

Exercise 3: Image Feature Extraction

Introduction

In this exercise, we will compute image features from regions of an image. Please use the Jupyter Notebook provided to complete this exercise.

Info

All parts in the code that require your input for completion are marked with flag “#TODO”.

Tasks

1 Setup

Open the file `ex3.ipynb` (available on Moodle) using Jupyter.

2 Read image and extract an rectangular crop

- 2.1 Download the imagery for this exercise.
- 2.2 Read the image
- 2.3 Extract a rectangular crop from the images (using the bounding box data provided in the Jupyter Notebook)

3 Implement functions to compute image features

- 3.1 Implement the function to compute the average of pixel values for each band
- 3.2 Implement the function to compute the standard deviation of pixel values for each band
- 3.3 Implement the function to compute the histogram of pixel values for each band
- 3.4 Compute the three types of features that you implemented for the rectangular crop that you computed previously

4 Segment image using SLIC

- 4.1 Use the function `slc` from the library `skimage` to segment the image into regions
- 4.2 Display the borders of the regions extracted by SLIC

5 Compute image features from regions extracted by SLIC

- 5.1 Implement the function `compute_image_features_from_regions` (see the Jupyter Notebook) to compute image features of all the regions extracted by SLIC

Q In the Jupyter Notebook, we ask SLIC to obtain 700 segments. You can increase or decrease this value. What do you think is the disadvantage of using very large values or very small values?

Q What is the shape of the numpy array that contains all the image features, computed by `compute_image_features_from_regions`?