Course Introduction

Introduction to Computer Vision
Spring 2026, Lecture 1

Course Introduction

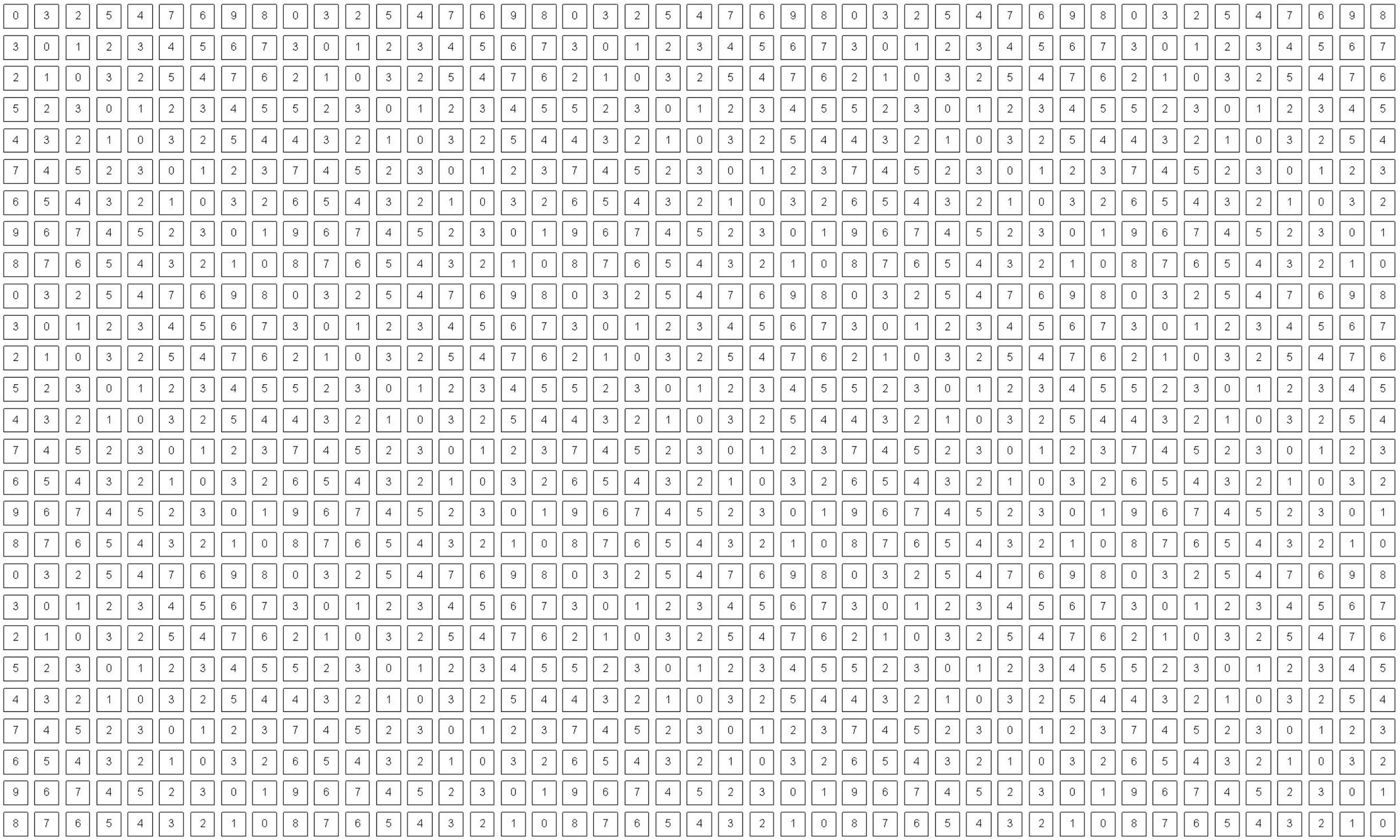
- What is computer vision?
- Course fast-forward and logistics

Hi!

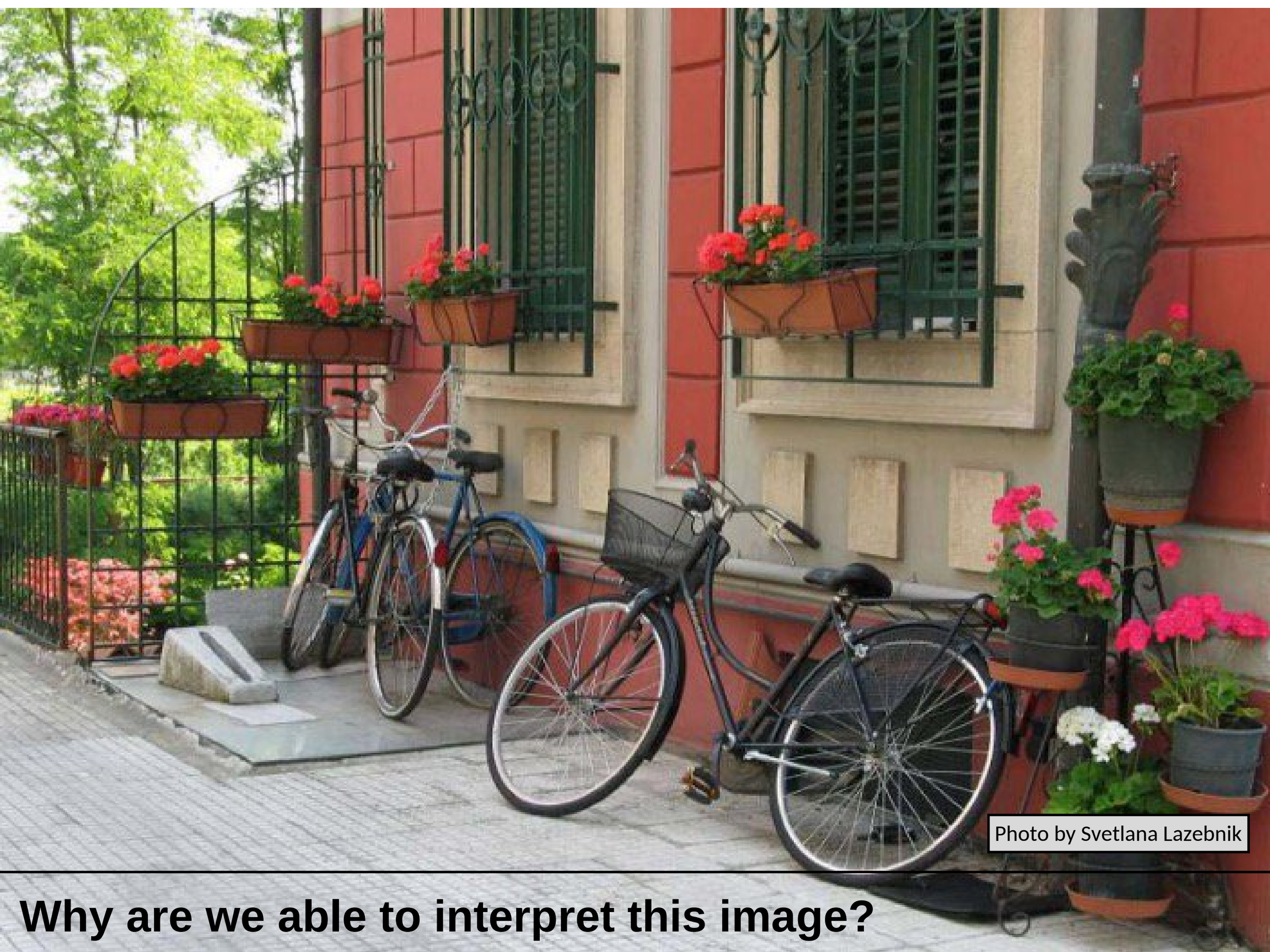
- Ilias TOUGUI, PhD
- Assistant Professor at UIR
- Computer science researcher and educator specializing in machine learning applications for healthcare.
- https://www.liaou.xyz/

What is computer vision?

What a person sees



What a computer sees



Why are we able to interpret this image?

