UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Image Processing

2223-3-E3101Q118

Aims

The course aims to give students the theoretical and practical skills for the design and development of algorithms and systems for the processing, segmentation, analysis and classification of digital images and videos.

Contents

The student will acquire specific skills that will put him in a position to understand the chain of processing, analysis and classification of images and videos. The student will also acquire the skills needed to design, develop and integrate specific modules in complex application systems .

Detailed program

1 A background on visual perception, human vision vs. artificial vision, color perception. Image sampling and quantization.

2 Image enhancement using intensity transformation functions.

3 Spatial image filtering using liner and non-liner filters "

4 Color spaces. Color image processing.

5 Region-based and edge-based image segmentation

6 Mathematical morphology. Texture analysis

7 Image description and representation (regions, contours, polygonal approximation)

8 Image recognition; supervised and unsupervised image classification.

9. Introduction to deep convolutional neural networks

Prerequisites

none

Teaching form

Classroom lessons and excercises (MATLAB) with discussion of use cases.

Textbook and teaching resource

Digital Image Processing, 3rd Edition, Gonzalez & Woods I S B N n u m b e r : 9 7 8 0 1 3 1 6 8 7 2 8 8 , 2 0 0 8 , http://www.imageprocessingplace.com/index.htm

PDF of the slides provided by the professors.

Semester

first semester

Assessment method

The exam is composed of two parts,

The Written exam is composed of closed-ended questions, and open-ended questions related to the topics covered in the course.

The practical part concerns the Implementation and discussion of a project concerning the processing and analysis of images. Group of at most 3 persons with individual evaluation.

The final grade is the average of the written and project scores.

Some, non mandatory, assignments will be provided. Submitting them will provide extra points on the final evaluation.

Office hours

after each lessons, and by request

Sustainable Development Goals