COSC 6373: Computer Vision
Homework 06

Visualizing what ConvNets learn

Description

In this assignment, you will look at what deep convolutional neural networks (ConvNets) learn and how they understand the images we feed them. You will use Keras to visualize inputs that maximize the activation of the filters in different layers of the VGG16 architecture trained on ImageNet [1].

Part A:

1. Read tutorial in reference [1] and write a step-by-step explanation of the described process.
2. Upload your explanation document to teams.

Part B:

Based on your understanding of the visualization algorithm:

1. Create input images that maximize the activation of specific filters in a target layer. Such images represent a visualization of the pattern that the filter responds to.
2. Visualize the first 8 filters in the following layers: conv1_1, conv2_1, conv3_1, conv4_1, and conv5_1.
3. What do you notice in the different filters?
4. What kind of information does each filter learn?

Submission Guidelines

1. Upload the .ipynb and . pdf and of your notebook (name: COSC6373-HW06-ICA-Report-Firstname-Lastname.pdf) with your output and comments.

References

1. "Visualizing what convnets learn," https://keras.io/examples/vision/visualizing_what_convnets_learn/
2. "How convolutional neural networks see the world" https://blog.keras.io/how-convolutional-neural-networks-see-the-world.html