The goal of computer vision is

to give computers

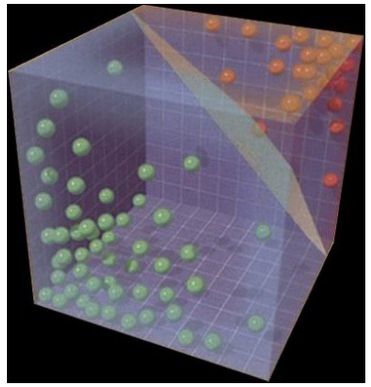
(super) human-level perception

Typical perception pipeline

input

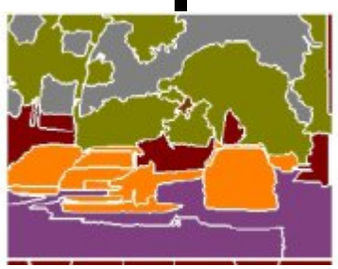
what should we look at?

image representation



‘fancy math’

output



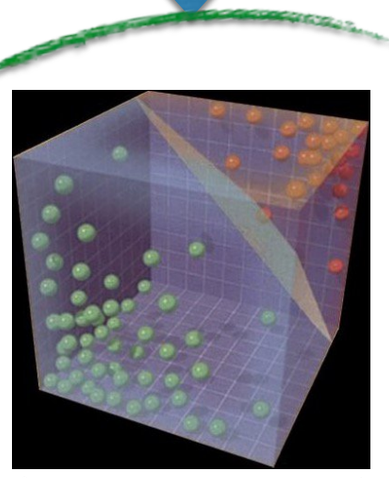
what can we understand?
(semantic segmentation)

Typical perception pipeline

input

what should we look at?

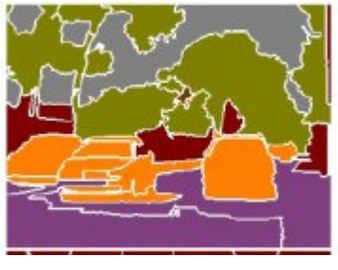
image representation



‘fancy math’

easy to get lost in the techniques

output



what can we understand? (semantic segmentation)

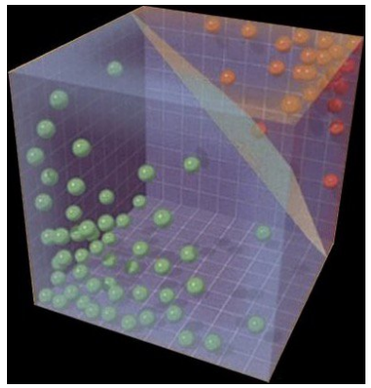
Typical perception pipeline

input

what should we look at?

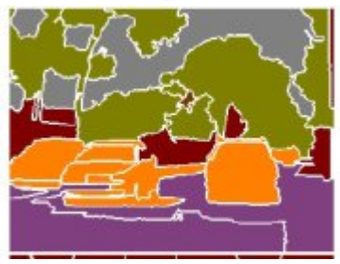
image representation

The parts that we are most interested in



‘fancy math’

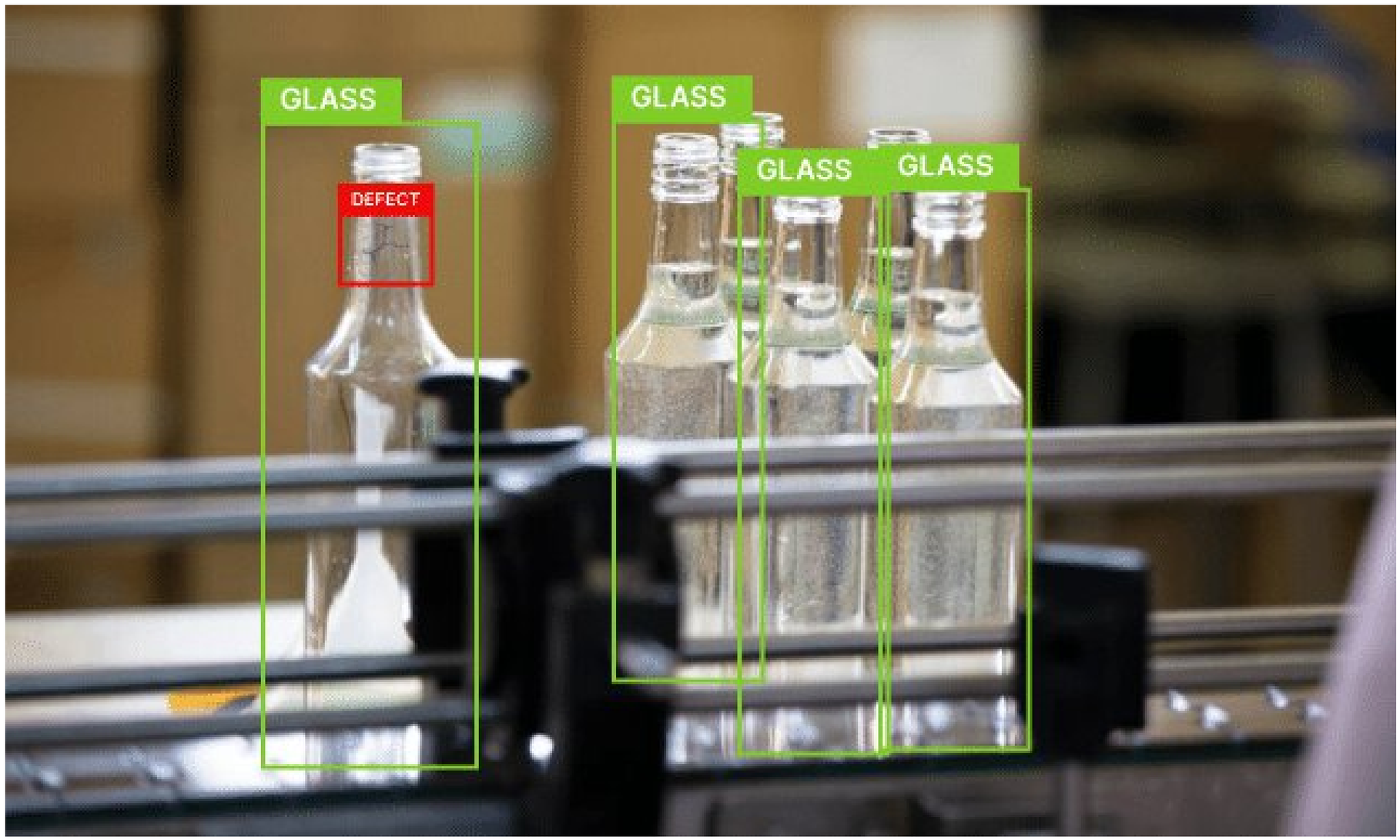
output



what can we understand?
(semantic segmentation)

