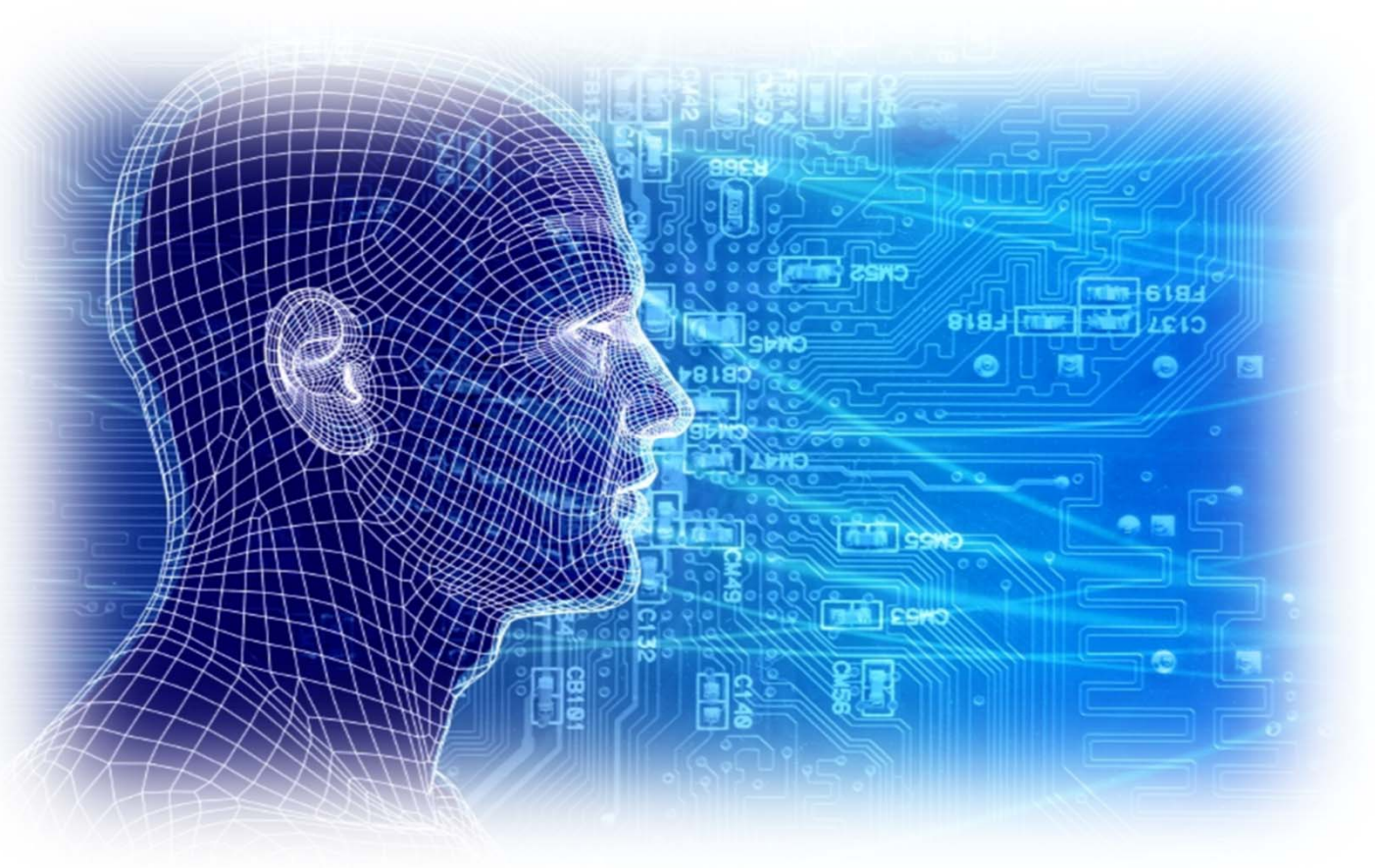
Image Processing & Vision



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Before you make choice…

- You→ Background and experience in this domain?

