Development of intelligent systems (RInS)

Object detection

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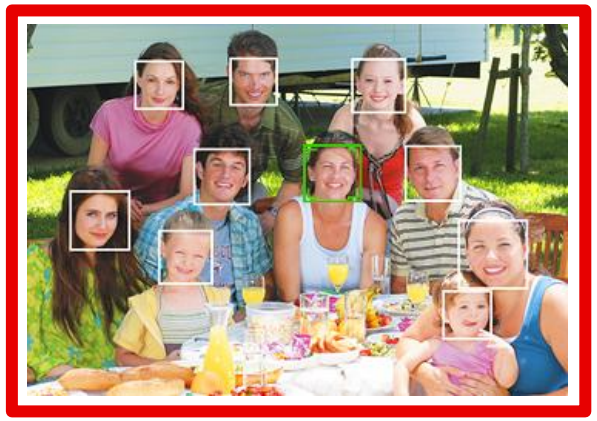
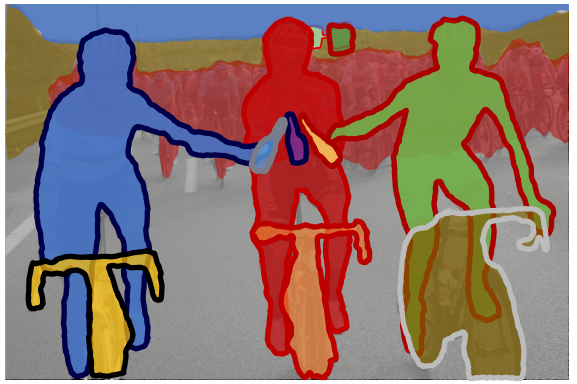
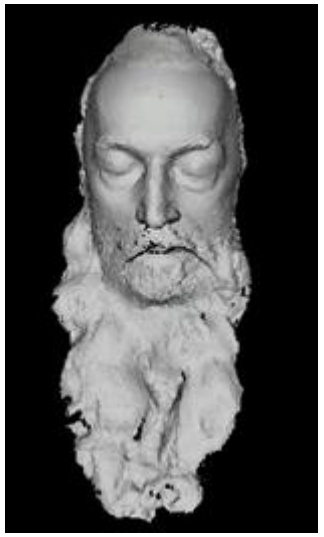
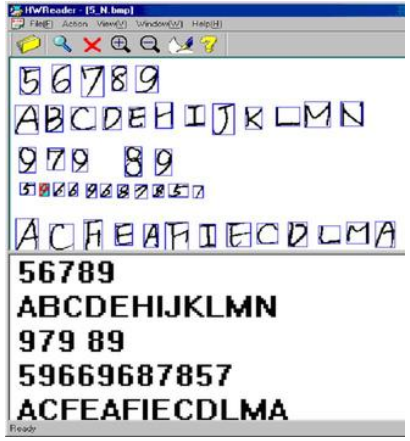
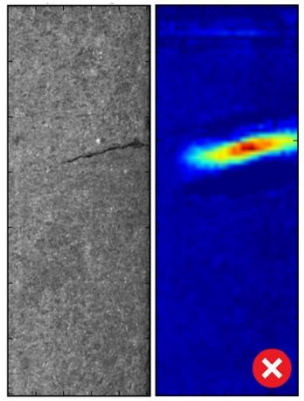
Computer vision











Visual information

Computer vision tasks

Face detection!

Classification

What is depicted in the image?

Categorisation

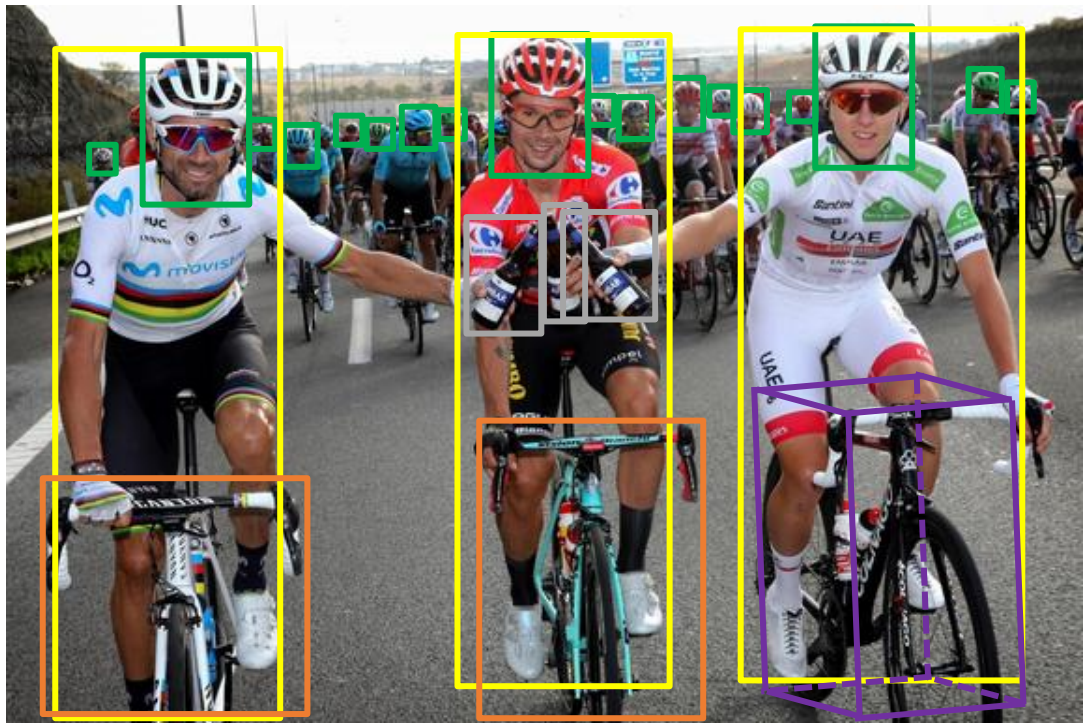
Localisation

Recognition/identification of instances

Detection

Where in the image?

