Computer Vision (CV)

Polytechnic University of Tirana 12-16 May, 2025

CHRISTIAN MATA, PHD
christian.mata@upc.edu

UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONA**TECH**
Barcelona East School of Engineering
UPC

▶ **PART 1: Contents**

▶ PART 2: Schedule

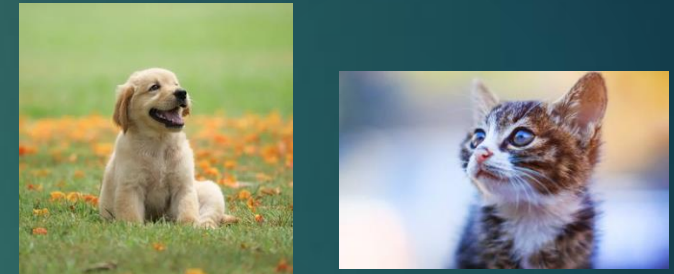▶ PART 3: Repository

IMAGE PREPROCESSING

- Basic handling (math operations, reshape, logical masks)

- Filtering methods (Spatial, morphological, frequency)

IMAGE SEGMENTATION

Pixelclustering(unsupervised)

Pixel classification (supervised)

Deep Learning

(Encoder-Decoder)

IMAGE CLASSIFICATION

- Extraction of regional features

- Region-based features (Traditional ML)

- Deep Learning (CNNs)

Module 1: Introduction to image processing (4 hours)

Basic image handling and preprocessing. Spatial (convolutional) filters, morphological operations, filters in the frequency domain.

Module 2: Image segmentation (4 hours)

Unsupervised segmentation using clustering algorithms. Supervised methods using pixelwise classifiers.

Module 3: Image classification (4 hours)

Extraction of regional features. Texture analysis and entropy. Region-based supervised classifiers. PCA Eigenfaces.

Module 4: Introduction to deep learning (4 hours)

Convolutional neural networks for image classification. Segmentation using Convolutional Neural Networks.

▶ PART 1: Content

▶ **PART 2: Schedule**

▶ PART 3: Repository

Computer Vision (CV)
Part 2: Schedule

TIRANA

	Monday 12	Tuesday 13	Wednesday 14		
9-10h	Presentation Module 1		Module 3		
10-11h	Module 1		Module 3: Exercise 3		
11-12h	Module 1		Module 3		
12-13h	Module 1: Exercise 1		Module 3: Exercise 4		
13-14h					
14-15h		Module 2			
15-16h		Module 2			
16-17h		Module 2			
17-18h		Module 2: Exercise 2			

ONLINE

	Monday 19	Tuesday 20	Wednesday 21	Thursday 22	Friday 23
9-10h					
10-11h					
11-12h					
12-13h					
13-14h					
14-15h					
15-16h	Module 4	Module 4	Test		
16-17h	Module 4	Module 4	Test		
17-18h	Module 4	Module 4			

▶ PART 1: Content

▶ PART 2: Schedule

▶ **PART 3: Repository**

Computer Vision (CV)
Part 3: Repository

Course materials

 https://github.com/xtianu/CV_Tirana