Course: Computer Vision and Image Processing — credits: 4

Course code	ELVH18GCVIP
Name	Computer Vision and Image Processing
Study year	2022-2023
ECTS credits	4
Language	English
Coordinator	S.S. Ahmed
Modes of delivery	Assignment Lecture Practical / Training
Assessments	Computer Vision and Image Processing - Assignment

Learning outcomes

The student is able to:

1. Explain how a colour image is represented digitally;
2. Explain methods of image enhancement to improve the quality of a digital image;
3. Implement in code methods of image enhancement to improve the quality of a digital image;
4. Explain different methods of image segmentation;
5. Apply different methods of image segmentation;
6. Explain object recognition / template matching methods.
7. Apply object recognition / template matching methods.

Content

The acquired skills are relevant ingredients for a general workflow of creating meaningful information out of digital images. In this study, the student will learn how images are represented and stored in computers, implement methods to improve the quality or change characteristics of digital images, apply methods to detect features and segment images automatically. The final goal is for the student to understand and apply simple methods to recognize objects in an image.
Globally, the following subjects will be addressed during the lectures in this study unit:
- Digital representation of gray-scale and color images, including different types of color models (e.g. RGB, HSV);
- Image enhancement using pixel operations (e.g. histogram equalization);
- Image enhancement using spatial and frequency filtering;
- Edge finding methods (Laplace, Sobel);
- Image segmentation techniques;
- Template matching;
- Other methods of object recognition.

There are both practical and theoretical assignments to assess all Learning Outcomes. The practical assignments will be programing assignments (PA) in which students must implement the methods and techniques in question. The theoretical assignment will be a written exam (WE) to test student understanding of the topics. The final grade will be composed by an weighted average of both grades: 0.6*WE + 0.4*PA

Included in programme(s)

Electrical Engineering Major Sensor Technology
Minor Industrial Automation
Exchange Industrial Automation (spring)

School(s)

Institute of Engineering

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