Model Optimization and Tuning Phase Template

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Project Title	Covid vision: Advanced Covid-19 Detection From Lung X-Rays With Deep Learning
Maximum Marks	10 Marks

Model Optimization and Tuning Phase

The Model Optimization and Tuning Phase involves refining neural network models for peak performance. It includes optimized model code, fine-tuning hyperparameters, comparing performance metrics, and justifying the final model selection for enhanced predictive accuracy and efficiency.

Hyperparameter Tuning Documentation (8 Marks):

Model	Tuned Hyperparameters

Model 1

```
[ ] import tensorflow
    callbacks = [
        tensorflow.keras.callbacks.EarlyStopping(patience=6)
    ]

▶   model.compile(optimizer='adam',
            loss='categorical_crossentropy',
            metrics=['accuracy'])
    r = model.fit_generator(train,validation_data=test,epochs=30,steps_per_epoch=len(train),validation_steps=len(test),callbacks=callbacks)

⟳   <ipython-input-28-fc55da4108eb>:4: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future version. Please use `Mod
      r = model.fit_generator(train,validation_data=test,epochs=30,steps_per_epoch=len(train),validation_steps=len(test),callbacks=callbacks)
    Epoch 1/30
    459/459 [==============================] - 443s 943ms/step - loss: 2.8611 - accuracy: 0.7394 - val_loss: 2.6365 - val_accuracy: 0.7754
    Epoch 2/30
    459/459 [==============================] - 468s 1s/step - loss: 2.7342 - accuracy: 0.7925 - val_loss: 3.3855 - val_accuracy: 0.7314
    Epoch 3/30
    459/459 [==============================] - 443s 966ms/step - loss: 2.8670 - accuracy: 0.7994 - val_loss: 6.2702 - val_accuracy: 0.7557
    Epoch 4/30
    459/459 [==============================] - 435s 948ms/step - loss: 2.8285 - accuracy: 0.8097 - val_loss: 4.5829 - val_accuracy: 0.7665
    Epoch 5/30
    459/459 [==============================] - 443s 965ms/step - loss: 2.7212 - accuracy: 0.8195 - val_loss: 3.2819 - val_accuracy: 0.7986
    Epoch 6/30
    459/459 [==============================] - 440s 959ms/step - loss: 2.7196 - accuracy: 0.8223 - val_loss: 5.0545 - val_accuracy: 0.7670
    Epoch 7/30
    459/459 [==============================] - 439s 956ms/step - loss: 2.8262 - accuracy: 0.8240 - val_loss: 4.8095 - val_accuracy: 0.7781
```

From the above run time, we can observe that at 7th epoch model is giving the best accuracy that is 0.8240 which is initialized through call back parameter

Final Model Selection Justification (2 Marks):

Final Model	Reasoning

Xception	We tried the other models like sequential model but it gave accuracy as 0.775 so we decided to take xception model as final model