A Computer Vision Sampler

COMPSCI 527

Today:

• Introduction to computer vision

• Course logistics
One Image, Many Questions
Recognition and Re-Identification

- 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
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 assignments after homework 0
- Some math, some text, some programming
- OK to work in groups of one, two, three [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
Exams and Grades

• Exams:
  • One midterm on March 9, in person (just before spring break)
  • One final on May 5, 2-4 PM, in person, not cumulative (two hours, not three)
  • Closed book, closed notes

• Grades:
  • Homework: 50% (lowest homework score dropped)
  • Exams: 47% (0.7 max(Midterm, Final) + 0.3 min(Midterm, Final))
  • Class attendance: 2%
  • Class evaluation: 1%
Attendance

- Two points out of 100 are for attendance
- Download the app at https://arkaive.com
- Enroll with code KBB2
- Check in within 30 minutes and up to 10 minutes early
  - $\geq 20$ credits: 2 points
  - $10 \leq$ credits $\leq 19$: 1 point
  - $< 10$ credits: 0 points
- I update credits on Sakai about once a month
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: Yuqi Wang, Jonathan Donnelly
- Undergraduate TAs: Aakash Kothapally, Aining Liu, Aqib Mahfuz, Frank Willard, Louis Hu, Matthew Giglio, Nicholas Talati
- If you like this course, please volunteer to TA next year!
- Each of us will have office hours each week, either in person or on Zoom
- **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