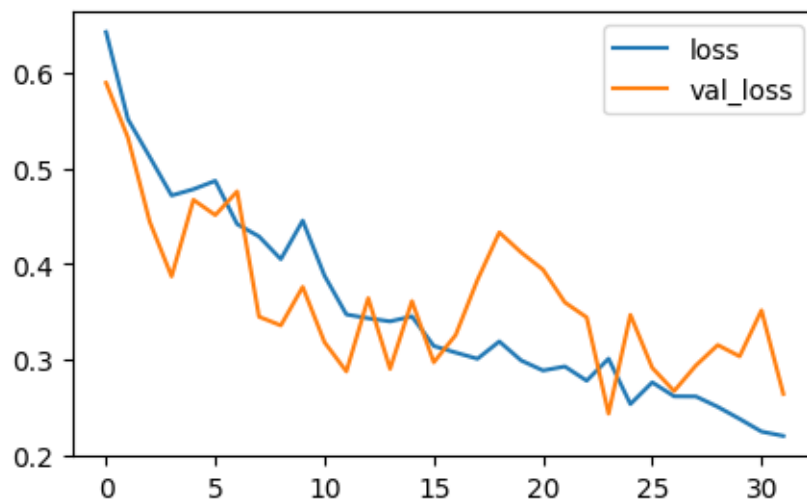```

```
learning_rate: 2.5000e-04
Epoch 16/40
27/27   2s 70ms/step -
accuracy: 0.8623 - loss: 0.3101 - val_accuracy: 0.8511 - val_loss: 0.2971 -
learning_rate: 2.5000e-04
Epoch 17/40
27/27   2s 70ms/step -
accuracy: 0.8631 - loss: 0.3106 - val_accuracy: 0.8404 - val_loss: 0.3257 -
learning_rate: 2.5000e-04
Epoch 18/40
27/27   2s 70ms/step -
accuracy: 0.8622 - loss: 0.2968 - val_accuracy: 0.8511 - val_loss: 0.3835 -
learning_rate: 2.5000e-04
Epoch 19/40
27/27   2s 70ms/step -
accuracy: 0.8808 - loss: 0.2980 - val_accuracy: 0.8511 - val_loss: 0.4333 -
learning_rate: 2.5000e-04
Epoch 20/40
27/27   2s 70ms/step -
accuracy: 0.8658 - loss: 0.3020 - val_accuracy: 0.8617 - val_loss: 0.4123 -
learning_rate: 2.5000e-04
Epoch 21/40
27/27   2s 70ms/step -
accuracy: 0.8638 - loss: 0.3110 - val_accuracy: 0.8617 - val_loss: 0.3943 -
learning_rate: 2.5000e-04
Epoch 22/40
27/27   2s 70ms/step -
accuracy: 0.8807 - loss: 0.3172 - val_accuracy: 0.8723 - val_loss: 0.3600 -
learning_rate: 2.5000e-04
Epoch 23/40
27/27   2s 70ms/step -
accuracy: 0.8826 - loss: 0.2812 - val_accuracy: 0.8723 - val_loss: 0.3442 -
learning_rate: 2.5000e-04
Epoch 24/40
27/27   2s 71ms/step -
accuracy: 0.8629 - loss: 0.3059 - val_accuracy: 0.8723 - val_loss: 0.2433 -
learning_rate: 2.5000e-04
Epoch 25/40
27/27   2s 70ms/step -
accuracy: 0.8929 - loss: 0.2686 - val_accuracy: 0.8617 - val_loss: 0.3469 -
learning_rate: 2.5000e-04
Epoch 26/40
27/27   2s 71ms/step -
accuracy: 0.8786 - loss: 0.2739 - val_accuracy: 0.8404 - val_loss: 0.2914 -
learning_rate: 2.5000e-04
Epoch 27/40
27/27   2s 70ms/step -
accuracy: 0.8982 - loss: 0.2619 - val_accuracy: 0.8617 - val_loss: 0.2670 -
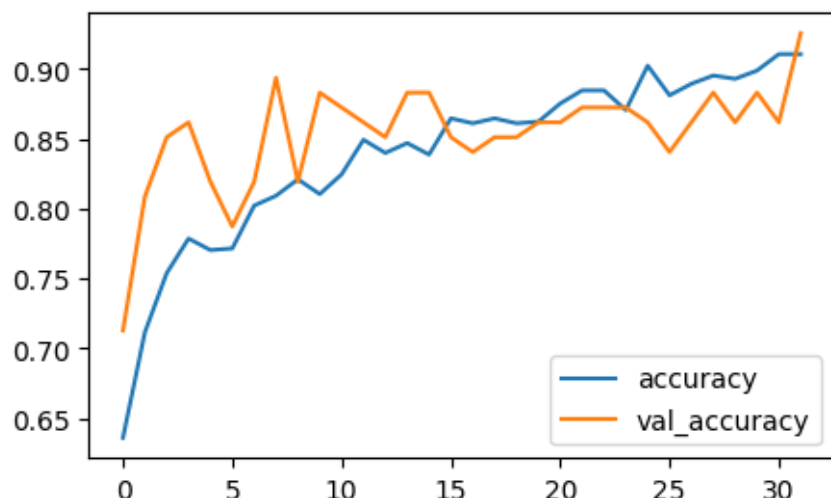```

