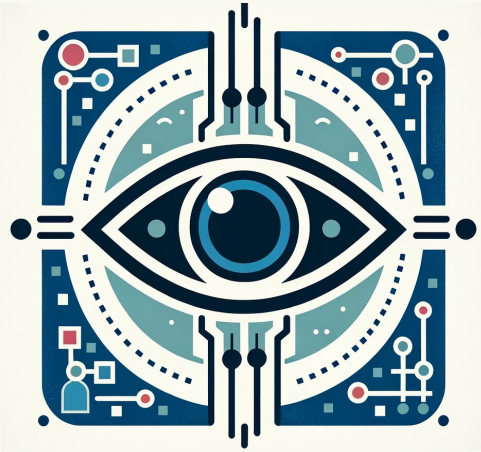
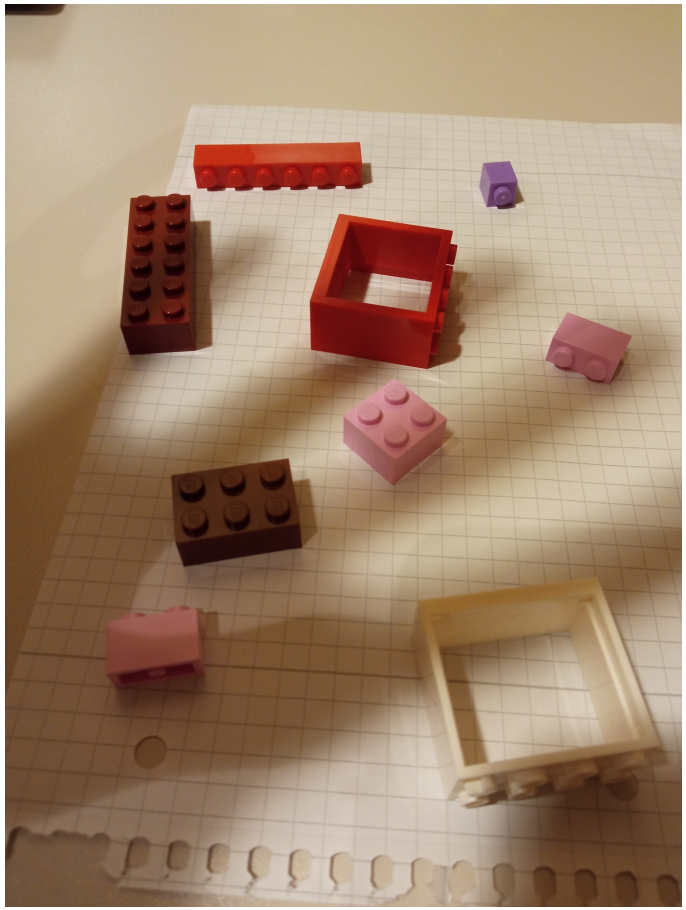


