

Project goal: to create a model that is able to identify the artist behind various famous artworks. This project is a first step in the process of eventually learning to train models to evaluate artwork and identify forgery. I have strayed from the dataset that I mentioned in my project proposal, and I am instead using a dataset of Impressionist artworks. The model should classify into the following categories (Impressionist artists): Cezanne, Degas, Gauguin, Hassam, Matisse, Monet, Pissarro, Renoir, Sargent, and VanGogh.

Below is a screenshot of the progress across epochs after fitting my original model (without a pretrained model):

```
model = keras.applications.Xception(weights=None, input_shape=(256, 256, 3), classes=10)
model.compile(optimizer='rmsprop', loss='categorical_crossentropy')
#model.fit(train_ds, epochs=10, validation_data=validation_ds)
```

Found 3988 files belonging to 10 classes.  
Found 990 files belonging to 10 classes.

Epoch 1/10  
125/125 [=====] - 1346s 11s/step - loss: 2.4114 - val\_loss: 2.2975  
Epoch 2/10  
125/125 [=====] - 1137s 9s/step - loss: 2.0313 - val\_loss: 2.1797  
Epoch 3/10  
125/125 [=====] - 1093s 9s/step - loss: 1.8592 - val\_loss: 2.2842  
Epoch 4/10  
125/125 [=====] - 1097s 9s/step - loss: 1.6943 - val\_loss: 11.5825  
Epoch 5/10  
125/125 [=====] - 1103s 9s/step - loss: 1.5473 - val\_loss: 3.1106  
Epoch 6/10  
125/125 [=====] - 1103s 9s/step - loss: 1.4071 - val\_loss: 2.6519  
Epoch 7/10  
125/125 [=====] - 1089s 9s/step - loss: 1.2571 - val\_loss: 10.8543  
Epoch 8/10  
125/125 [=====] - 1103s 9s/step - loss: 1.1189 - val\_loss: 3.1330  
Epoch 9/10  
125/125 [=====] - 1093s 9s/step - loss: 0.9440 - val\_loss: 3.1456  
Epoch 10/10  
125/125 [=====] - 1091s 9s/step - loss: 0.7840 - val\_loss: 3.8931

The loss was minimized to 0.78

Now here is the progress across epochs after fitting a model using the pretrained ResNet50 model for transfer learning:

```
model.fit(train_ds, epochs=10, validation_data=validation_ds)
```

Epoch 1/10  
125/125 [=====] - 383s 3s/step - loss: 4.1001 - accuracy: 0.4030 - val\_loss: 1.9816 - val\_accuracy: 0.4687  
Epoch 2/10  
125/125 [=====] - 391s 3s/step - loss: 0.8616 - accuracy: 0.7460 - val\_loss: 1.7853 - val\_accuracy: 0.5707  
Epoch 3/10  
125/125 [=====] - 1348s 11s/step - loss: 0.4235 - accuracy: 0.8653 - val\_loss: 2.1048 - val\_accuracy: 0.5414  
Epoch 4/10  
125/125 [=====] - 378s 3s/step - loss: 0.1979 - accuracy: 0.9353 - val\_loss: 2.0977 - val\_accuracy: 0.5758  
Epoch 5/10  
125/125 [=====] - 378s 3s/step - loss: 0.1272 - accuracy: 0.9574 - val\_loss: 2.2173 - val\_accuracy: 0.5889  
Epoch 6/10  
125/125 [=====] - 380s 3s/step - loss: 0.0860 - accuracy: 0.9747 - val\_loss: 2.3518 - val\_accuracy: 0.5848  
Epoch 7/10  
125/125 [=====] - 378s 3s/step - loss: 0.0745 - accuracy: 0.9777 - val\_loss: 2.5421 - val\_accuracy: 0.6111  
Epoch 8/10  
125/125 [=====] - 401s 3s/step - loss: 0.0675 - accuracy: 0.9799 - val\_loss: 2.7811 - val\_accuracy: 0.5697  
Epoch 9/10  
125/125 [=====] - 430s 3s/step - loss: 0.1235 - accuracy: 0.9589 - val\_loss: 2.9279 - val\_accuracy: 0.6071  
Epoch 10/10  
125/125 [=====] - 430s 3s/step - loss: 0.1890 - accuracy: 0.9486 - val\_loss: 3.4913 - val\_accuracy: 0.5505

The loss was minimized to ~ 0.19

Moving forward, I would like to evaluate/analyze the performance of the models to find where I could improve and where the models struggle to distinguish between artists