Classify Objects with Pretrained Network

In this exercise, you will explore different pretrained networks and see how they classify different objects.

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```
clear
addpath(genpath(pwd))
```

Pick one of three networks to load in.

```
net = alexnet;
```

Inspect network

```
% Inspect network's layers
% analyzeNetwork(net);
net.Layers

% Inspect the different classes available
% Look at the last layer in the network
classes = net.Layers(end).ClassNames
```

Classify the images in the folder

Try reading in a few of the images and display them

```
im = imread(['02-Images',filesep,'file01.jpeg']);
imshow(im)
```

Based on your network, you'll have to look at the first layer to determine how to resize your image. Use the following command to see input size

```
net.Layers(1).InputSize
```

```
ans = 1×3
   227   227     3
```

```
inputSize = net.Layers(1).InputSize(1:2);
```

Resize your the images and classify them.

```
im = imresize(im, inputSize);
label = classify(net,im);
title(char(label))
```

Run this in a loop using datastore

A datastore can be used when we have lots of images that we can't load into memory at once. It serves as a way to point to a collection of images when we need them without reading them directly into MATLAB at once. (See imageDatastore documentation for more details)

You can manage and read images with the datastore:

- `hasdata:` determines if data is available to read
- `read`: imports images one-by-one in consecutive order (used for loops)
- `readimage`: imports a select image
- `readall`: imports all images

Create the datastore for the entire image directory.

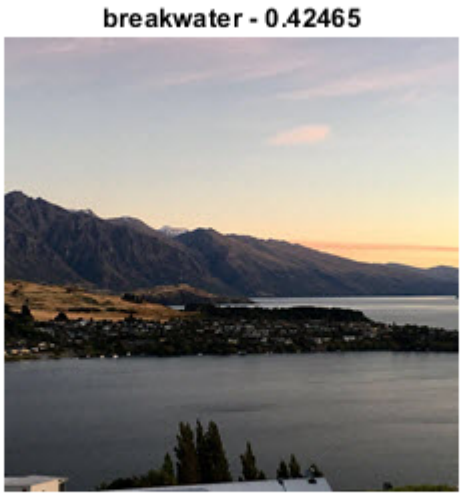
```
imgPath = '02-Images';
ids = imageDatastore(imgPath)
```

```
ids =
  ImageDatastore with properties:

                      Files: {
                             ' ...\02-PretrainedModelExercise\02-Images\file01.jpeg';
                             ' ...\02-PretrainedModelExercise\02-Images\file02.jpeg';
                             ' ...\02-PretrainedModelExercise\02-Images\file03.jpeg'
                              ... and 9 more
                             }
    AlternateFileSystemRoots: {}
                   ReadSize: 1
                     Labels: {}
                    ReadFcn: @readDatastoreImage
```

Read, resize, and classify all images one at a time.

```
while hasdata(ids)
```

```
    im = read(ids);
    imR = imresize(im, inputSize);
    [label,score] = classify(net,imR);
    maxScore = max(score);
    figure
    imshow(im)
    title([char(label) ' - ' num2str(maxScore)])

end
```



hotdog - 0.11834

Shetland sheepdog - 0.11419

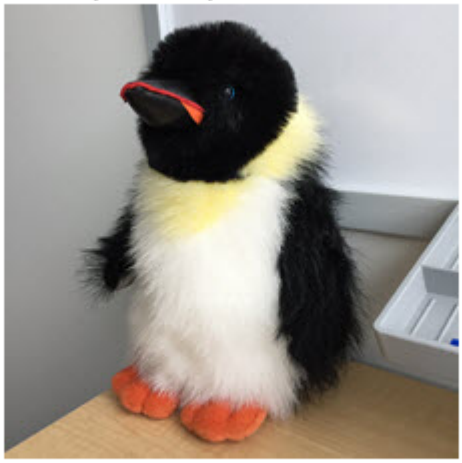
bakery - 0.091036

lakeside - 0.45887

bucket - 0.91955

studio couch - 0.99976

Japanese spaniel - 0.37028



cardigan - 0.3755


```
ids.reset
```

Classify pictures from the internet

```
URL = 'http://elelur.com/data_images/mammals/monkey/monkey-02.jpg';
filename = 'MonkeyPicture.jpg';
websave(filename, URL);

im = imread('MonkeyPicture.jpg');
im = imresize(im, inputSize);
classify(net,im)
```

```
ans = categorical
     macaque
```