COMPUTER VISION

Project

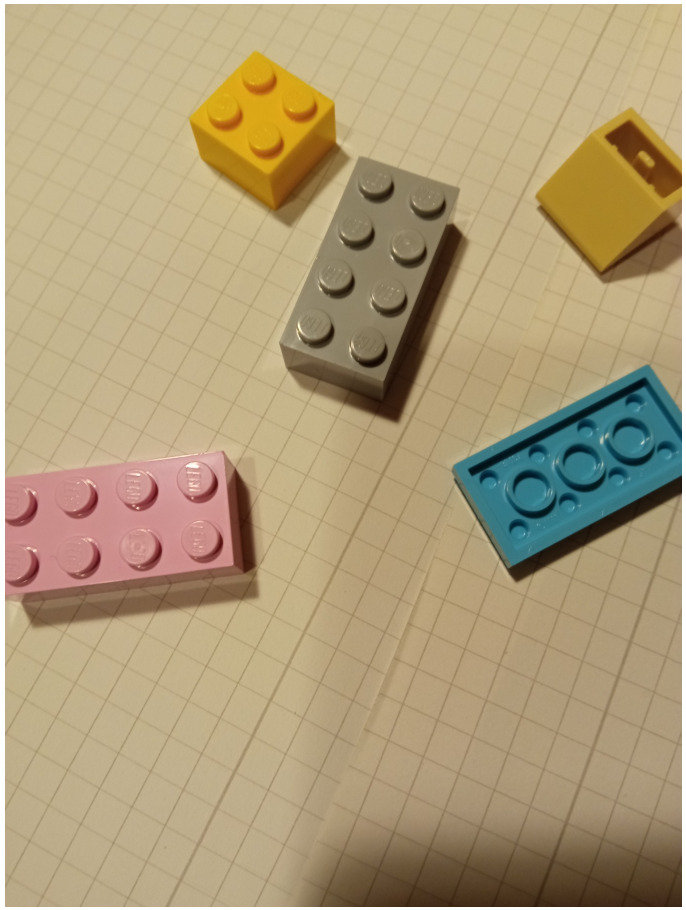
Luis F. Teixeira | M.EIC | FEUP

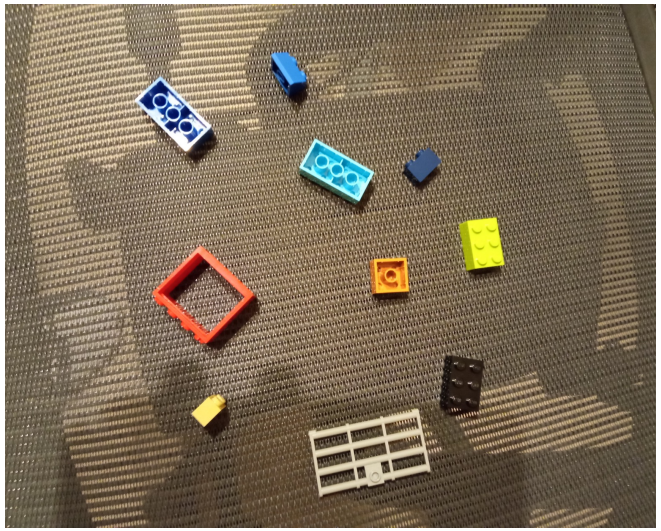
TASK 1

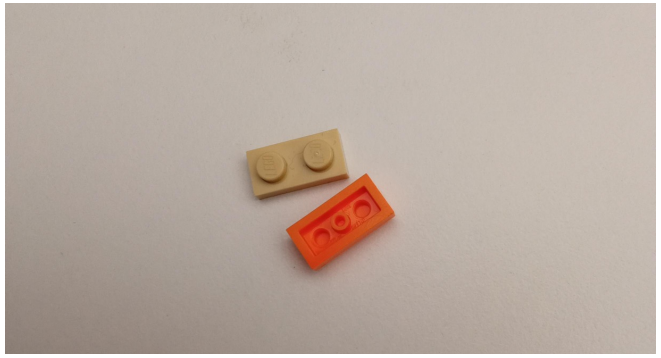


- Input:
  - Image containing **one or more** LEGO bricks
- Output:
  - Total number of bricks
  - Position of the bricks (bb)
  - Number of different colours

TASK 1







Dataset: https://mostwiedzy.pl/en/open-research-data/tagged-images-with-lego-bricks,20230914083344815231 1-0

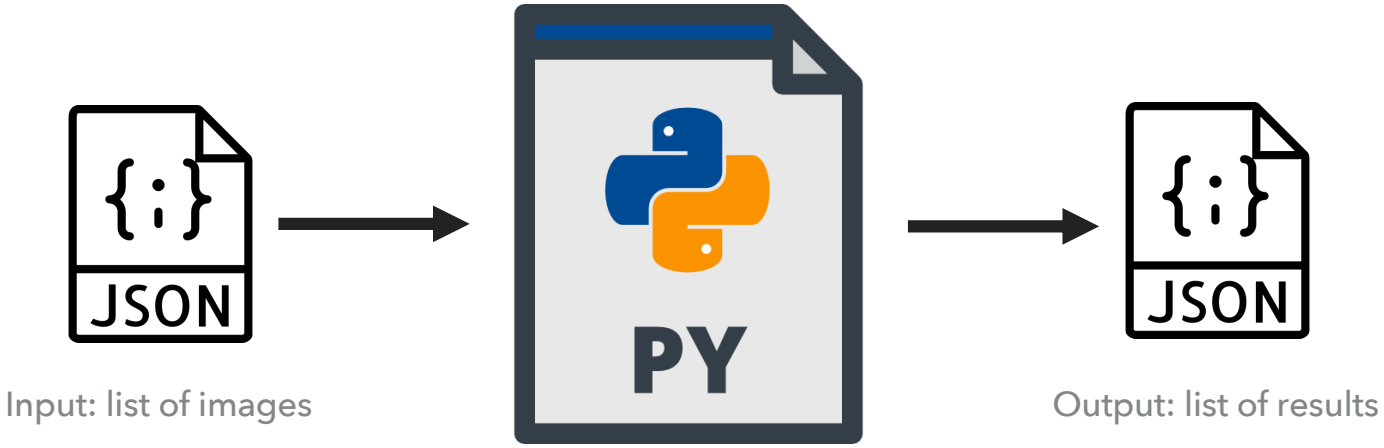
TASK 1

- Dataset:
  - 50 images randomly chosen from a public dataset
  - The results will be tested in 10 **undisclosed** images

