

reproducibility-experiment-carl

September 1, 2025

1 Reproducibility Experiment - Carl et al. (2020)

1.1 Imports

```
[1]: from pathlib import Path
from PIL import Image
import numpy as np
import tensorflow as tf
from tensorflow.keras.applications import InceptionResNetV2
from tensorflow.keras.applications.inception_resnet_v2 import decode_predictions
```

```
2025-09-01 17:52:54.200511: I external/local_xla/xla/tsl/cuda/cudart_stub.cc:32]
Could not find cuda drivers on your machine, GPU will not be used.
2025-09-01 17:52:54.203964: I external/local_xla/xla/tsl/cuda/cudart_stub.cc:32]
Could not find cuda drivers on your machine, GPU will not be used.
2025-09-01 17:52:54.212173: E
external/local_xla/xla/stream_executor/cuda/cuda_fft.cc:467] Unable to register
cuFFT factory: Attempting to register factory for plugin cuFFT when one has
already been registered
WARNING: All log messages before absl::InitializeLog() is called are written to
STDERR
E0000 00:00:1756741974.225582 198924 cuda_dnn.cc:8579] Unable to register cuDNN
factory: Attempting to register factory for plugin cuDNN when one has already
been registered
E0000 00:00:1756741974.229299 198924 cuda_blas.cc:1407] Unable to register
cuBLAS factory: Attempting to register factory for plugin cuBLAS when one has
already been registered
W0000 00:00:1756741974.240815 198924 computation_placer.cc:177] computation
placer already registered. Please check linkage and avoid linking the same
target more than once.
W0000 00:00:1756741974.240830 198924 computation_placer.cc:177] computation
placer already registered. Please check linkage and avoid linking the same
target more than once.
W0000 00:00:1756741974.240832 198924 computation_placer.cc:177] computation
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target more than once.
W0000 00:00:1756741974.240833 198924 computation_placer.cc:177] computation
placer already registered. Please check linkage and avoid linking the same
```

target more than once.

2025-09-01 17:52:54.244479: I tensorflow/core/platform/cpu_feature_guard.cc:210] This TensorFlow binary is optimized to use available CPU instructions in performance-critical operations.
To enable the following instructions: AVX2 FMA, in other operations, rebuild TensorFlow with the appropriate compiler flags.

1.2 Setup

1.2.1 Global variables

```
[2]: DATA_PATH = Path("data/kaggle-90-different-animals")
```

1.2.2 Load the model

```
[3]: model = InceptionResNetV2(weights="imagenet")  
target_size = model.input_shape[1:3] # the required image dimensions (299, 299)
```

2025-09-01 17:52:57.352617: E
external/local_xla/xla/stream_executor/cuda/cuda_platform.cc:51] failed call to
cuInit: INTERNAL: CUDA error: Failed call to cuInit: UNKNOWN ERROR (303)

1.2.3 Load the images into a test data set

For the experiment, 90 common animals are chosen. They are sourced from Google Images and provided in a labeled format in a public [Kaggle dataset](#).

```
[4]: def load_normalized_image(path, target_size=target_size):  
    image = Image.open(path).convert("RGB")  
    image = image.resize(target_size)  
    return np.array(image) / 255.0 # 1d array with floats from 0 to 1 as input  
    ↳ for neural network
```

```
[5]: wildlife_images = []  
labels = []  
  
animal_species = sorted([d.name for d in DATA_PATH.iterdir() if d.is_dir()])  
  
for species_name in animal_species:  
    animal_image_folder = DATA_PATH / species_name # every species has its  
    ↳ image folder  
    for image_path in animal_image_folder.glob("*.jpg"):  
        image_array = load_normalized_image(image_path)  
        wildlife_images.append(image_array)  
        labels.append(species_name)  
  
X_test = np.stack(wildlife_images, axis=0) # there is no training phase, so all  
    ↳ samples are test samples  
y_true = np.array(labels)
```

1.3 Test

```
[7]: y_pred = model.predict(X_test)
```

29/29 127s 4s/step

```
[8]: y_pred_labels = [pred[0][1] for pred in decode_predictions(y_pred, top=1)]
```

```
[9]: y_pred_labels
```

```
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[illegible]


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