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

• 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?

Tian Lan et al ICCV 2013
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(Midterm, Final) + 0.3 min(Midterm, 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