

CV1 Part1 Lab Exercises

Introduction

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Overview

The first part of the course includes 4 lab Jupyter NoteBooks:

- 1) Introductory exercises
- 2) Geometric Transformations
- 3) Basic Image Processing
- 4) Edge Detection

The labs contain theoretical as well as programming parts, and are aimed at providing you a first hand experience of applying computer vision algorithms. The programming part is based on Python.

Some exercises will be graded.

Lab Environment

The lab exercises are based on Python, and require certain packages (e.g. numpy, matplotlib, opencv).

Anaconda: Python distribution that contains a package and environment manager:

- To create, activate and update environments with different versions of Python and/or packages installed in them.
- To install IDEs: Spyder, Jupyter Notebook.
- It is free and easy to install: <https://docs.anaconda.com/anaconda/>

You should create an environment with the last compatible and available (platform dependent) python and OpenCV packages.

Running Jupyter Notebook

The code in Jupyter Notebooks are split into differents “cells”. You can run the code in a particular “cell” by clicking on the cell, and pressing the “Run” button.

The screenshot shows a Jupyter Notebook interface. At the top, there's a navigation bar with a logo, the word "jupyter", and buttons for "Quit" and "Logout". Below the navigation bar, there are tabs for "Files", "Running", and "Clusters", with "Files" currently selected. A message "Select items to perform actions on them." is displayed above the file list. The file list shows a single file named "exercise_0_first_steps.ipynb" with a size of 18.2 kB and a modified time of 42 minutes ago. To the right of the file list are buttons for "Upload", "New", and a refresh icon. Below the file list is a toolbar with various icons for file operations like back, forward, and search. The main workspace shows a code cell with the following Python code:

```
In [1]: 1 intro_images_path = './Images/intro_images/'  
2 edge_images_path = '././Images/Edge Images/'  
3 seg_images_path = '././Images/Seg Images/'  
4 feature_images_path = '././Images/feature_images/'  
5 output_path = '././Images/outputs/'  
6 print('Image paths ....')
```

Below the code cell, the text "Image paths" is visible. At the bottom of the notebook, there's a footer with the text "COMPUTER VISION I", "Master in Artificial Intelligence, USC, UDC, UVigo", and "Academic year 2022/23". A circular logo with a blue and white design is also present at the bottom.

Working on your laptop

For the first exercises, you will need the following packages: Jupyter notebook, Numpy, Matplotlib, and OpenCV-Python.

- First create an environment (e.g. cv1, with python 3.8) where all the packages will be installed.
- You can then activate the environment using: `conda activate cv1`

Note: You always need to activate the conda environment before installing necessary packages or running code.

Handing in Assignments

Each student has to upload a zip file using the corresponding tool (Handing in assignment) of the virtual classroom. The zip must include:

- The Jupyter Notebook with code, comments, and intermediate (if relevant) and final results (showing how the code works).
- A pdf (or html) file of the notebook.
- All the necessary files to run the code.