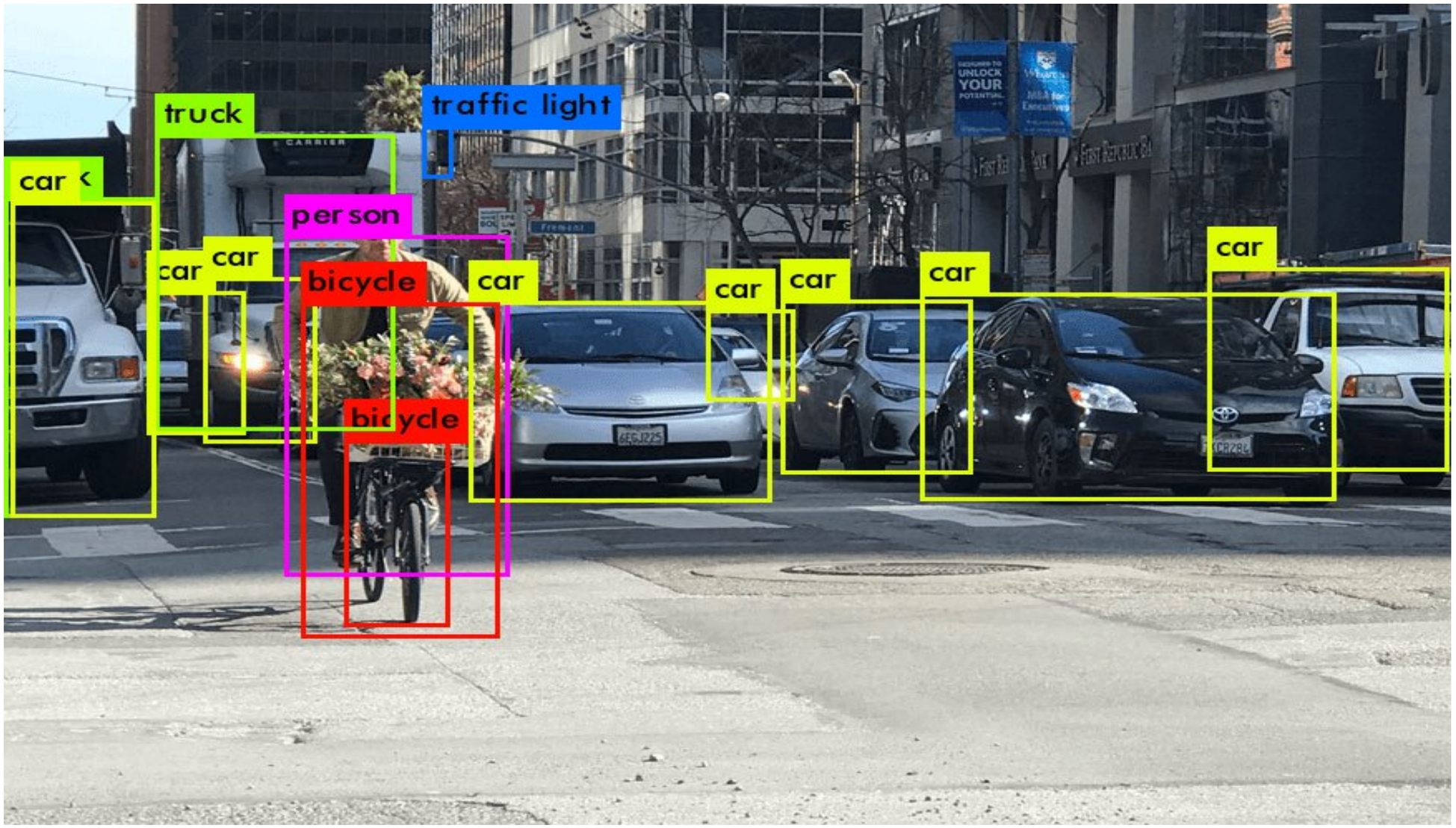
Applications of computer vision

Vision in Industry



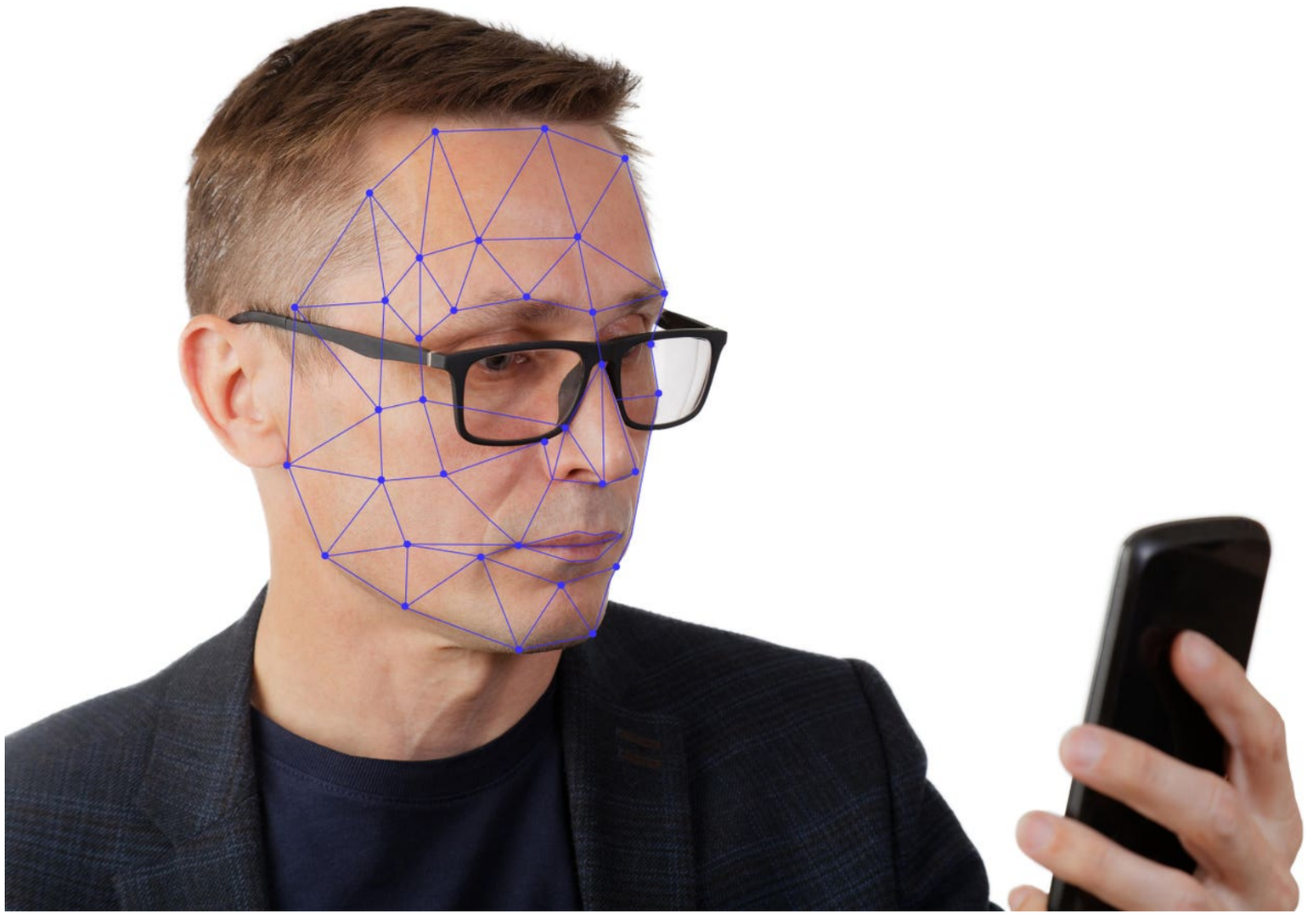
e.g. Automated visual inspection

Vision in Transportation



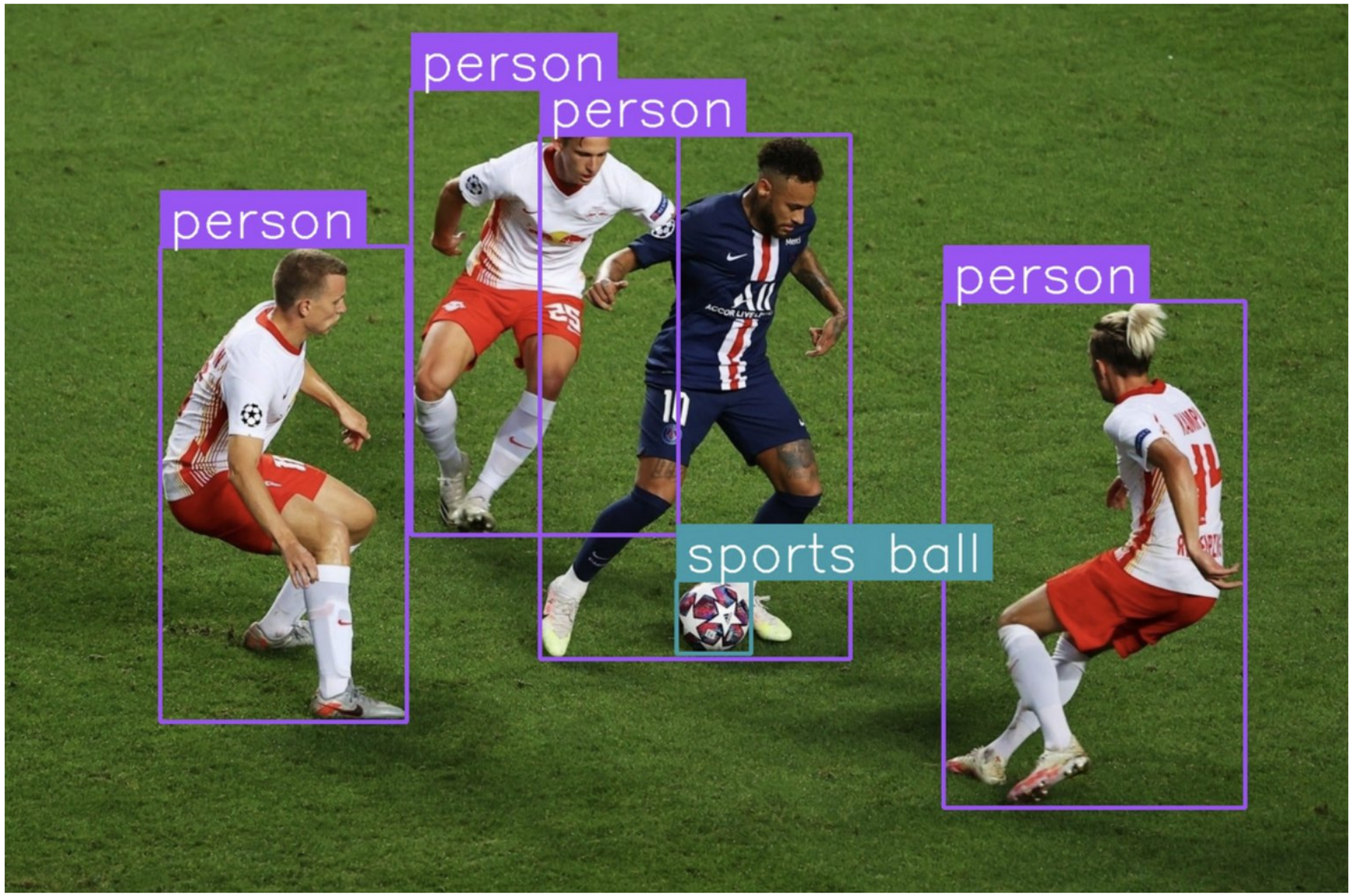
e.g. Object Recognition and Traffic Management