Content & Learning Goal

- **C**
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- **L**
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    de…
  - kn… r on the
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  - kn…
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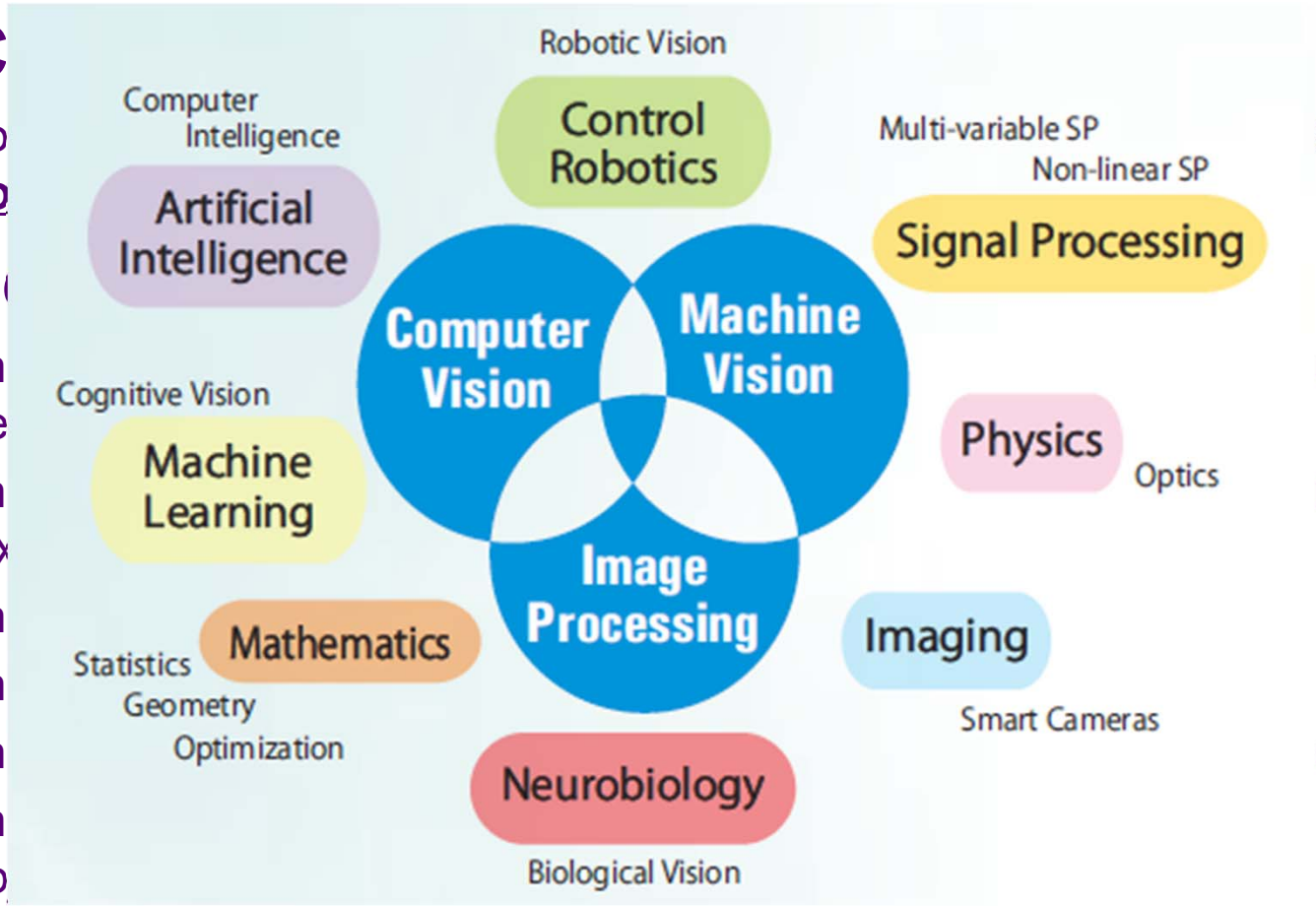

Tool: how to crack?

- MATLAB is a software package designed for (among other things) data processing

- For the beginner to learn image processing and analysis, Matlab is the best!
  - DIP*image* is a MATLAB toolbox available from TU Delft (http://www.diplib.org/)

- **Fontys has license for students/lecturers**
- **New software skill on your CV**

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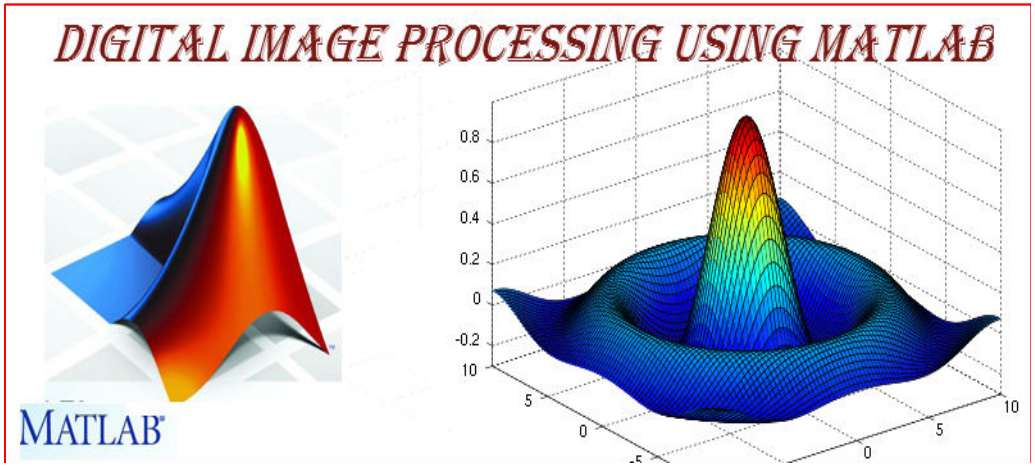
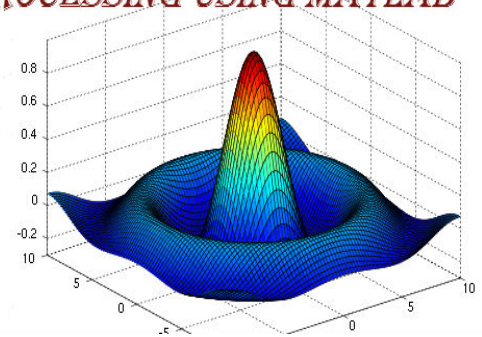
OpenCV



Content & Learning Goal



➢ Content

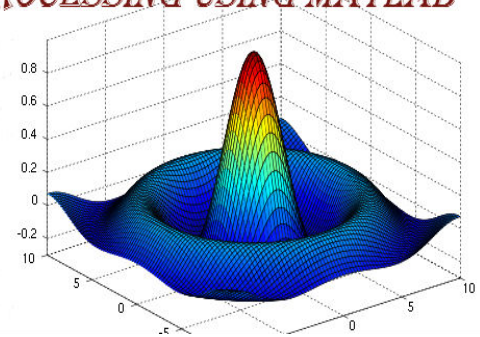
- to introduce basics/advanced techniques of **image processing** & **computer vision**

➢ Learning Goal

- knows the basics of image processing (pixels, color representation, color depth.
- knows what a convolution filter is, and can implement such a filter on the pixel level.
- knows when to use some basic filters: mean, median, Gaussian, Sobel.
- knows how to apply Hough line detection.

Image processing toolbox
Image enhancement
Image Filtering

Content & Learning Goal



➢ Content

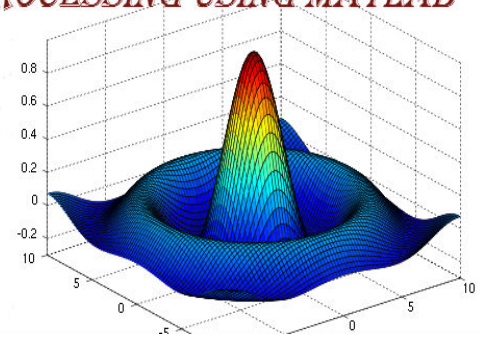
- to introduce basics/advanced techniques of **image processing** & **computer vision**

➢ Learning Goal

Statistics & Machine Learning Toolbox

- knows the k-nearest technique and can apply it to recognize digits.

Content & Learning Goal



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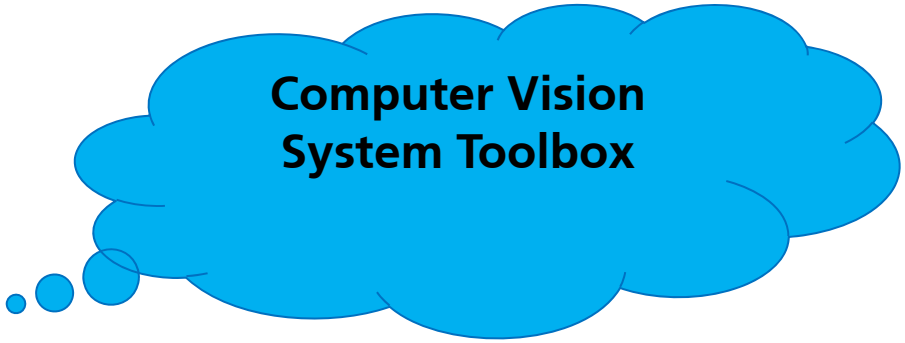

- knows the Haar cascade technique and can apply it to recognize certain objects, like face, mouth, eye.

