COMPUTER ENGINEERING (LM55)

(Lecce - Università degli Studi)

Teaching IMAGE PROCESSING

GenCod A003122
Owner professor Cosimo DISTANTE

Teaching in italian IMAGE PROCESSING

Teaching IMAGE PROCESSING

SSD code ING-INF/03

Reference course COMPUTER ENGINEERING

Course type Laurea Magistrale

Credits 9.0

Teaching hours Ore-Attivita-frontale: 81.0

For enrolled in 2017/2018

Taught in 2017/2018

Course year 1

Language INGLESE

Curriculum PERCORSO COMUNE

Location Lecce

Semester Secondo-Semestre

Exam type Orale

Assessment Voto-Finale

Course timetable
https://easyroom.unisalento.it/Orario

BRIEF COURSE DESCRIPTION

The goal of image processing class is to provide the fundamentals of developing an intelligent machine vision system. The goal is to study and analyse images and videos to understand their content and derive 3D information. Problems in this field concern the identification of 3D shapes of an acquired scene, to determine how objects move, and recognize objects through the analysis of still images or a sequence of them (ie through static and / or time-varying information). The course provides an introduction to classical image processing techniques and end up to introduce the Deep Learning methodologies that are nowadays at the basis of all the disrupting innovations in several sectors: self-driving cars, security for face recognition and behaviour understanding, precision medicine and agricolture etc

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COURSE AIMS

at the end of the course the student will be able to:
be familiar with the theoretical and practical aspects of image processing; have acquired the basics of the image formation process and understand the relationships between the 2D and 3D world; have acquired the essential ingredients to develop a processing pipeline to locate, recognize and track objects of interest.
Having acquired the basic principles of Deep Neural Networks (Deep Learning) and transfer learning in order to build intelligent vision systems

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FULL SYLLABUS

Introduzione ai sistemi di visione artificiale (2 ore); Formazione dell'immagine (3 ore); Geometria proiettiva 2D e 3D (3 ore); Miglioramento della qualità delle immagini (2 ore); analisi delle immagini a colori (2 ore); Filtraggio nello spazio e nel dominio delle frequenze (4 ore); Piramidi Gaussiane e Laplaciane (3 ore); Local feature detector (4 ore); Allineamento (4 ore); Segmentazione (3 ore); analisi della tessitura (2 ore); analisi del movimento (4 ore); structure from motion (2 ore); multi-view geometry (2); Riconoscimento automatico (2) Deep Learning (8 ore); Tracking (2 ore).

REFERENCE TEXT BOOKS

[1] Richard Szeliski, Computer Vision: Algorithms and Applications, Springer 2010.

[2] Deep Learning, by Goodfellow, Bengio, and Courville.

[2] Dictionary of Computer Vision and Image Processing, by Fisher et al. Note: Full text is available in 'Online Resources' section.