



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Ai for Signal and Image Processing

2526-1-F9103Q004-F9103Q00402

Obiettivi

The aim of this course is to provide theoretical foundations and practical skills on designing algorithmic techniques and artificial intelligence approaches for signal and image processing.

Contenuti sintetici

The course consists of a theoretical part and a part of practical exercises. The theoretical part analyzes algorithmic techniques and artificial intelligence approaches for signal and image processing. The exercises provide the skills for designing and implementing the treated signal and image processing methods by using state-of-the-art programming languages.

Programma esteso

- Image and signal acquisition devices characterization
- Concepts of signal processing, including sampling, convolution, z-transform, frequency analysis, and filtering
- Concepts of image processing, including convolution, histogram manipulation, frequency analysis, morphological operators, local feature extraction, and filtering
- Signal and image quality assessment
- AI techniques for image segmentation, object localization and detection
- Implementation of signal and image processing for AI on FPGA-based, GPU-based and embedded architectures

Prerequisiti

AI foundations, Mathematical foundations, Statistic foundations

Modalità didattica

Lectures and assisted exercises.

Lessons will be held in presence, unless further COVID-19 related restrictions are imposed.

Attendance at both lectures and exercises is warmly recommended.

Materiale didattico

- James H. McClellan, Ronald Schafer, Mark Yoder, Digital Signal Processing First, 2nd Global Edition, Pearson, 2017
- Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing, 4th edition, Pearson, 2018
- Slides of the lessons published on the course site
- Handouts published on the course site

Periodo di erogazione dell'insegnamento

First

Modalità di verifica del profitto e valutazione

Written exam aimed at verifying the student's knowledge, understanding of the subject, and capability of applying the obtained knowledge. The written exam consists of closed-ended questions, open-ended questions, and exercises. The duration of the exam is 2:30h. The mark is expressed in thirtieths and the grading will consider the correctness, completeness, and clarity of the answers to the questions and exercises. The exam is closed book. An additional oral discussion can be requested by the lecturer.

Orario di ricevimento

By video- or audio-conference on appointments taken by email (fastest way, every day).

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Thursday from 11 to 12 if not on mission for institutional duties.

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Sustainable Development Goals

ISTRUZIONE DI QUALITÀ