- Deliverables:
  - Short report (2 pages max) presenting the **methodology** and some **results**
  - Python script (only one file)

- Deadline: **April, 5** (23:59 AoE)

TASK 1



Input: list of images

Image processing pipeline (*)

Output: list of results

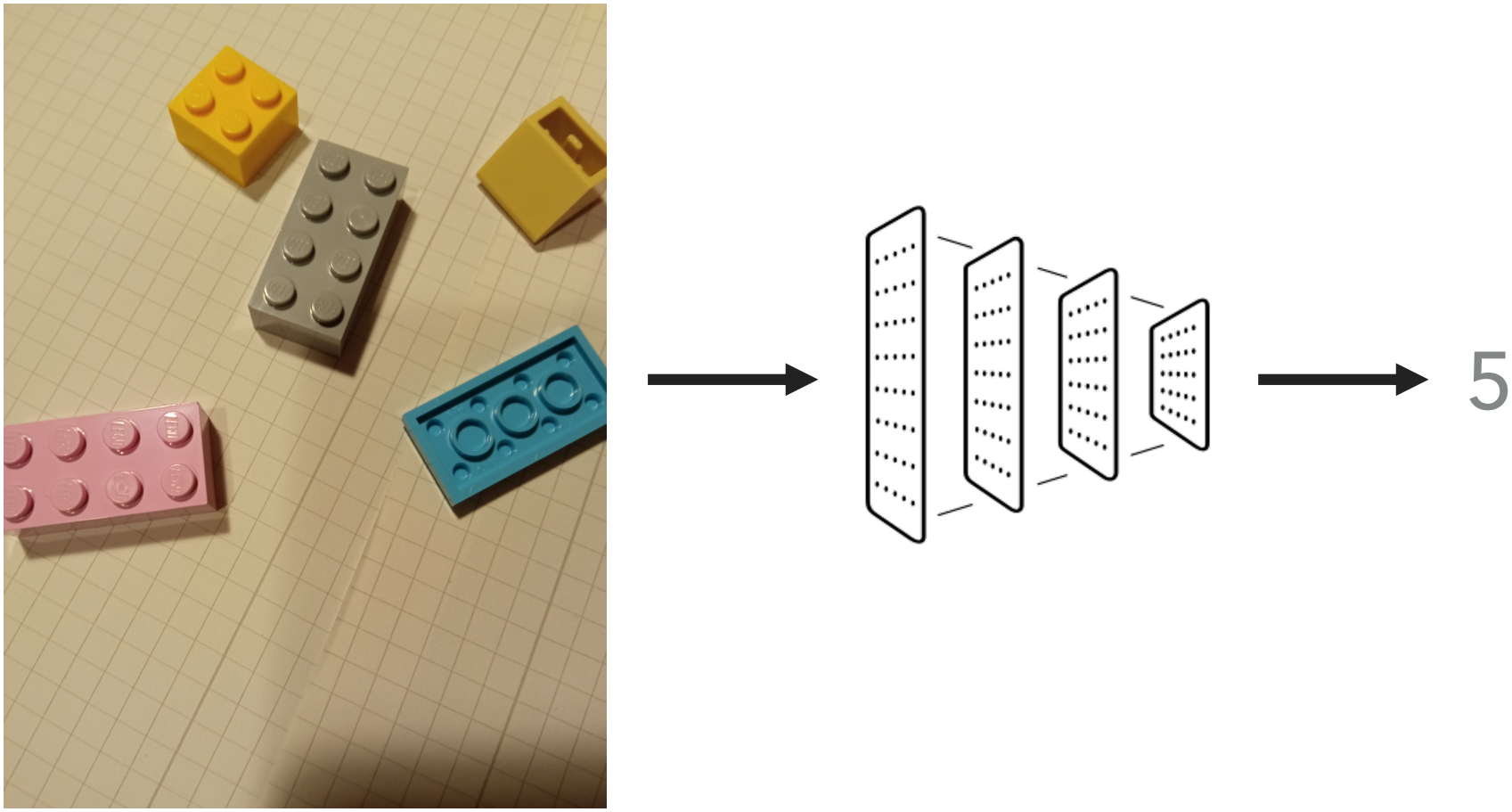
(*) using only OpenCV and other common libraries, like numpy and matplotlib