Detection



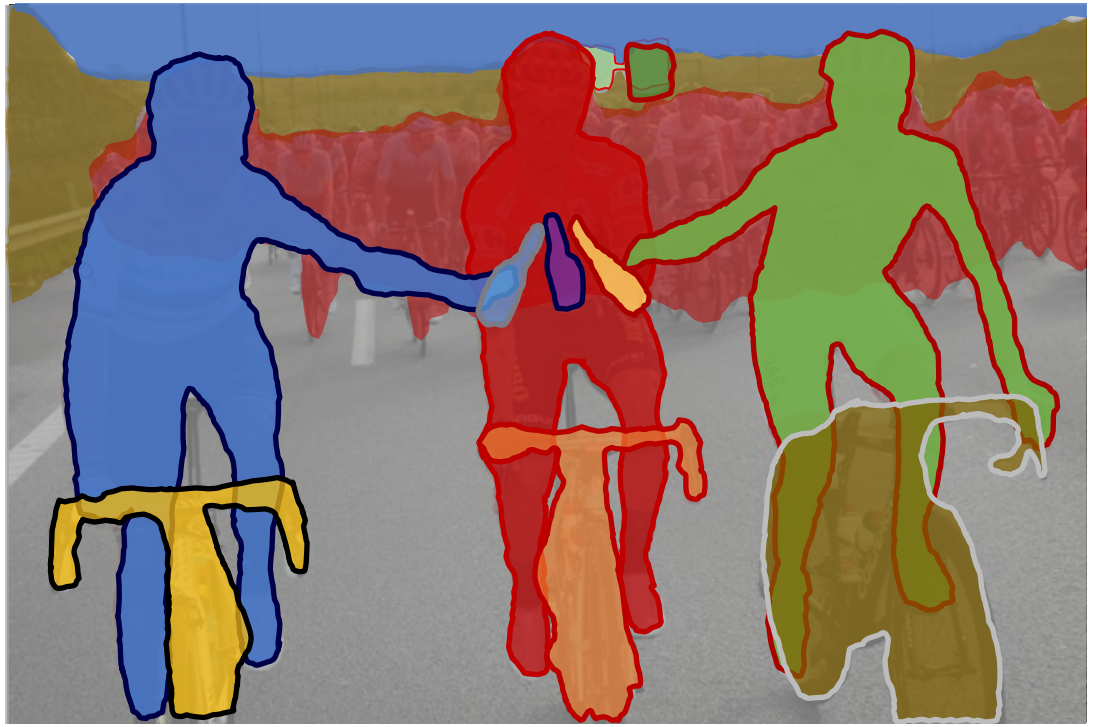
Instance segmentation

Segmentation

What does every pixel represent?

Semantic segmentation

Panoptic segmentation



Face detection

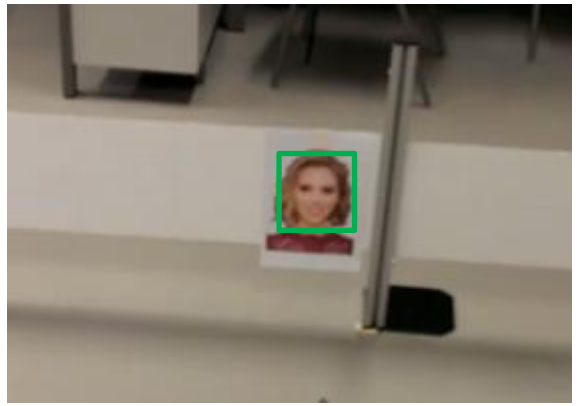
Find and localise all faces in the image.

Two stage object detection and recognition

very fast, efficient, general

Face detection

HOG+SVM
AdaBoost
SSD
YOLO, …



Face recognition

CNN

„Scarlet“

could be slower, computationally more complex, specific

Observation model

- Several face detectors available
  - HOG+SVM
  - AdaBoost
  - SSD
  - YOLO
  - Any other?
- Not perfect
- Which one is better?
  - More true positives
  - Less false positives
- Test set
  - Images, videos
  - Different angles, illumination
  - Motion blur, etc.
- Observation model
  - Performance
    - at different distances and angles
    - at different illuminations

Robustification of detection

- Use and robustify the better detector
- Take into account temporal dimension
  - Repetitive detections more robust
  - Filter out false positives
- Take into account spatial dimension
  - Non-maximum suppression
  - Observation model

- Map the image from 2D image to 3D world
- Anchor the image into the map
- Non-maximum suppression in the map
- Redetection of faces from different directions

Face detection

very fast, efficient, general

Face detection

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SSD
YOLO, …