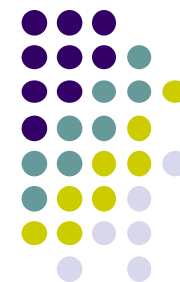# Image Processing and Computer Vision - Lab 6

Roberta Macaluso

Politecnico di Torino

Dipartimento di Automatica e Informatica (DAUIN)

Torino - Italy
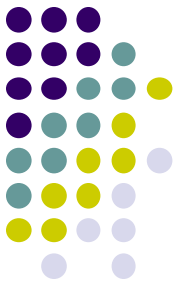
roberta.macaluso@polito.it
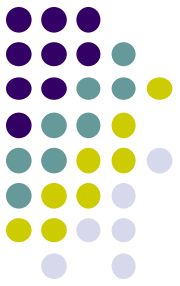
The Plan

1. Intro to Image Processing
2. CCD, CMOS, and Optical Systems
3. Intro to OpenCV
4. Fourier Transform (and Friends)
5. Image Segmentation
6. Car Lane Detection
   - today (14/05) and next week (21/05)
7. Face Detection and Tracking
8. Neural Network Introduction
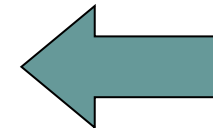
Advanced Image Segmentation

- Today and next week
  - 3 hours
- Text of the exercises/tasks
  - on the Teaching Portal
- You need some still images and some videos
  - both available on the Teaching Portal
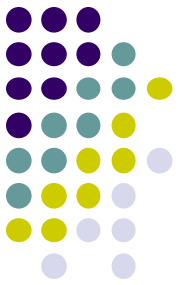
Goal

- Use image segmentation techniques and algorithms to solve a realistic problem
  - detect car lanes
- Differently from the previous labs, you have to pick some choices and experiment more…
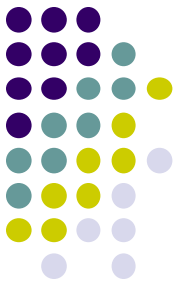
Hough Line Detector

```
lines = cv2.HoughLinesP(img, rho,
theta, threshold, minLineLength,
maxLineGap)
```
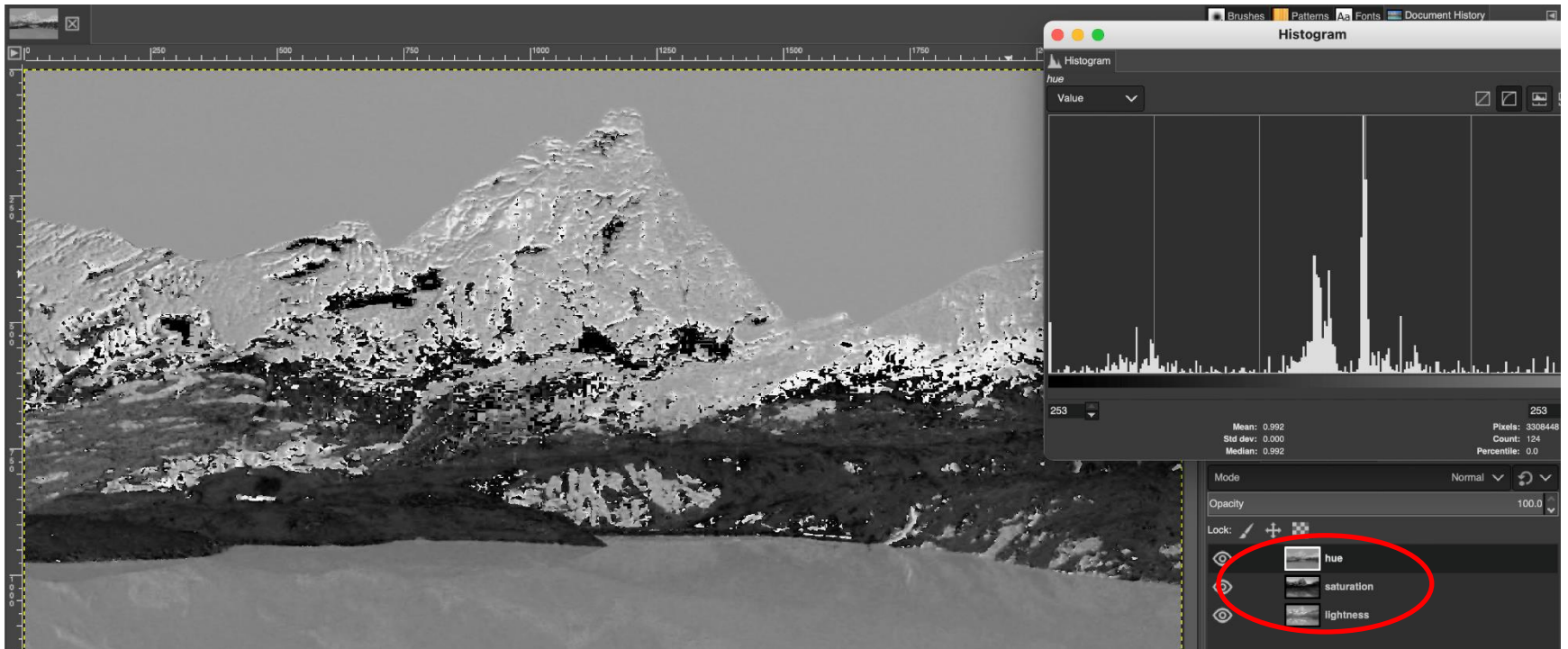
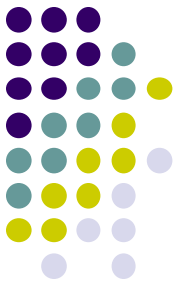- Find line segments in a binary image using the probabilistic Hough transform, where:
  - `img`: an 8-bit, single-channel binary source image
  - `rho`: Distance resolution of the accumulator in pixels (`1` in this case is fine)
  - `theta`: angle resolution of the accumulator in radians (`np.pi/180` in this case).
  - `maxLineGap`: maximum allowed gap between points on the same line to link them.

