

# Assignment\_6.3

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## 0.1 File information

File: Assignment\_6.3.ipynb

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Course: DSC650 - Big Data

Assignment Number: 6.3

Purpose: Perform images classification using Keras' ResNet50 model

### 0.1.1 References: <https://keras.io/api/applications/#classify-imagenet-classes-with-resnet50>

```
[1]: # Import required packages
import keras

from tensorflow.keras.applications.resnet50 import ResNet50
from tensorflow.keras.preprocessing import image
from tensorflow.keras.applications.resnet50 import preprocess_input, \
    decode_predictions
import numpy as np

import matplotlib.pyplot as plt

import os
from pathlib import Path
```

```
[2]: # Set results directory for writing
import os

current_dir = Path(os.getcwd()).absolute()
results_dir = current_dir.joinpath('results')
results_dir.mkdir(parents=True, exist_ok=True)
pred_dir = results_dir.joinpath('predictions')
pred_dir.mkdir(parents=True, exist_ok=True)
rez_dir = pred_dir.joinpath('resnet50')
rez_dir.mkdir(parents=True, exist_ok=True)
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output_path = rez_dir.joinpath('6.3_output.txt')

image_dir = current_dir.joinpath('images')
image_dir.mkdir(parents=True, exist_ok=True)
image_path1 = image_dir.joinpath('elephant.jpg')
image_path2 = image_dir.joinpath('brown_heron.jpg')
image_path3 = image_dir.joinpath('mazda6.jpg')
image_path4 = image_dir.joinpath('rubix_cube.jpg')
image_path5 = image_dir.joinpath('black_panther.jpg')
image_path6 = image_dir.joinpath('pancakes.jpg')
image_path7 = image_dir.joinpath('elvis.jpg')
image_path8 = image_dir.joinpath('beach.jpg')

```

## 0.2 Use Keras' ResNet50 model

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[3]: # Set model
model = ResNet50(weights='imagenet')

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[5]: # Prepare images and make predictions

# Loop through each image number
for i in range(1, 9):

    # Set variables for each iteration
    image_var = 'img' + str(i)
    image_path_var = 'image_path' + str(i)
    x_var = 'x' + str(i)
    preds_var = 'preds' + str(i)

    # Load & Prepare Images
    # Use exec to use variables as variable names for assignment
    # img1 = image.load_img(image1_path, target_size=(224, 224))
    # x1 = image.img_to_array(img1)
    # x1 = np.expand_dims(x1, axis=0)
    # x1 = preprocess_input(x1)
    exec(image_var + " = image.load_img(" + image_path_var + ", target_size=(224, 224))")
    exec(x_var + " = image.img_to_array(" + image_var + ")")
    exec(x_var + " = np.expand_dims(" + x_var + ", axis=0)")
    exec(x_var + " = preprocess_input(" + x_var + ")")

    # Predict classification, given the image
    # preds1 = model.predict(x1)
    exec(preds_var + " = model.predict(" + x_var + ")")

    # Print top 3 class predictions to file

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# print('elephant.jpg Predicted Classification:',  

→ decode_predictions(preds1, top=3)[0])  

exec("print(" + image_path_var + ")")  

exec("print('Top Predicted Classifications:', decode_predictions(" +  

→ preds_var + ", top=3)[0]))")  

print('\n')  
  

# Save top 3 class predictions to file  

with open(output_path, 'a') as f:  

    # f.write('Image1 Predicted Classification:')  

    # f.write(str(decode_predictions(preds1, top=3)[0]))  

    exec("f.write('Image" + str(i) + " Top Predicted Classifications:')")  

    exec("f.write(str(decode_predictions(" + preds_var + ", top=3)[0]))")  

    f.write('\n')

```

```

/home/jovyan/dsc650/dsc650/assignments/assignment06/images/elephant.jpg  

Top Predicted Classifications: [('n02504458', 'African_elephant', 0.82441497),  

('n01871265', 'tusker', 0.13024771), ('n02504013', 'Indian_elephant',  

0.0450453)]

```

```

/home/jovyan/dsc650/dsc650/assignments/assignment06/images/brown_heron.jpg  

Top Predicted Classifications: [('n02009912', 'American_egret', 0.65401363),  

('n02012849', 'crane', 0.29959893), ('n02009229', 'little_blue_heron',  

0.041909814)]

```

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/home/jovyan/dsc650/dsc650/assignments/assignment06/images/mazda6.jpg  

Top Predicted Classifications: [('n03459775', 'grille', 0.5550667),  

('n04285008', 'sports_car', 0.15522261), ('n03770679', 'minivan', 0.15521756)]

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/home/jovyan/dsc650/dsc650/assignments/assignment06/images/rubix_cube.jpg  

Top Predicted Classifications: [('n03637318', 'lampshade', 0.7923201),  

('n04380533', 'table_lamp', 0.08034326), ('n04131690', 'saltshaker',  

0.018887475)]

```

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/home/jovyan/dsc650/dsc650/assignments/assignment06/images/black_panther.jpg  

Top Predicted Classifications: [('n03424325', 'gasmask', 0.39724994),  

('n03803284', 'muzzle', 0.19846866), ('n03146219', 'cuirass', 0.19226594)]

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```

/home/jovyan/dsc650/dsc650/assignments/assignment06/images/pancakes.jpg  

Top Predicted Classifications: [('n07920052', 'espresso', 0.28728676),  

('n03443371', 'goblet', 0.2217832), ('n07579787', 'plate', 0.12054154)]

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```
/home/jovyan/dsc650/dsc650/assignments/assignment06/images/elvis.jpg
Top Predicted Classifications: [('n04201297', 'shoji', 0.93931574),
('n09835506', 'ballplayer', 0.021105176), ('n04005630', 'prison', 0.007911853)]
```

```
/home/jovyan/dsc650/dsc650/assignments/assignment06/images/beach.jpg
Top Predicted Classifications: [('n09428293', 'seashore', 0.810462),
('n09332890', 'lakeside', 0.11253014), ('n09421951', 'sandbar', 0.054353572)]
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