Vision in Biometrics



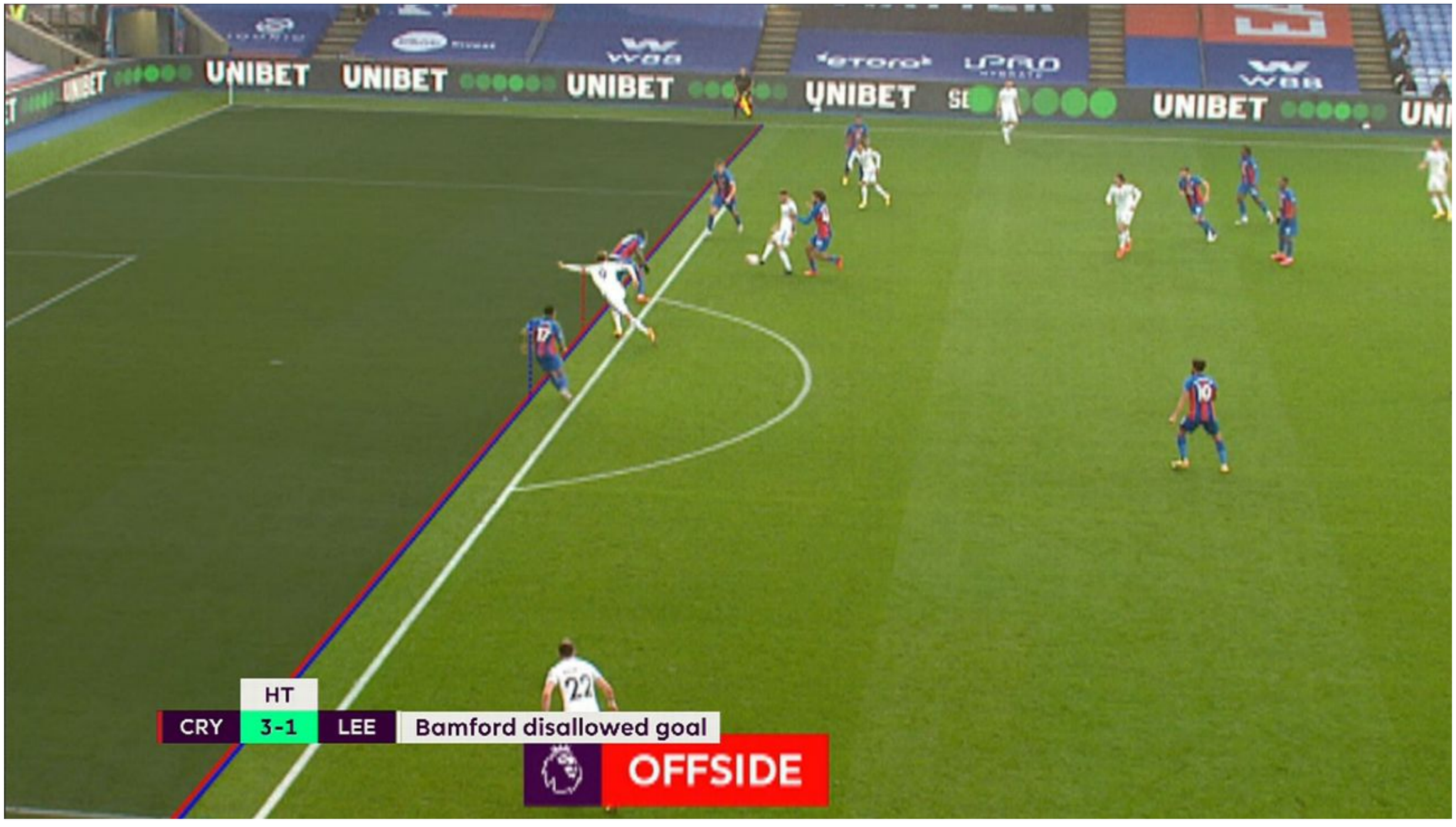
e.g. Face ID

Vision in Sports



e.g. Player and Ball Tracking

Vision in Sports

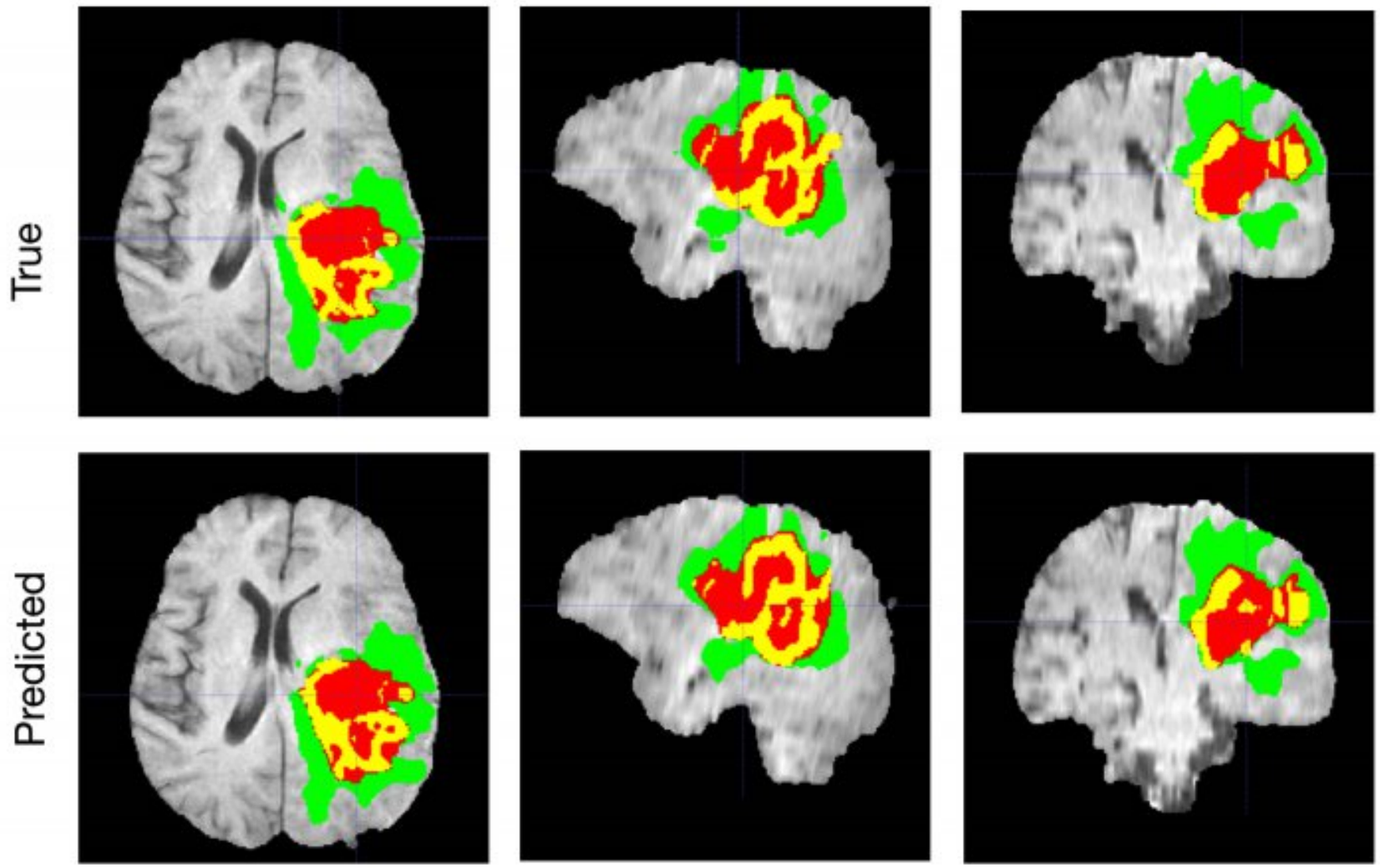


e.g. Video assistant referee (VAR)