```
learning_rate: 2.5000e-04
Epoch 28/40
27/27              2s 71ms/step -
accuracy: 0.8808 - loss: 0.2866 - val_accuracy: 0.8830 - val_loss: 0.2939 -
learning_rate: 2.5000e-04
Epoch 29/40
27/27              2s 72ms/step -
accuracy: 0.8946 - loss: 0.2330 - val_accuracy: 0.8617 - val_loss: 0.3153 -
learning_rate: 2.5000e-04
Epoch 30/40
27/27              2s 72ms/step -
accuracy: 0.9122 - loss: 0.2072 - val_accuracy: 0.8830 - val_loss: 0.3034 -
learning_rate: 2.5000e-04
Epoch 31/40
27/27              2s 70ms/step -
accuracy: 0.9073 - loss: 0.2271 - val_accuracy: 0.8617 - val_loss: 0.3516 -
learning_rate: 2.5000e-04
Epoch 32/40
27/27              0s 70ms/step -
accuracy: 0.9178 - loss: 0.2107Reached desired accuracy so cancelling training!
27/27              2s 72ms/step -
accuracy: 0.9175 - loss: 0.2111 - val_accuracy: 0.9255 - val_loss: 0.2640 -
learning_rate: 2.5000e-04
Current training accuracy: 0.9104829430580139
Current validation accuracy: 0.9255319237709045
Reseting all weights…
Current number of trials: 18
```

```
['loss', 'compile_metrics']
3/3                0s 18ms/step -
accuracy: 0.9237 - loss: 0.2758
[0.26403629779815674, 0.9255319237709045]
3/3                0s 31ms/step
```

WARNING:absl:You are saving your model as an HDF5 file via `model.save()` or
`keras.saving.save_model(model)`. This file format is considered legacy. We
recommend using instead the native Keras format, e.g.
`model.save('my_model.keras')` or `keras.saving.save_model(model,
'my_model.keras')`.

Classification Report:

	precision	recall	f1-score	support
Female	0.90	0.93	0.92	41
Male	0.94	0.92	0.93	53
accuracy			0.93	94
macro avg	0.92	0.93	0.92	94
weighted avg	0.93	0.93	0.93	94

[1]:	accuracy	loss	val_accuracy	val_loss	learning_rate
0	0.636042	0.643298	0.712766	0.590022	0.00050
1	0.711425	0.551962	0.808511	0.532574	0.00050
2	0.753828	0.512314	0.851064	0.444354	0.00050
3	0.778563	0.472008	0.861702	0.387149	0.00050
4	0.770318	0.478555	0.819149	0.467416	0.00050
5	0.771496	0.487343	0.787234	0.451432	0.00050
6	0.802120	0.441961	0.819149	0.476216	0.00050

```
7    0.809187  0.429066      0.893617  0.344922        0.00050
8    0.820966  0.405210      0.819149  0.335798        0.00050
9    0.810365  0.445625      0.882979  0.376152        0.00050
10   0.824499  0.387891      0.872340  0.318126        0.00025
11   0.849234  0.347297      0.861702  0.287595        0.00025
12   0.839812  0.343275      0.851064  0.364435        0.00025
13   0.846879  0.340051      0.882979  0.290233        0.00025
14   0.838634  0.345261      0.882979  0.361280        0.00025
```

[ ]:

[ ]:

[ ]: