UNIVERSITÀ DEGLI STUDI DI PADOVA

**Introducing mid-level image processing
Recall on derivative filters**

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- From low-level to mid-level image processing
  – What is the difference? Discussion

- Edge detection filters – recall

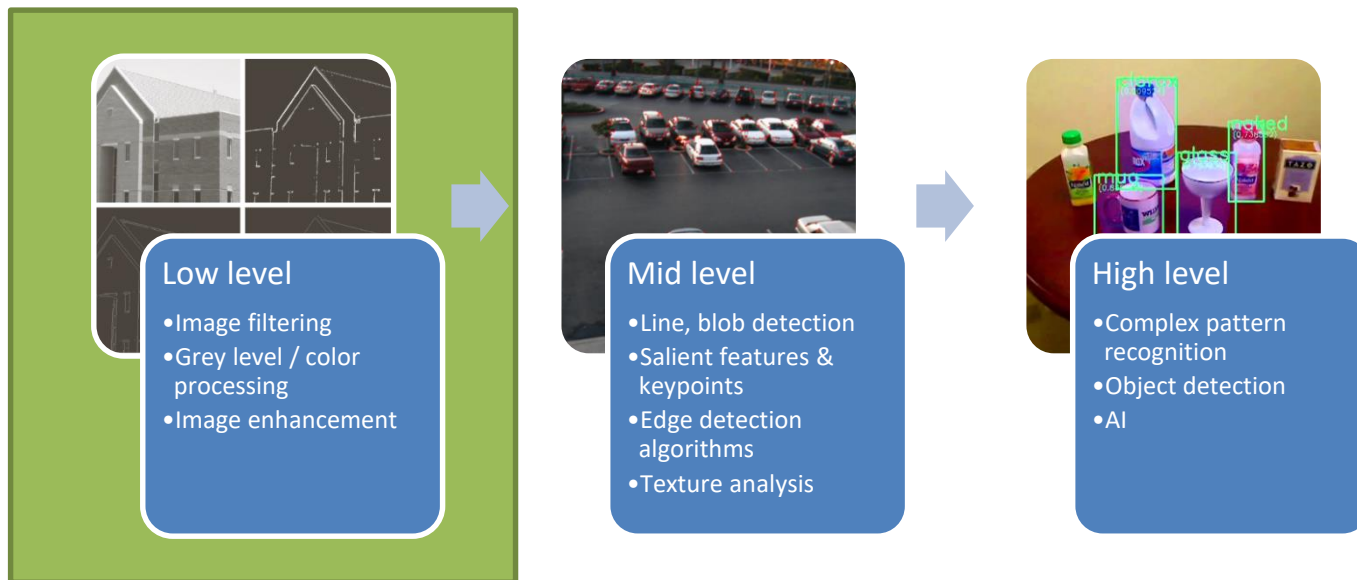Slides by Stefano Ghidoni and Pietro Zanuttigh, figures from Gonzalez & Woods

- So far, we have considered:
  - Single-pixel transforms
  - Local operators
  - Convolutional filtering
  - DFT
  - Image restoration
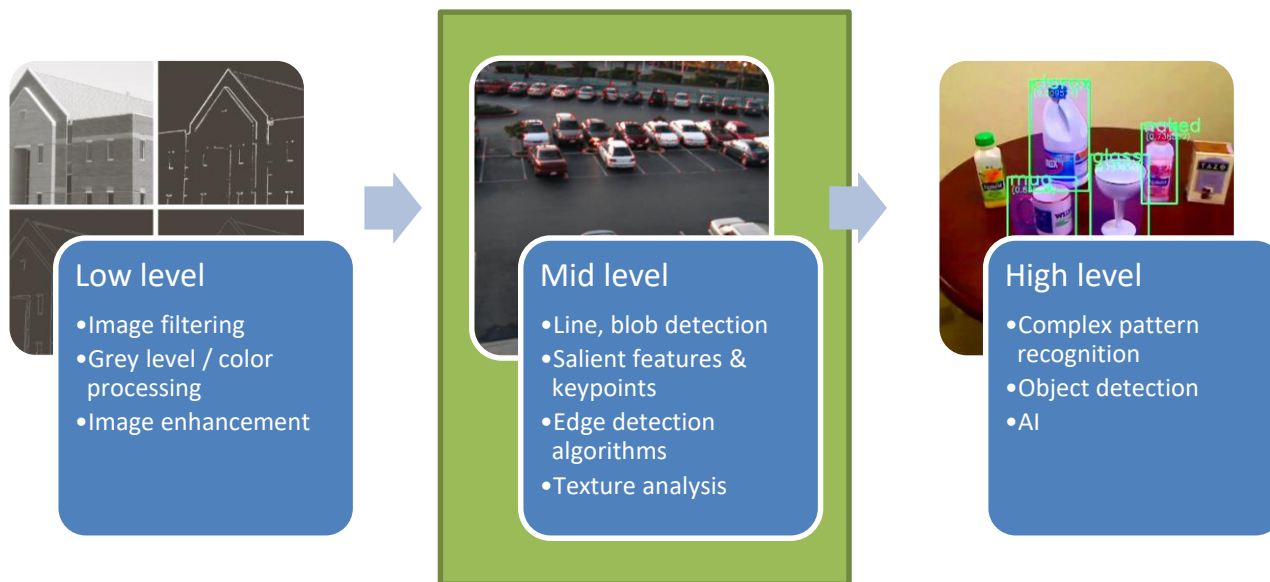- What are the concepts behind these filters and processes?

- The next step is mid level

- Which concepts do you think are involved in mid-level?

- Computer vision systems often start with an image enhancement module
  - Based on the image processing techniques discussed in this first part of the course

Low level
- Image filtering
- Grey level / color processing
- Image enhancement

Mid level
- Line, blob detection
- Salient features & keypoints
- Edge detection algorithms
- Texture analysis

High level
- Complex pattern recognition
- Object detection
- AI

- Mid-level algorithms are based on more complex *models*
  - E.g.: a line, an edge

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- We start our discussion on mid-level considering
  - Edge detection
  - Line detection

- Derivative filters highlighted edges in the image
  - Can they be considered edge detectors?

- Derivative filters highlighted edges in the image

    – Can they be considered edge detectors?

- Such filters highlight the edges in an image

- They highlight edge pixels

- Filtered images *lack the concept of edge*

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