SWS3009A Deep Learning
Assignment Answer Book

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Complete this answer book and save to PDF before uploading to Canvas. Deadline is 11.59 pm on Monday 10 July 2023.

1. Fill in the number of images you've gotten for each of the species:

   Ragdolls: 201 images
   Singapura: 101 images
   Persians: 210 images
   Sphynx: 204 images
   Scottish Folds: 205 images

2. Description of our architecture and justification:

```
# Constants
num_classes = 5 # Number of cat breeds
image_size = (224, 224)
batch_size = 5

# Load the MobileNet model without the top classification layers
base_model = MobileNet(weights='imagenet', include_top=False,
input_shape=(image_size[0], image_size[1], 3))
```

```
# Freeze the base model layers
for layer in base_model.layers:
layer.trainable = False
```

```
# Add custom classification layers on top of the base model
x = base_model.output
x = GlobalAveragePooling2D()(x)
x = Dense(256, activation='relu')(x)
predictions = Dense(num_classes, activation='softmax')(x)
```

```
# Create the final model
model = Model(inputs=base_model.input, outputs=predictions)

model.compile(optimizer='adam', loss='categorical_crossentropy',
metrics=['accuracy'])
```

3. Results:

   On High Image Quality Set:
   Training Accuracy: **97.23** (%)
   Validation Accuracy: **96.00** (%)

Is there any overfitting? How do you know?

Is there any underfitting? How do you know?

There is no obvious sign of overfitting and underfitting ,as the Training Accuracy improves as well as the Validation Accuracy, and the loss is relatively small in the end of training.