Vision in Agriculture

e.g. Detecting Plant disease

Vision in Healthcare



e.g. Brain tumor segmentation with AI

Vision in Cars

BMW 5/6/7 series

e.g. BMW night vision

Vision in Cars

e.g. Automated Parking

Vision for VR/AR

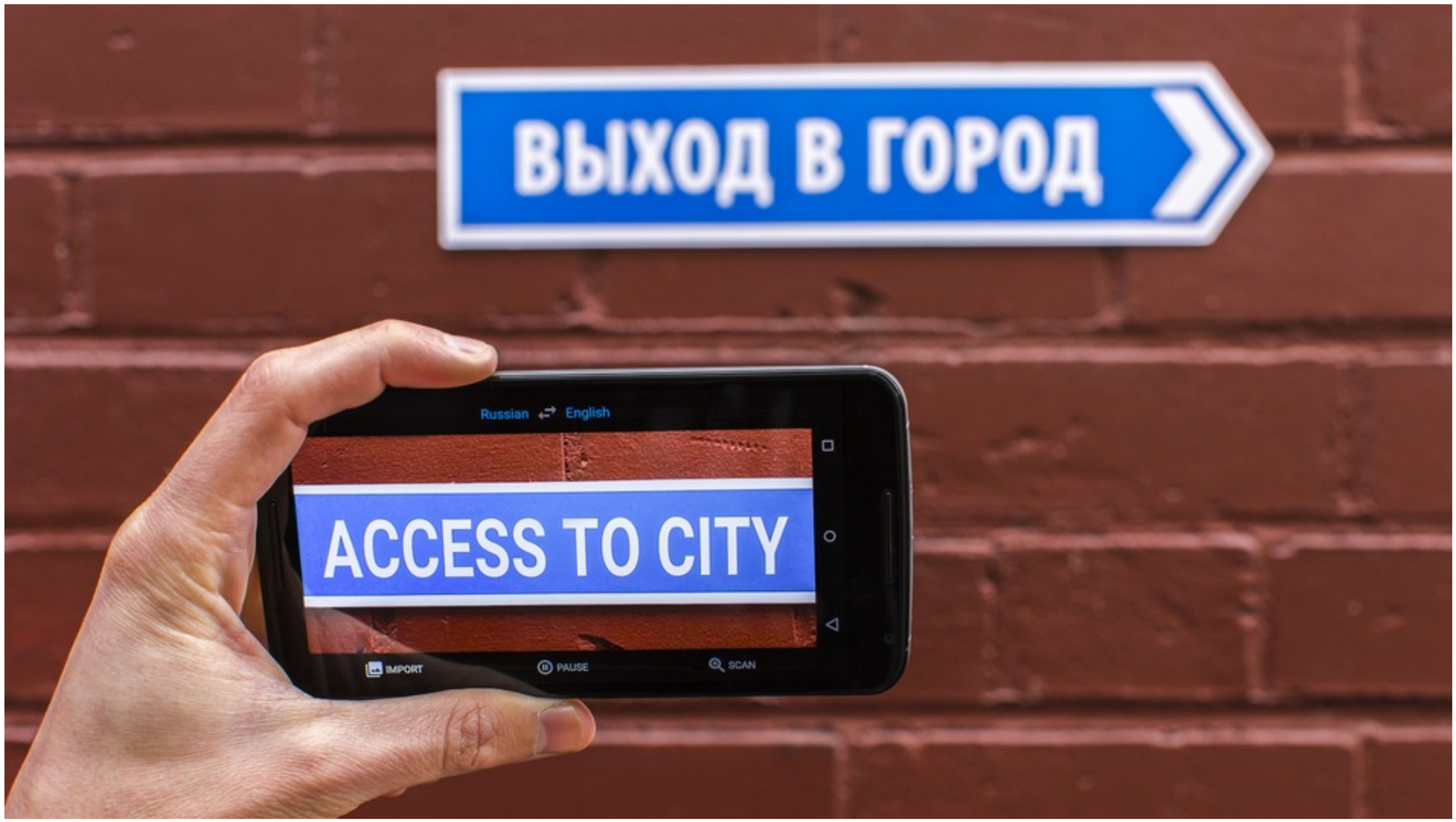
e.g., Pokemon GO

Vision in Arts

e.g., Style Transfer

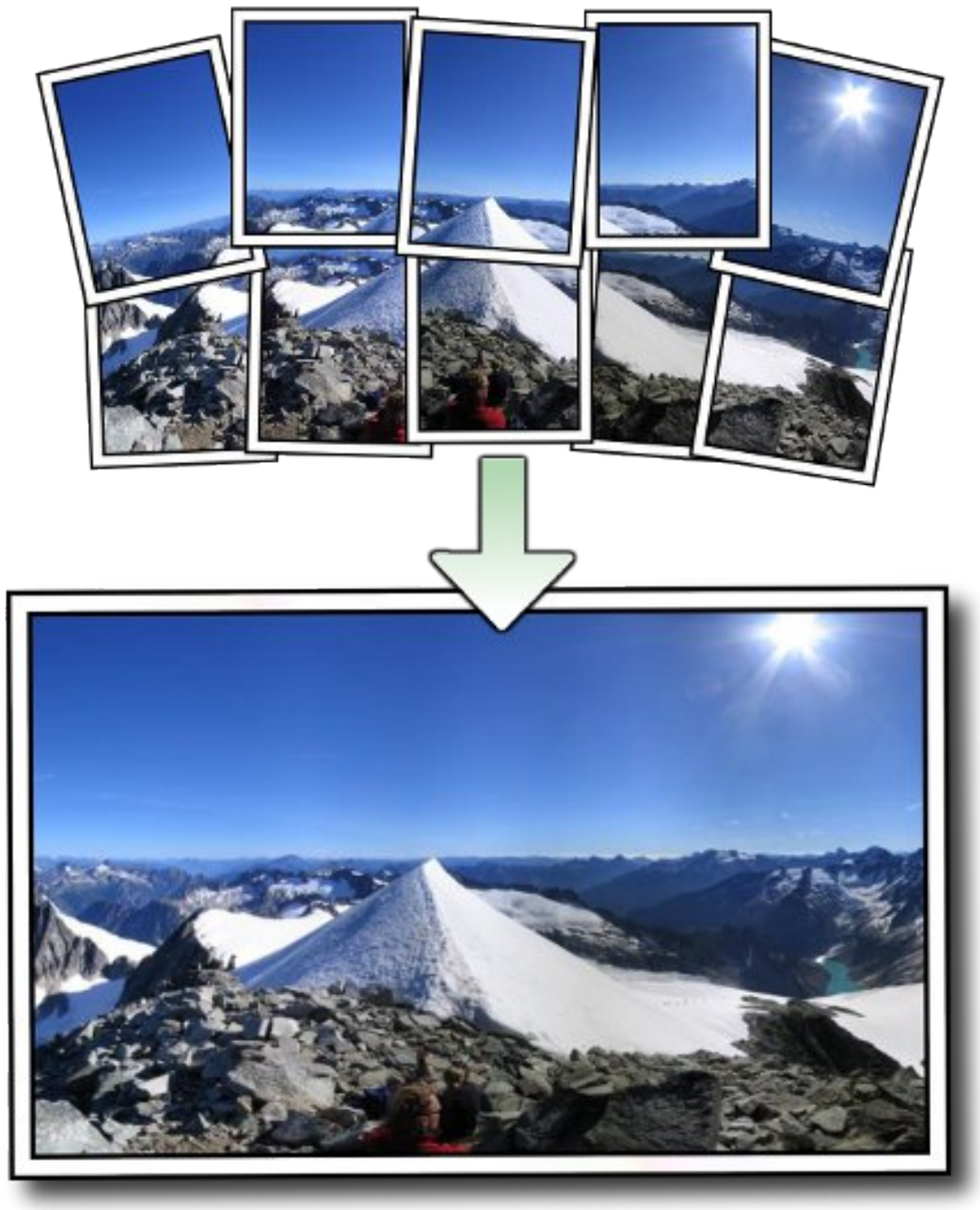