TASK 1

- Grading
  - Task 1 accounts for **30%** of the overall project grade
  - Elements being considered: methodology, report and quality of the results

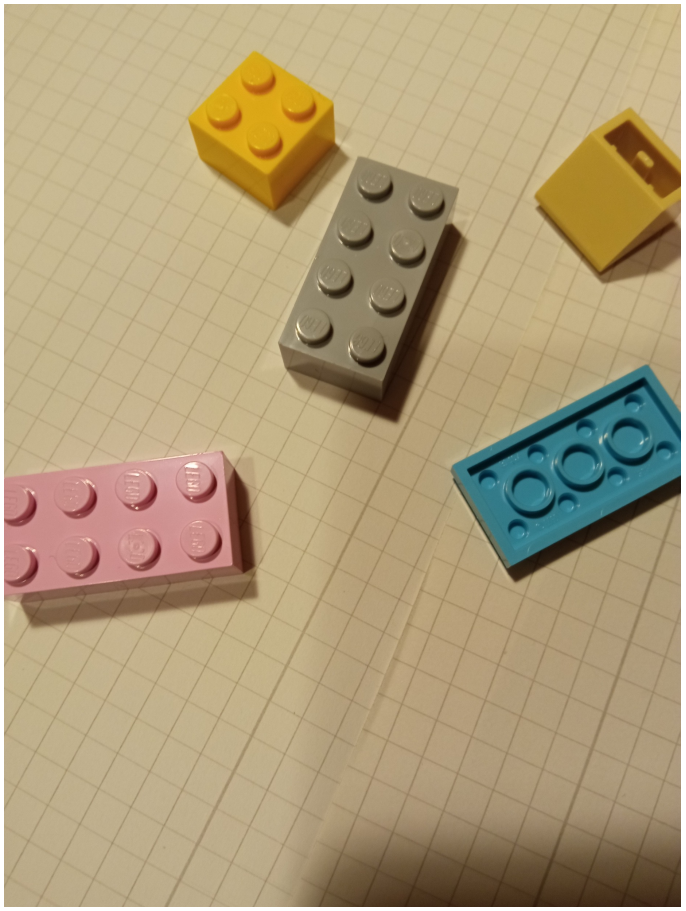
- Important remarks
  - Follow **strictly** the JSON structure for the input and output files
  - It is **okay** to use AI tools while developing your work, but it is **not okay** to use them without acknowledging it
  - All members of the group **are expected to understand** the methodology and the submitted code