Find Non-RGB Values From An Image
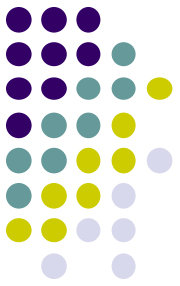
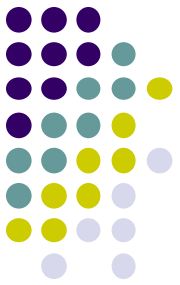- Use GIMP

  - Colors > Components > Decompose…

  - pick the scale you want

  - the result is one level for each channel of the image

  - select the areas you are interested in for each level and look at the min-max values on the histogram
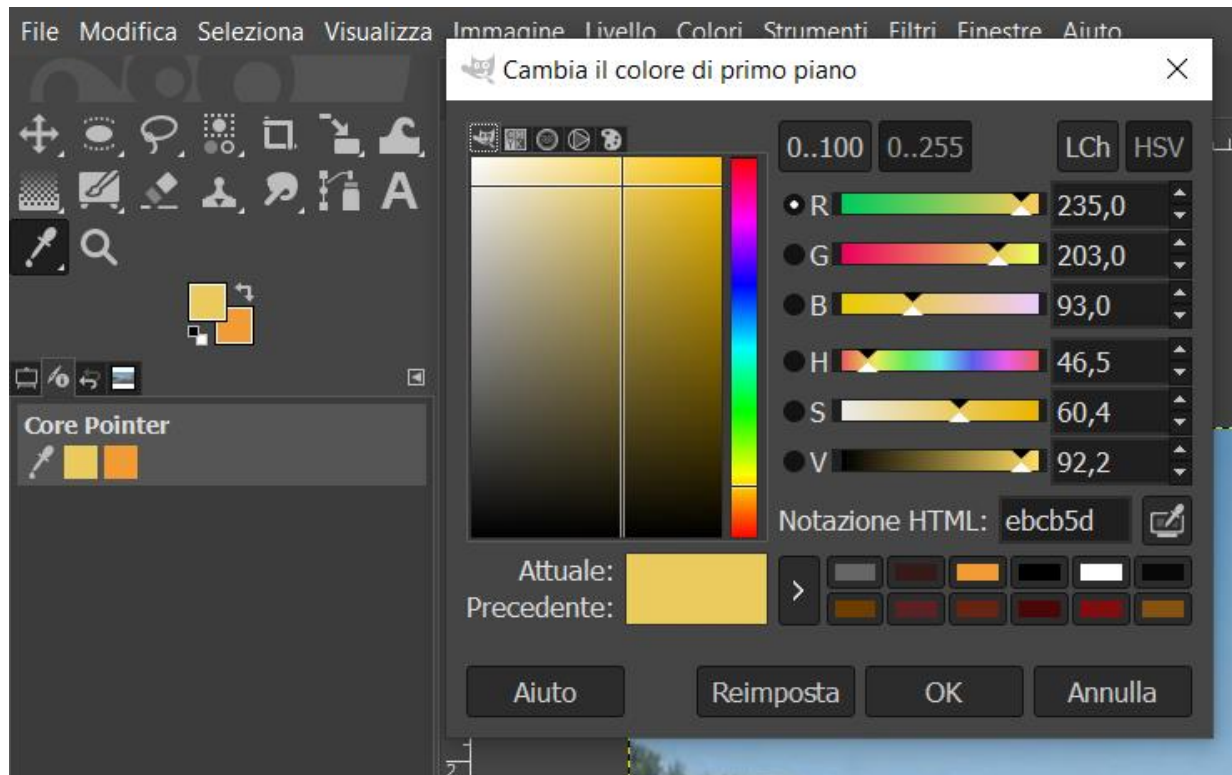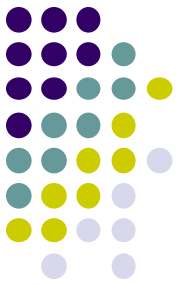
Find Non-RGB Values From An Image
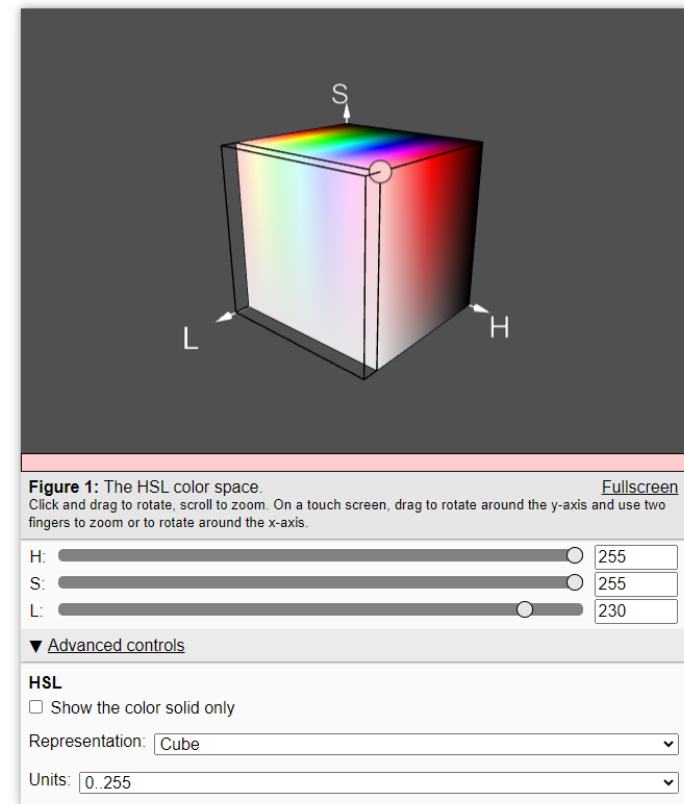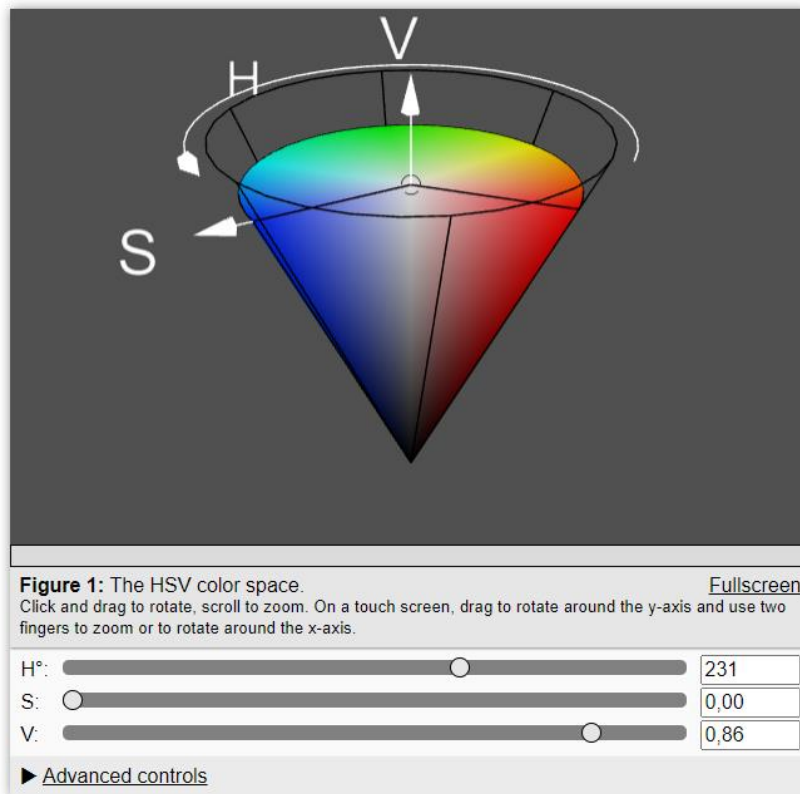
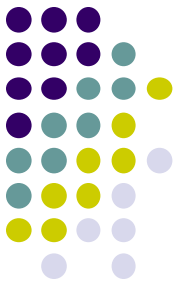# Find Non-RGB Values From An Image