Deep Fake

Vision in Smartphone



e.g., Google Translate

Vision in Smartphone

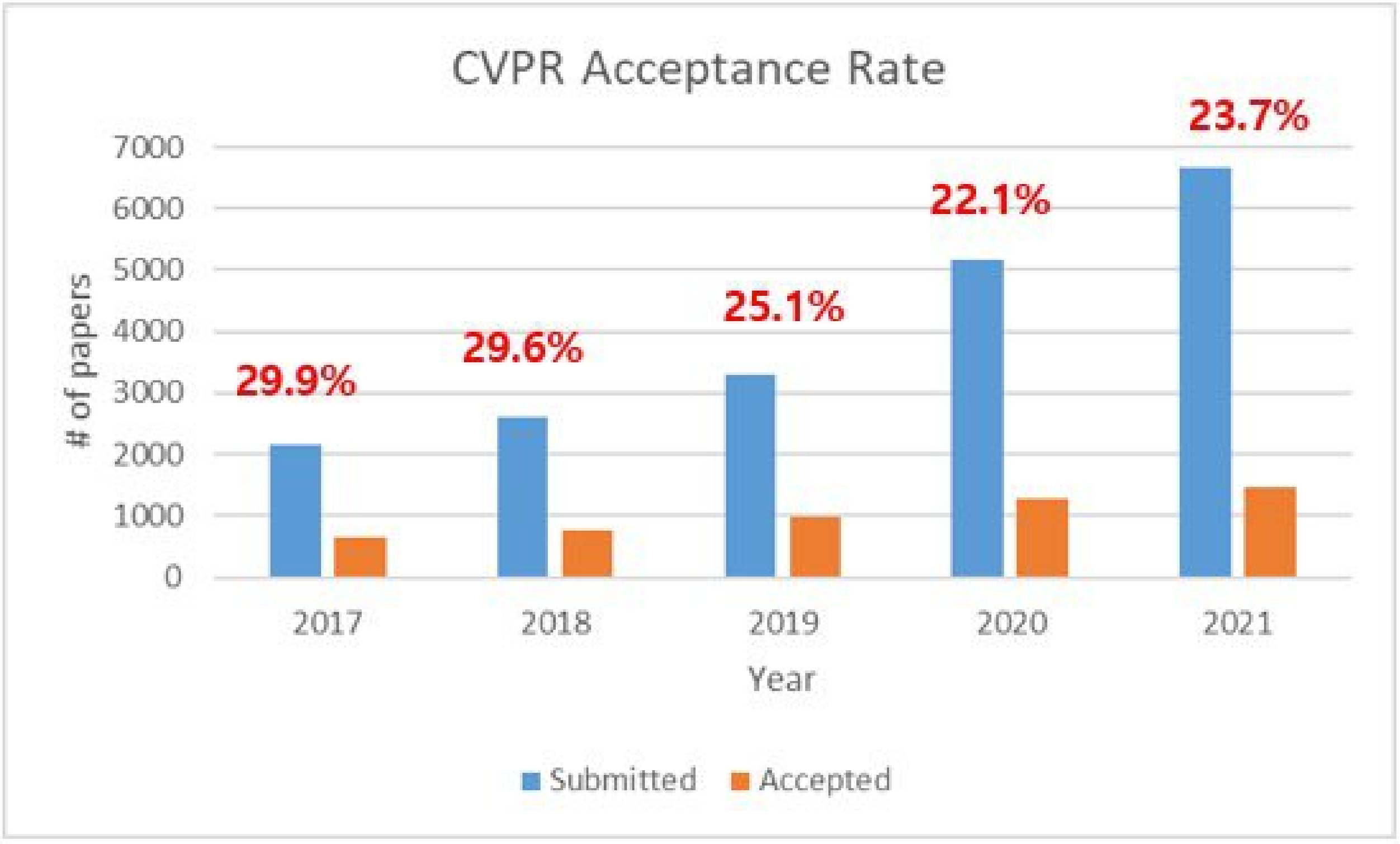


e.g., Image Stitching

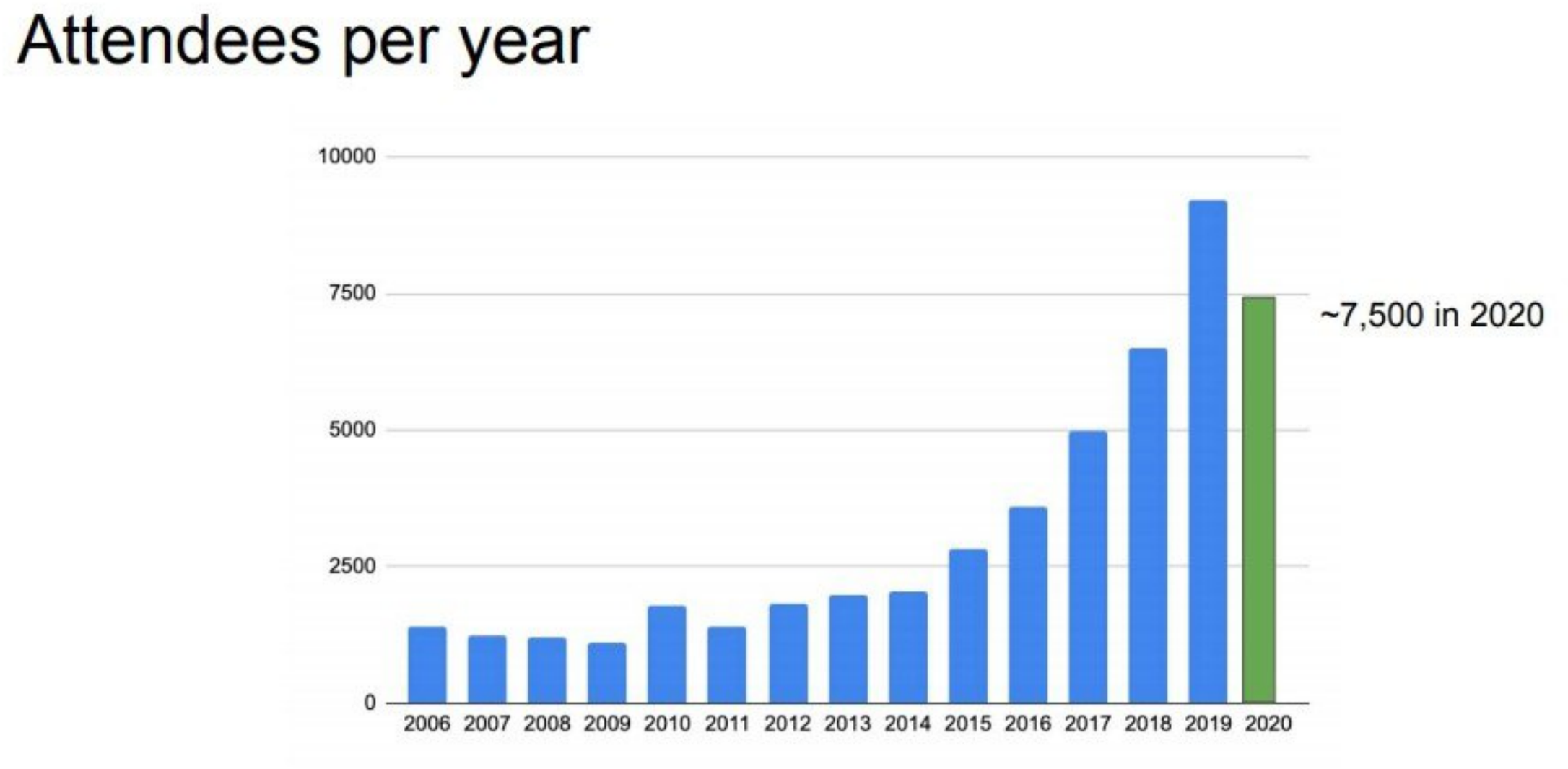
It’s a good time to do computer vision

Industry aggressively hiring CV graduates

Stats for CVPR (Computer Vision and Pattern Recognition)



