**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: 200 images

Persians: 210 images

Sphynx: 204 images

Scottish Folds: 205 images

1. 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'])

1. Results:

**On High Image Quality Set:**

Training Accuracy: **97.23** (%)

Validation Accuracy: **85.13** (%)

Is there any overfitting? How do you know?

**There is a little sign of overfitting, as the Training Accuracy improves while the Validation Accuracy drops a little.**

Is there any underfitting? How do you know?

**There is no underfitting ,as the loss is relatively small in the end of training.**