GIMP: Color Picker

Find Non-RGB Values From An Image

https://web.cs.uni-paderborn.de/cgvb/colormaster/web/color-systems/hsl.html

Figure 1: The HSV color space.
Click and drag to rotate, scroll to zoom. On a touch screen, drag to rotate around the y-axis and use two fingers to zoom or to rotate around the x-axis.

Fullscreen

H°:		231
S:		0,00
V:		0,86

▶ Advanced controls

Figure 1: The HSL color space.
Click and drag to rotate, scroll to zoom. On a touch screen, drag to rotate around the y-axis and use two fingers to zoom or to rotate around the x-axis.

Fullscreen

H:		255
S:		255
L:		230

▼ Advanced controls

HSL
☐ Show the color solid only
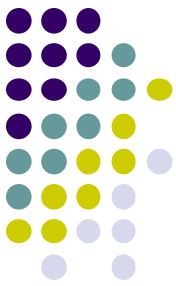
Representation: Cube

Units: 0..255

Advanced Image Segmentation

- Hints, insights, links, etc. are in the text of the exercises

  - I am here for you…

  - … please ask if you need any help or clarification

License

This work is licensed under the Creative Commons "Attribution-NonCommercial-ShareAlike International (CC BY-NC-SA 4.0)" License.

You are free to:

- **Share** - copy and redistribute the material in any medium or format
- **Adapt** - remix, transform, and build upon the material

for any purpose, even commercially.

Under the following terms:

- **Attribution** - You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.
- **Noncommercial** - You may not use the material for commercial purposes.
- **Share Alike** - If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original.