Stats for CVPR (Computer Vision and Pattern Recognition)

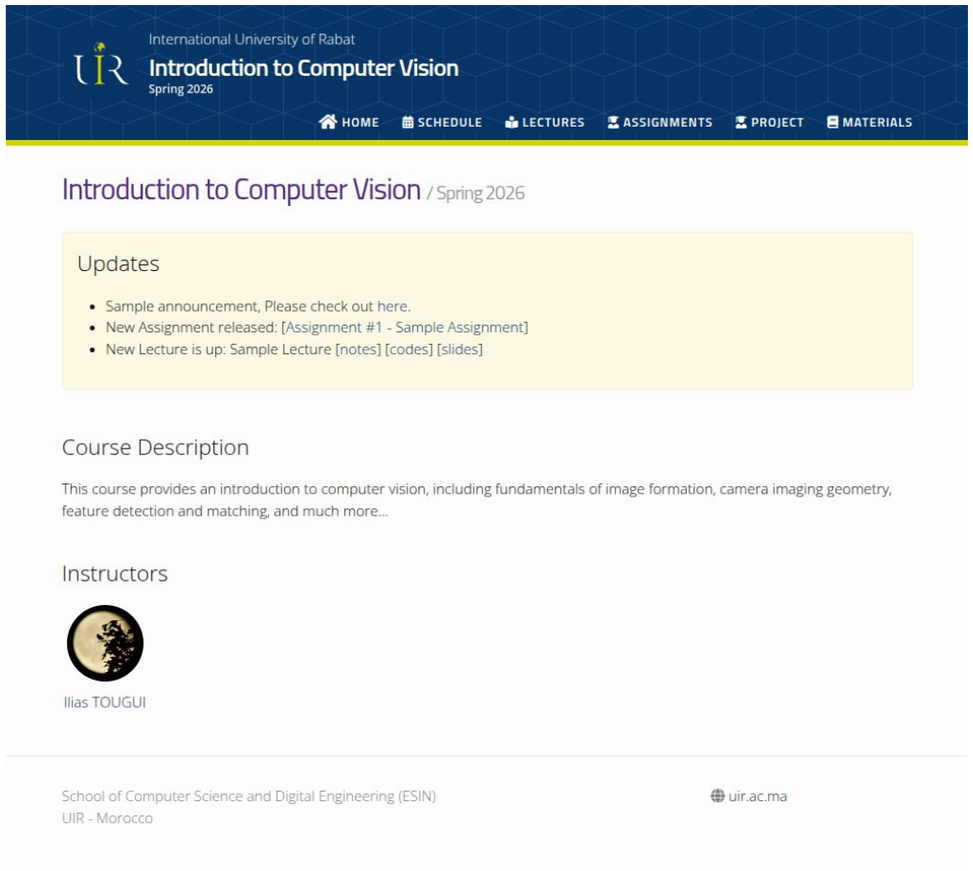


Course logistics

Course website

https://liaoux.github.io/uir-cv-2026/

- Lecture slides
- Labs
- Readings
- Final Project



Course assignments

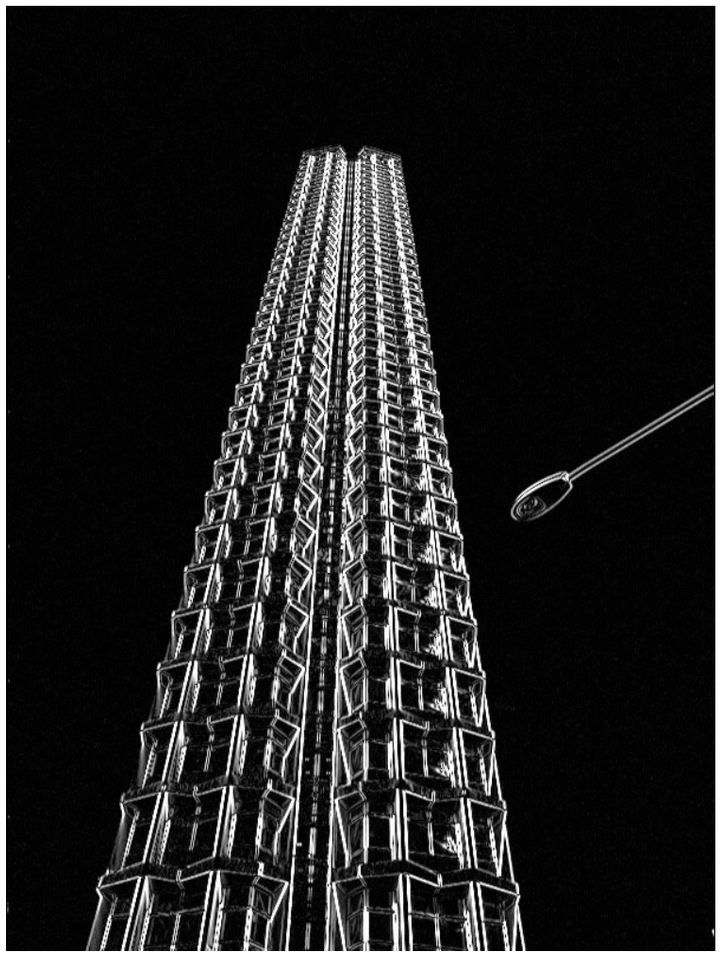
https://connect.uir.ac.ma/

- Labs / Project submissions

Topics to be covered

Image processing:

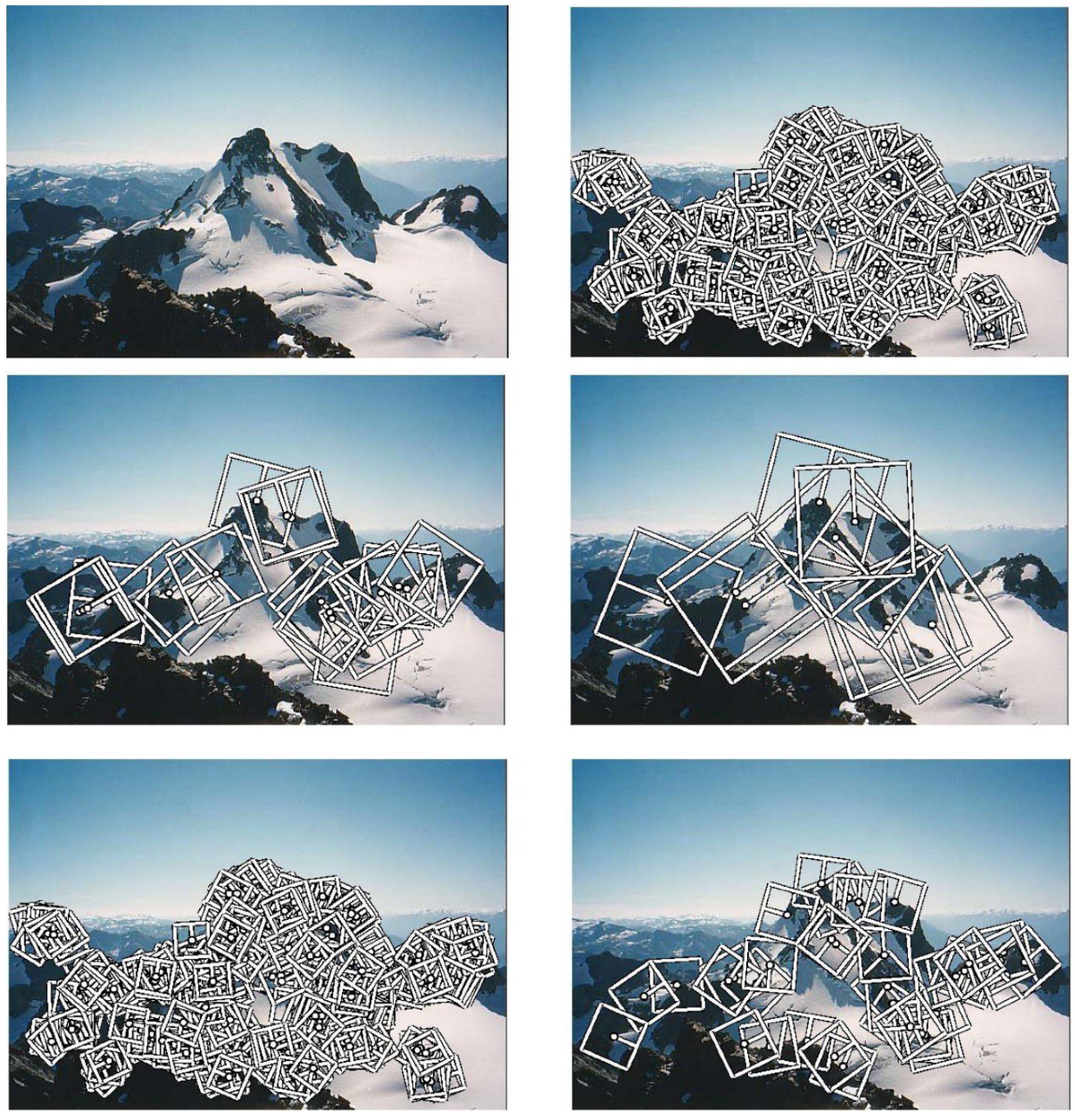
- Basics of filtering.
- Image pyramids.
- Gradients and lines.
- Hough transforms.



Topics to be covered

Feature detection and correspondences:

- Corner detection.
- SIFT et al.
- Feature descriptors.



Grading

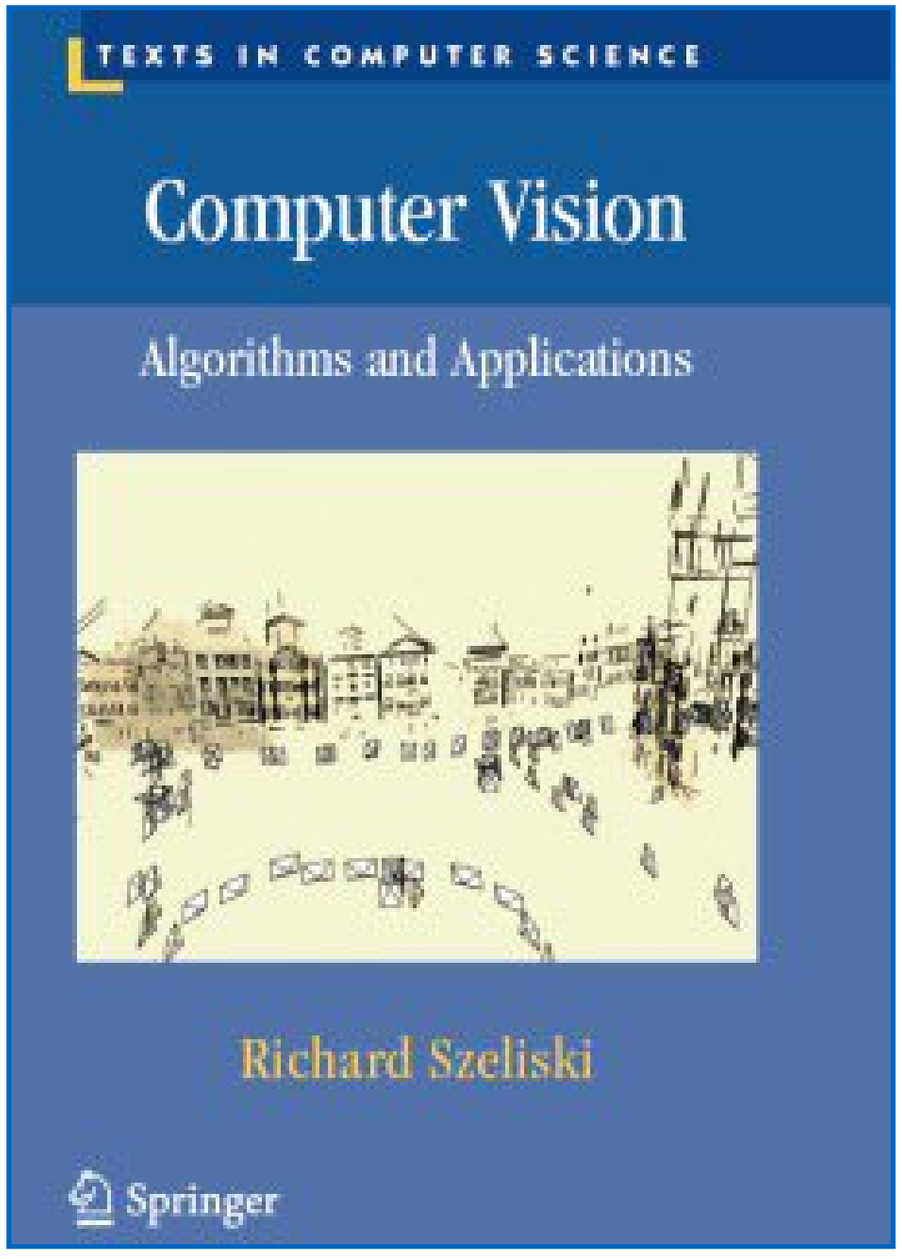
Based on:

- 5 Labs / Assignments
- 1 Final Project (mid-term)
- Final Exam

Participation:

- Be active! Ask questions.

Book



PDF online

http://szeliski.org/Book/

Prerequisites

We assume familiarity with calculus, linear algebra, basic probability, and programming.

Formal prerequisites:

- "Mathematical Foundations of Electrical Engineering" (18-202) and "Principles of Imperative Computation" (15-122)

OR

- "Matrix Algebra with Applications" (21-240) and "Matrices and Linear Transformations" (21-241) and "Calculus in Three Dimensions" (21-259) and "Principles of Imperative Computation" (15-122)

If you are missing a prerequisite but still want to enroll, let me know and we'll discuss it.

Contact information

- Feel free to email us about administrative questions.
  - please use [16385] in email title!
- Lecture questions should be asked on course website (or in lecture), and assignment/quiz/logistic questions should be asked on Piazza.
  - we won't answer technical questions through email.
  - you can post anonymously if you prefer.
- Office hours will be determined by poll.
  - feel free to email me about additional office hours.

<u>I will announce office hours at the end of this week.</u>