SGN-13000/SGN-13006 Introduction to Pattern Recognition and Machine Learning
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Exercise 2
ImageNet Challenge

To get the exercise points you should show your solutions to the problems to the assistant during an exercise session. During the exercise sessions the assistant is also available for your questions concerning the problems.

1. **ImageNet – get to know** (40 points)

   ImageNet Large Scale Visual Recognition Challenge (ILSVRC) is one of grand challenges of computer vision and pattern recognition research at the moment: http://www.image-net.org/challenges/LSVRC/2014/ .

   One of the sub-challenges is the classification challenge (Task 2a in ILSVRC2014) where the problem is to classify which of the 1,000 possible classes is present in a given image. In TUT Linux system we have this data available at

   /share/sgncourses/mlintro/Data/

   The original images are in *ImageNet* (only some classes) and "tiny" 8×8 colour (RGB) images (all classes) in *ImageNet-tiny-8x8-sRGB-8bit-convType-x*.

   We will develop machine learning methods for a set of 5 classes (although you can test the accuracy for all of them). Your first task is with the help of provided Matlab script to make a script that loads every 100th image (1, 101, 201 etc.) of each 5 class and shows both its original and tiny version.
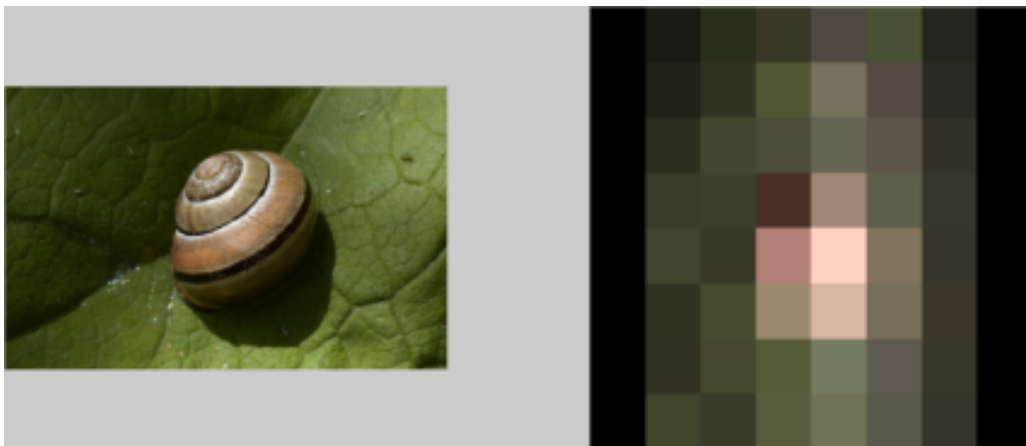

   Figure 1: Example output of the Matlab script.

   Hints: Use *subplot()* to plot multiple images into the same window. *imread()* and *imshow()* can be used to read and show images.

   Tasks:

   (a) Take the *imagenet01_plot_images_skeleton.m* Matlab script and edit it to plot original and tiny images.

   (b) Explore contents of the *synsets* variable and print also the class names of the displayed images.

   (c) What is the difference between the images in convType-1, convType-2 and convType-3 and speculate why might have these different versions?