TASK 2



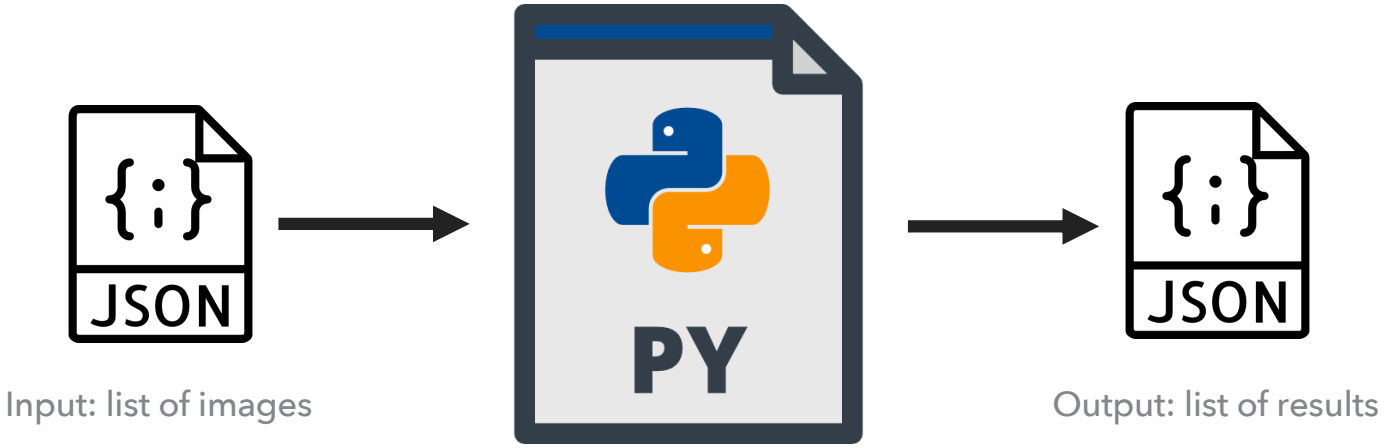
CNN image by Oleksandr Panasovskyi

TASK 2



- Input:
  - Image containing **one or more** LEGO bricks
- Output:
  - Total number of bricks
- Model(s):
  - CNN-based architecture
  - extra: quantitative comparison (with **adequate metrics**) different architectures

TASK 2



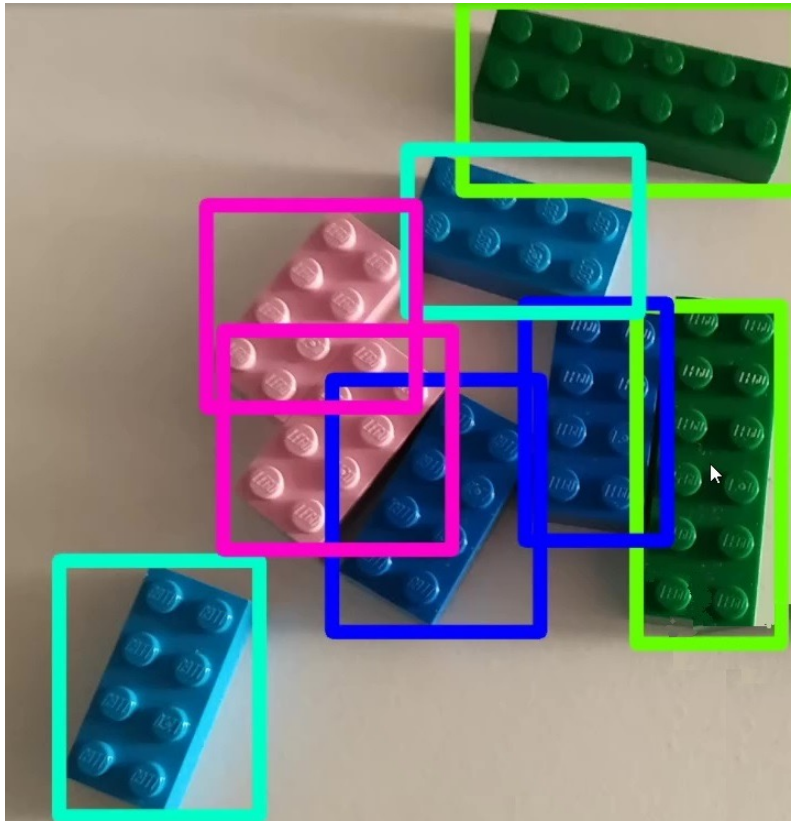
Input: list of images

Script of the deep learning-based model (*)

Output: list of results

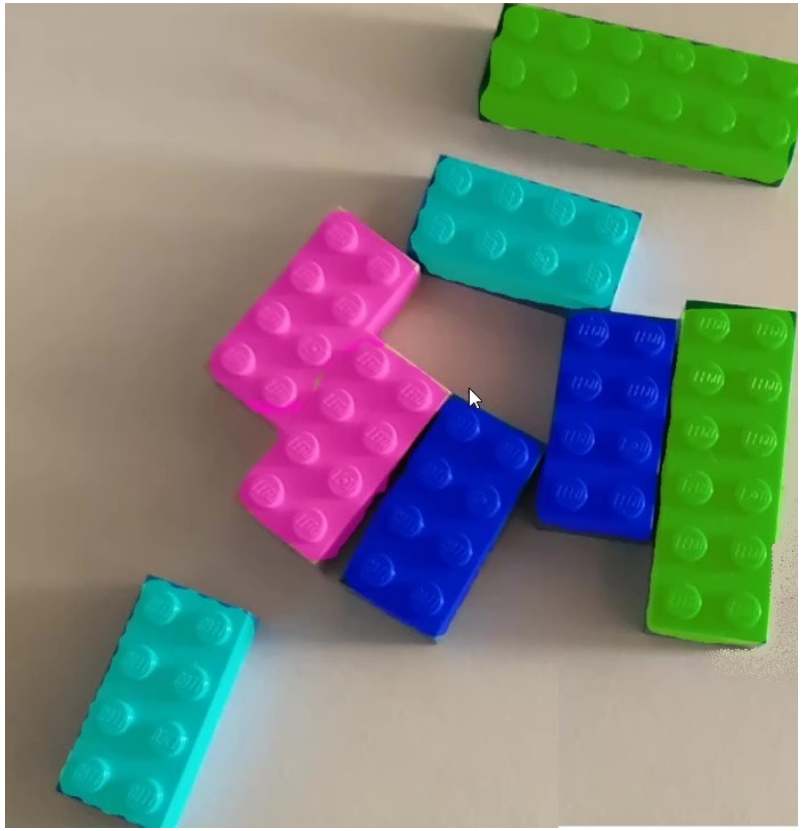
(*) using only PyTorch, OpenCV and other common libraries, like numpy and matplotlib