Content & Learning Goal

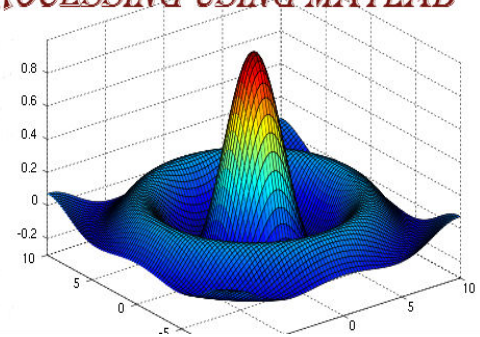

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Image processing toolbox
Image enhancement
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Statistics & Machine Learning Toolbox

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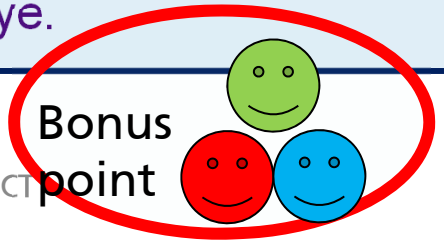

Computer Vision System Toolbox

Recommended reading

- Digital Image Processing.
  - Rafael C. Gonzalez & Richard E. Woods ISBN:978-0-13-168728-8

- Machine Vision: Automated Visual Inspection and Robot Vision"
  http://homepages.inf.ed.ac.uk/rbf/BOOKS/VERNON/

- Computer Vision Algorithms and Applications.
  - Richard Szeliski (http://szeliski.org/Book)

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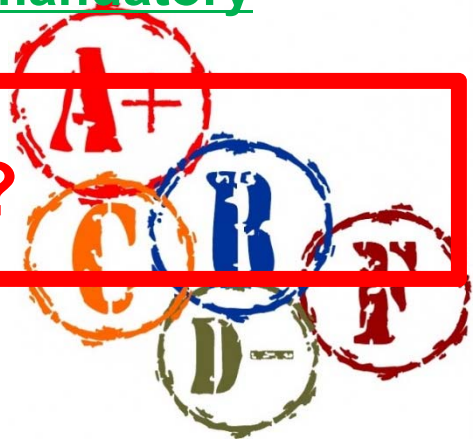
Course Overview

Week	Topic	Practical part
1	Matlab, DIPimage, loading and display image	Individual task
2	Image filtering: Blurring; derivative filters; sharpening; local maximum &minimum filters	Team task
3	Point operations(histogram-based operation, thresholding)	Team task
4	Binary morphology	Team task
5	Machine learning (recognize digits)	Team task
6	Computer Vision(Object Detection and Recognition, Hand gesture detection)	Team task
7		

Assessment: team player + your commitment!!!

- **Week 1: registration for this course**
  - **You must be present and register yourself**
- Week 2~6: absence?!
  - If you = 1 absence→ warning
  - If you > 1 absence → failed! (see next page)
- Weekly assignment (Theory + Practical)
  - Individual or team of 2 students
  - **The practical session of week3, 4 and 6 are mandatory**
- Week 7: **practical check/exam ???**



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Miss deadline/Absence--action steps to take…

- If you have a valid reason in case of
  - a medical problem, get a written statement from your doctor.
  - personal problem, contact the Study Councilors. Your mentor can help to guide you to the Study Councilors.

Action steps:

1. you will have to email your reason with the prove of your doctor or name of **the Study Councilor** to **the exam board** (fhict-examboardes@fontys.nl).
2. **The exam board** will decide to allow you to continue the course based on your prove.

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Assessment: team player + your commitment!!!

Week	Topic	Assignment	Canvas deadline (for IPV final grade)	Practical session: check/demo
1	Matlab, DIPimage, loading and display image	Individual task		
2	Image filtering: Blurring; derivative filters; sharpening; local maximum &minimum filters	Team task	assignment 2	
3	Point operations (histogram-based operation, thresholding)	Team task	assignment 3	Check assignment 2
4	Binary morphology	Team task	assignment 4	Check assignment 3
5	Machine learning (recognize digits)			Study day No lesson
6	Computer Vision(Object Detection and Recognition, Hand gesture detection)	Team task		Check assignment 4
7				

Leaning style

- Your pre-knowledge before this course?
  - Statistics, signal processing, programming…
- Reverse engineering←→systematical Learning
  - Industrial style: Commitment + Quick learning
  - **Make your choice!**

Questions?

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Content for Week 1_2

- Demo: Matlab + DIPimage tool

- Image processing basics

  Demo: Basic Image Import, Processing, and Export