

A Computer Vision Sampler

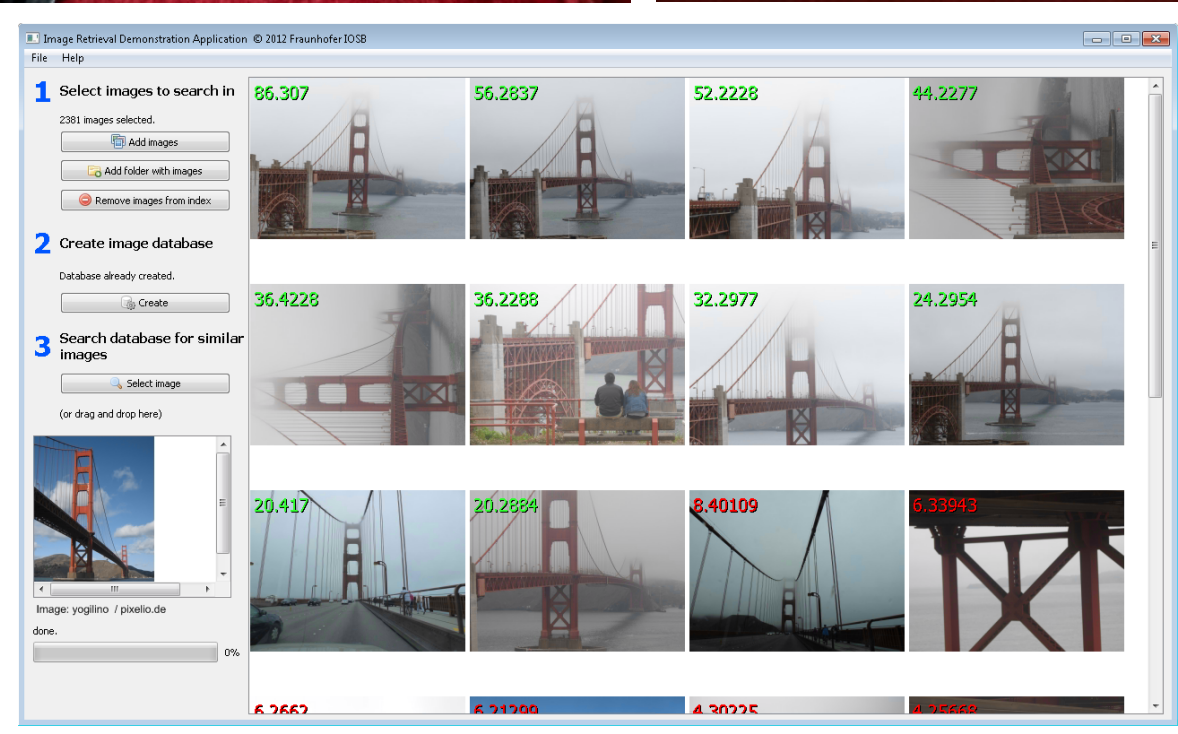