TASK 3



Brick detection

+

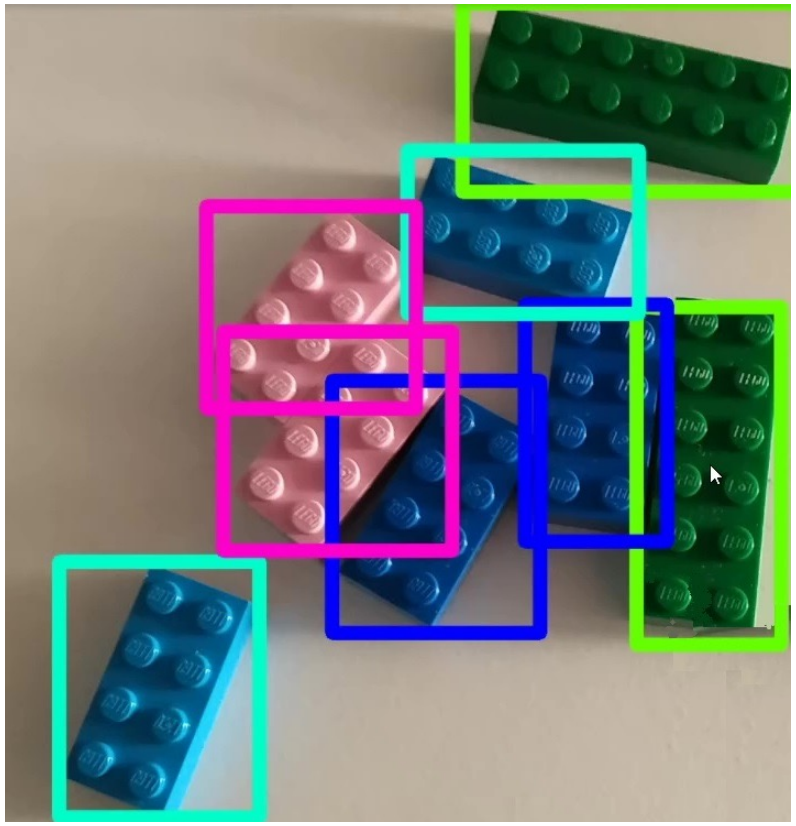


Brick segmentation

(but there's a catch: do it without annotations)

Images by Sergio Canu

TASK 3



- Detection:
  - At least one model, e.g. YOLO, Faster R-CNN
  - extra: quantitative comparison (with **adequate metrics**) of different architectures
- Segmentation:
  - One model, e.g. detection + traditional segmentation on the individual bounding boxes
  - Qualitative evaluation with some (good and bad) results are enough

TASKS 2 + 3

- Dataset:
  - https://doi.org/10.34808/wtxb-9076
  - Training/test splits will be provided
  - Others (need to be documented)

- Deliverables:
  - Short report (3 pages max) presenting the **methodology** and some **results**
  - Python script (only one file) + model (.pth) for task 2
  - Notebook with some results for task 3

- Deadline: **June, 11** (23:59 AoE)

- Intermediate Presentation: **May, 24** (Friday classes)

TASKS 2 + 3

- Grading
  - Tasks 2+3 account for **60%** of the overall project grade
  - Elements being considered: methodology, report and quality of the results

- Important remarks
  - Follow **strictly** the JSON structure for the input and output files
  - It is **okay** to use third-party code and AI tools while developing your work, but it is **not okay** to use them without acknowledging it
  - All members of the group **are expected to understand** the methodology and the submitted code