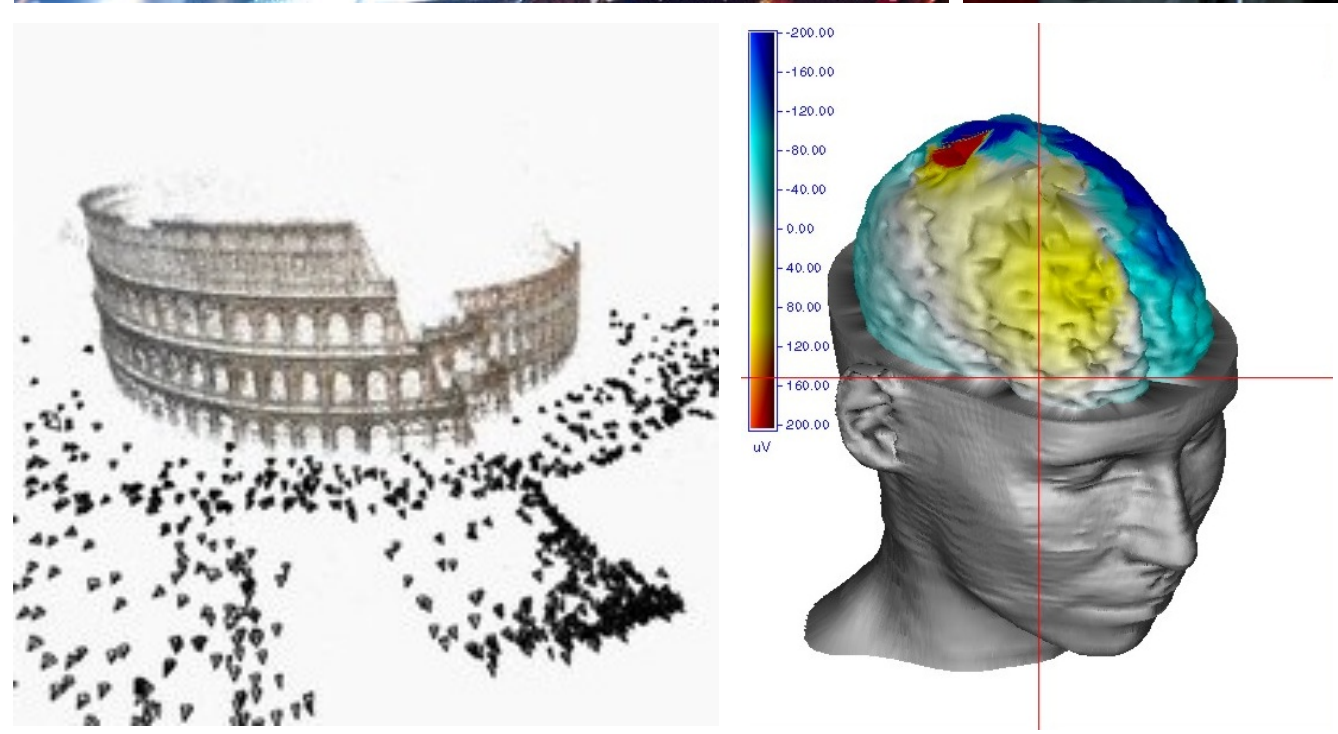
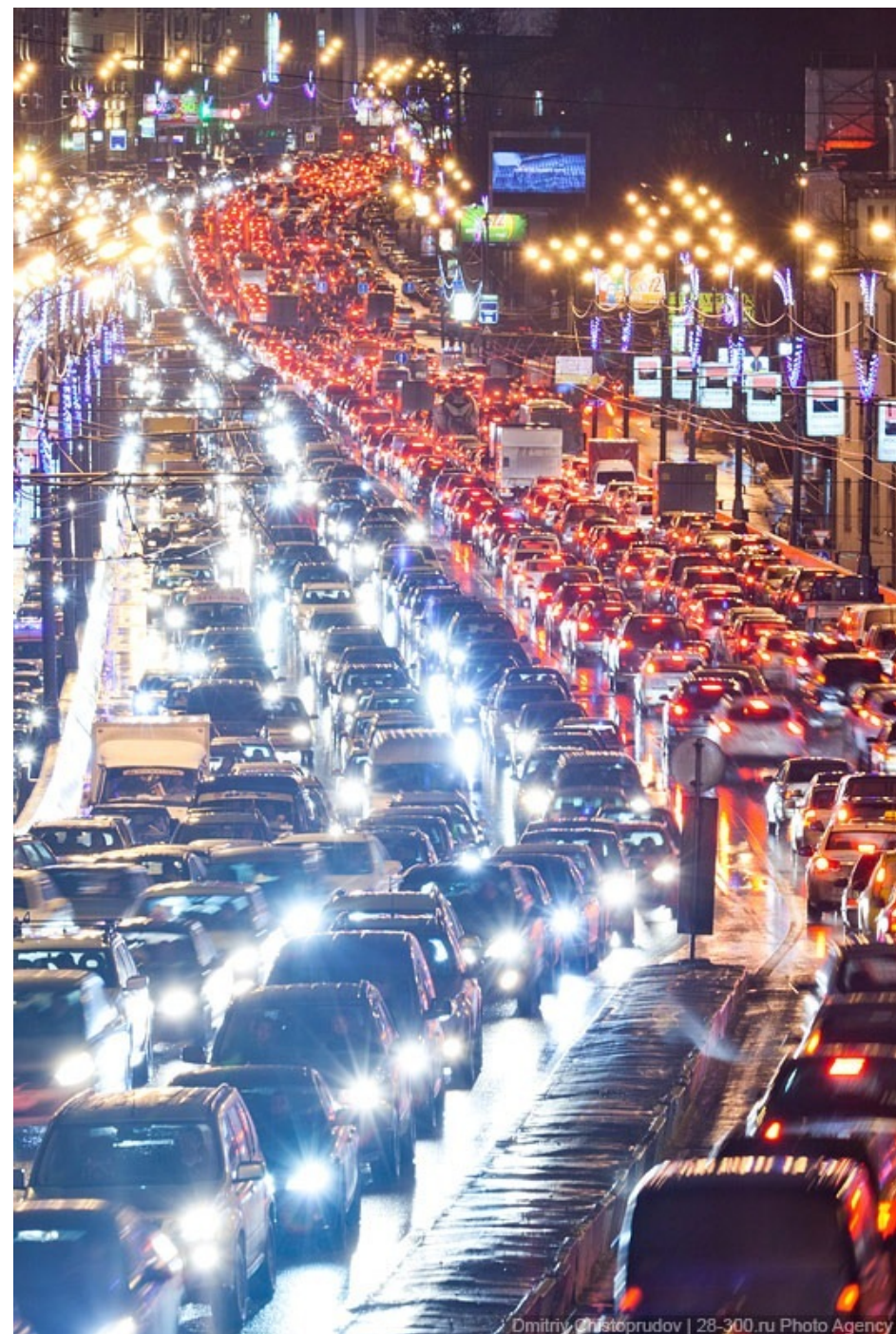
COMPSCI 527

Today:

- Introduction to computer vision
- Course logistics

A Penny for your Thoughts

- What single word best describes how you are feeling today?
- What is your main concern as you start your semester?
- Tell us all in the chat window

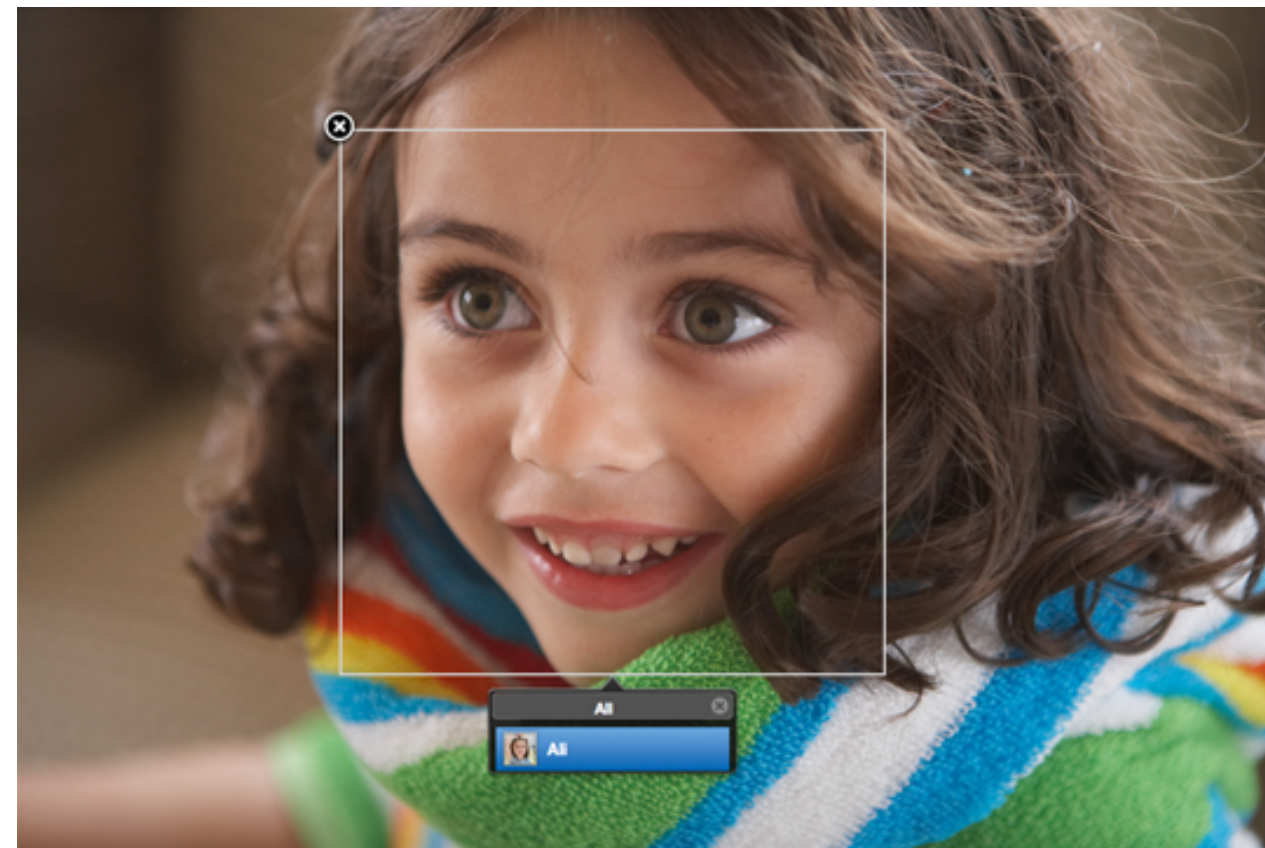
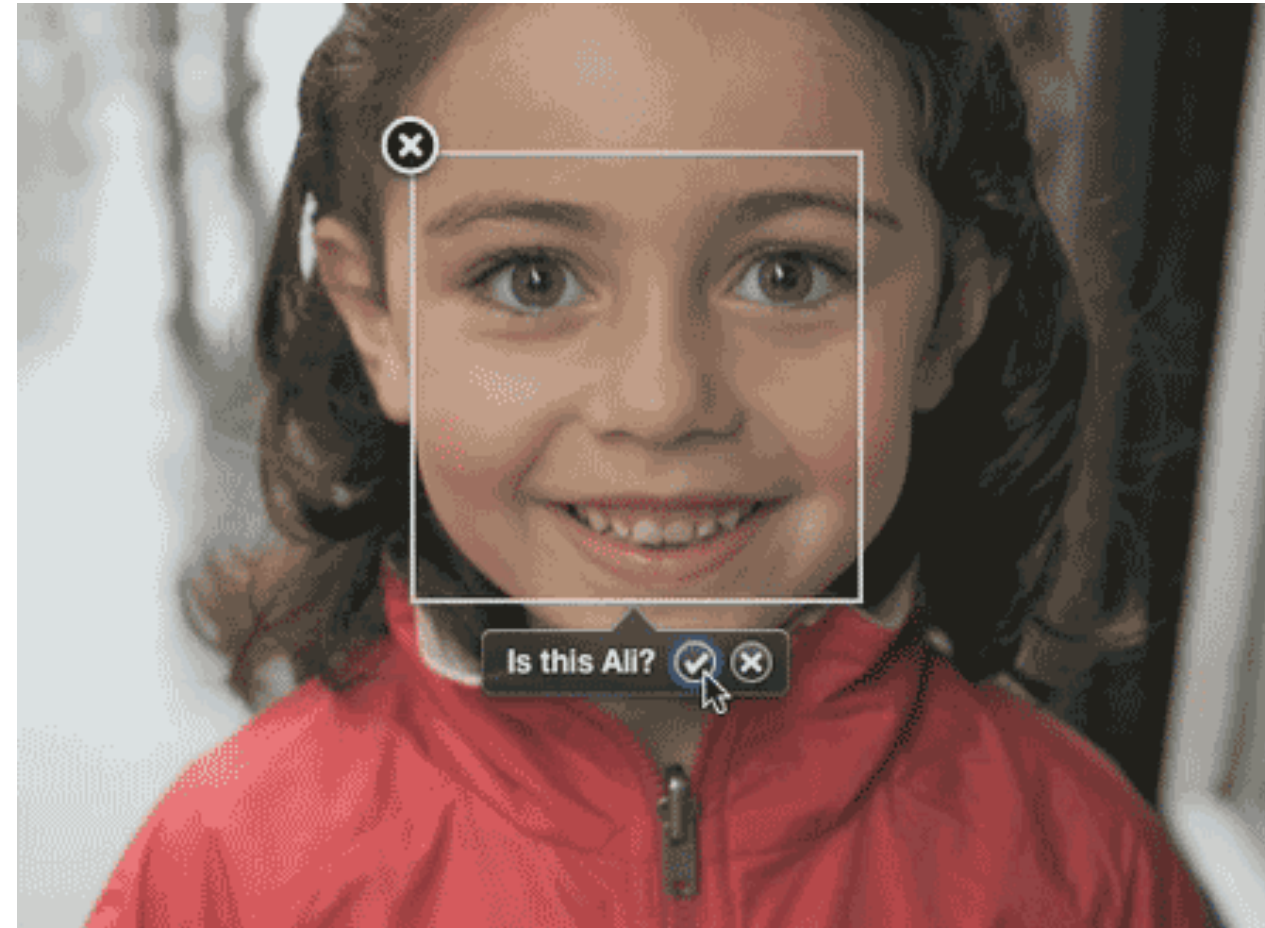


One Image, Many Questions



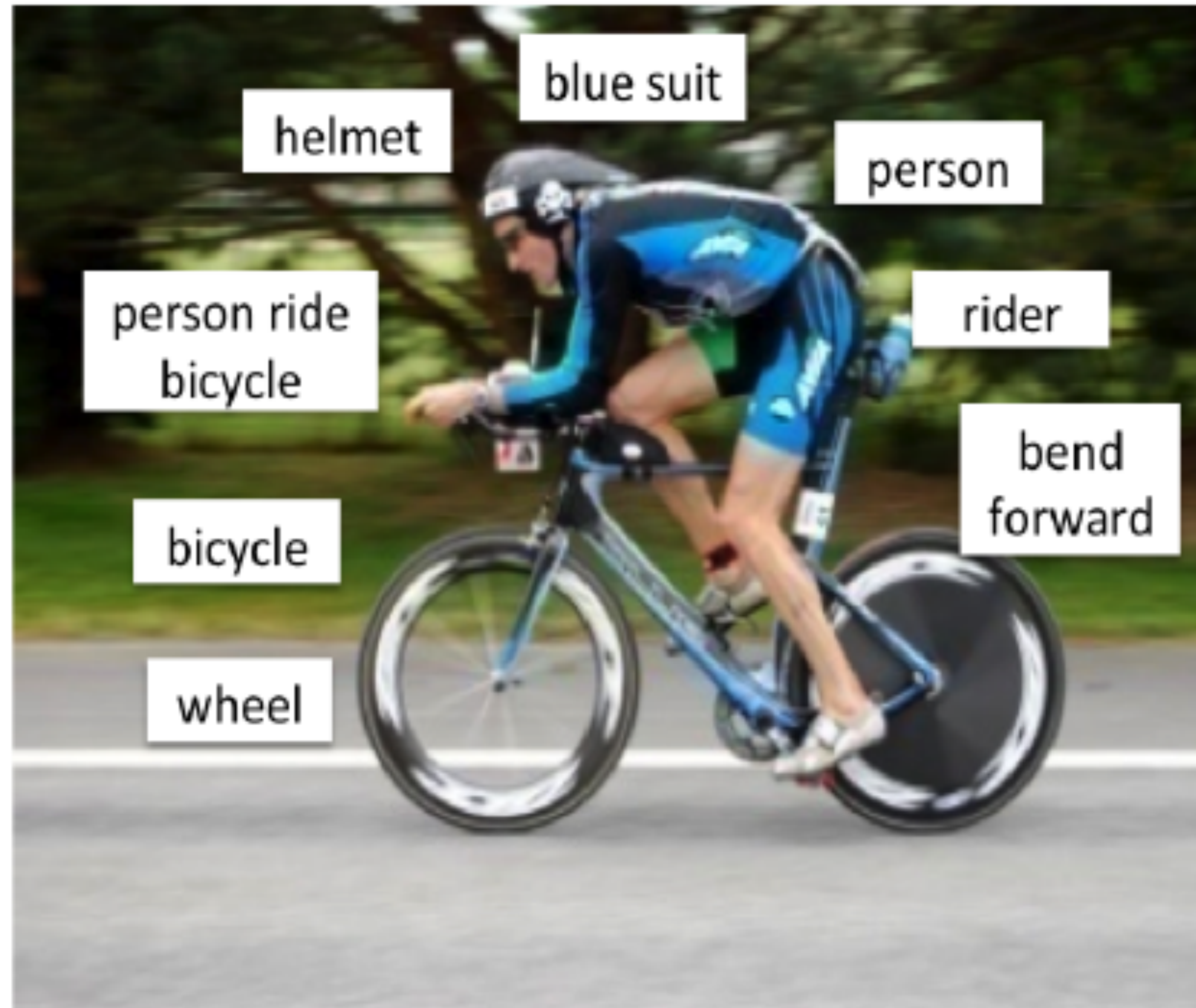
Recognition and Re-Identification

Apple Computers 2010



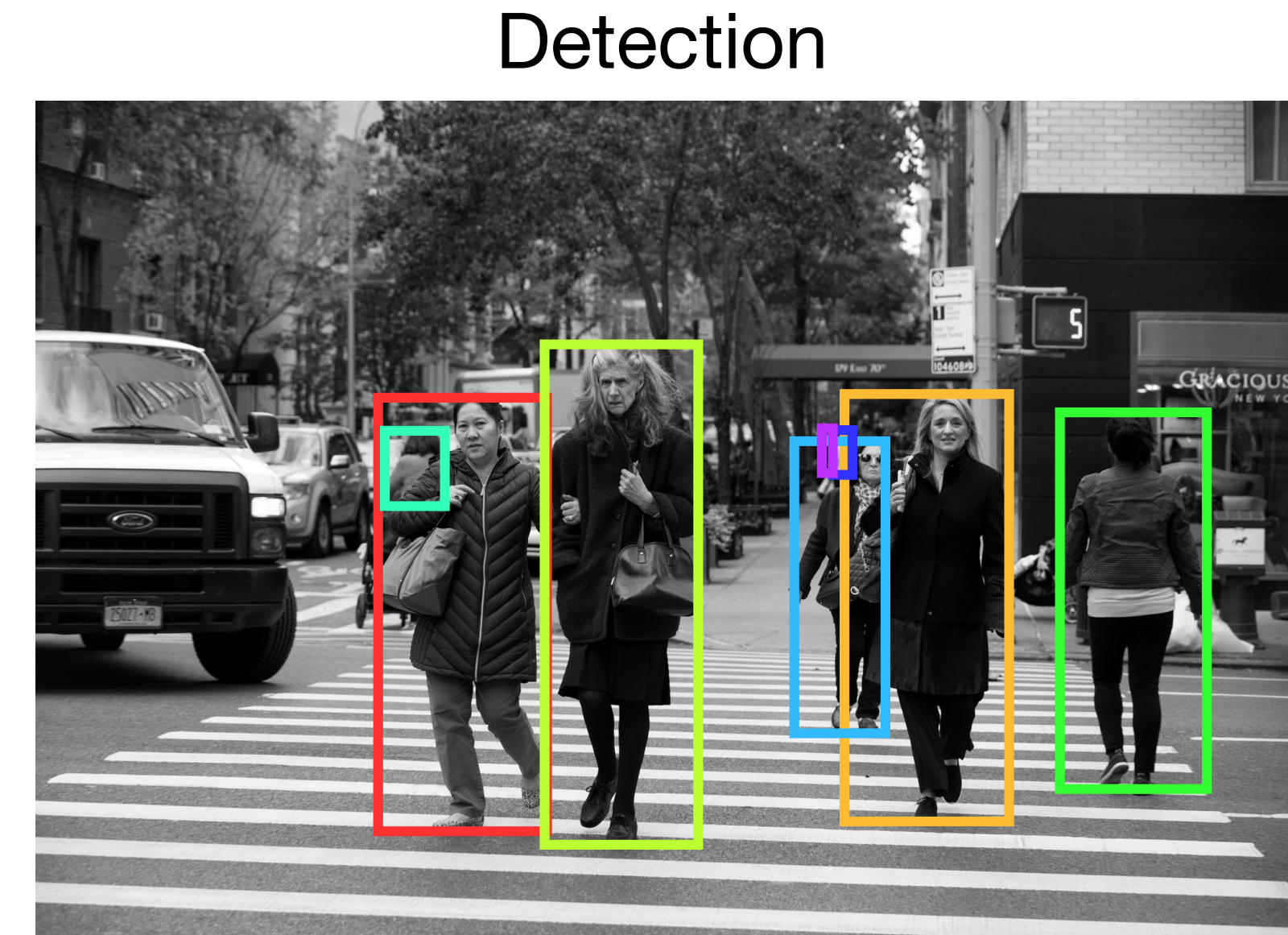
- Recognition: Who is this? What does this image depict (face, pedestrian crossing)?
- Re-Identification: Are these two people the same?
- Also recognize activities in video (“crossing” now becomes a verb)

What does “Recognition” Mean Anyway?



Detection and Segmentation

- Detection: Find instances of class x
- Class-Level Segmentation: Which pixels belong to class x ?
- Instance-Level Segmentation: Which pixels belong to each instance of class x ?



Tracking

Across two or more video frames



3D Reconstruction

From two or more images



Appearance is Tricky



Appearance is Tricky



Images are Cluttered



Logistics

Academic Integrity

- *Short version: Cheating will be prosecuted*
- Cheating: Using someone else's material or help in your work without giving credit [Lone exception: class materials need not be cited]
- Ditto for making materials available to others
- Giver/receiver are treated the same
- Format for using/making available is immaterial
- Only communication allowed during homework is with your group peers, if any, and with the teaching staff

Videos and Notes

- Prerecorded videos on the Syllabus page are compact versions of the lectures. They are *not* required
- In-person lectures will be recorded on Panopto (access from Sakai)
- ***Notes on the class Syllabus web page are required reading, and are your main source of information along with homework and sample solutions***
- ***Slides are lecture props, NOT study materials***
- ***All appendices in the notes are optional reading***
- Feel free to integrate with other sources. See *Resources* web page

Homework

- Homework 0 is on prerequisites and is due before the add/drop deadline
- 5-8 assignments
- Some math, some text, some programming
- OK to work in groups of one, two, three **from the same Section** [but no division of labor!]
- Jupyter notebooks → HTML → PDF
- Two submissions on Gradescope: PDF, Notebook
- **One pair of submissions per group, remember to list all names!**
- **No late homework accepted** (would be unfair to your peers)
- Worst homework score (including 0 for no homework) is dropped
- Second-worst homework counts half as much as each of the others

Exams and Grades

- Exams:
 - One midterm on February 24, in person
 - One final on April 30, 7-9 PM, in person, not cumulative
 - Closed book, closed notes
- Grades:
 - Homework: 49% (lowest homework score dropped, second-lowest downscaled)
 - Exams: 50% ($0.7 \max(\text{Midterm}, \text{Final}) + 0.3 \min(\text{Midterm}, \text{Final})$)
 - Class evaluation: 1%

Programming

- All programming will be in **Python 3**
- If you know how to program, picking up Python takes a few hours and Google while you program
- If you don't know how to program, this class may not be for you
- You will write **Jupyter Notebooks** for homework. They are easy to get used to, and let you intersperse text, math, figures, and code
- A first homework assignment will help you ease into these tools
- The **Anaconda** distribution for everything you need is very strongly recommended
- **Program and debug in PyCharm (see resources), not Jupyter!**
- See the *Resources* web page for tutorials on Python 3, Jupyter, Anaconda
- Specific instructions also given in homework 0

Teaching Staff

- *Graduate TAs:* Chudi Zhong, Yifei Ke, Lei Luo
- *Undergraduate TAs:* Aditya Paul, Anish Karpurapu, Annie Wang, Jonathan Lee, Michael Montelli, Wallace Peaslee
- If you like this course, please volunteer to TA next year!
- Each of us will have Zoom and in-person office hours each week (only Zoom until January 18, assuming Duke COVID guidelines do not change)
- **Check the online calendar before attending office hours**
- We'll keep listening to Ed STEM (at reasonable hours)
- **Talk to us!** We are here to help you learn