CSCI 497P/597P: Computer Vision

Scott Wehrwein

Lecture 0: Introduction, Logistics
Lectures will be recorded and posted privately for members of the class. Recordings will include only my shared screen, my webcam, and my audio. Audio and video of students is not part of the recording.
About Me

Scott Wehrwein
My research interests

- Research interests:
  - **Computer vision** and graphics
  - **Computational photography** and videography
  - Photo and video enhancement
  - Visualization
The short-term plan

**Today:**

1. What is computer vision?

2. Course logistics

**Friday:**

1. Course overview: What will we cover?

2. Jumping in: images, filtering and convolution
Questions?

• Yes please!

• Let's try this approach for now:
  • Ask your question in the #general text channel
What is computer vision?

- What does computer vision mean to you?

(post thoughts in #general)
What is computer vision?

• A goal-oriented field.

https://www.youtube.com/watch?v=9MeaaCwBW28
3D Shape Understanding
Object and Person Recognition

Terminator 2, 1991
Zoom and Enhance
Zoom and Enhance

Source: Nayar and Nishino, “Eyes for Relighting”
Face Detection
Face Recognition, Biometrics

“How the Afghan Girl was Identified by Her Iris Patterns”
Graphics, Movies, Games
Sports; Augmented Reality

Sportvision first down line
Nice explanation on www.howstuffworks.com

Tracking
Scene understanding
Medical imaging

MRI, CT Reconstruction

Skin cancer classification with deep learning: https://cs.stanford.edu/people/esteva/nature
Robotics

Mars Curiosity Rover

Amazon Picking Challenge
Smart and Self-Driving Cars

Mobileye
Tesla Autopilot
Safety features in many newer cars

Waymo
Uber
...
And so on...

• You just saw some examples of recent systems, many new in the past few years.

• Computer vision is a highly active research area
  • Deep learning has revolutionized the field in the past decade

• Lots of work going on in industry, both at Big Tech and startups.
Computer Vision

Attendees at CVPR, the flagship US-based computer vision research conference:
My work: Video Segmentation
My work: Illumination Estimation

Sunlit
Shadowed
My work: Illumination Estimation
towards
sun direction

Attached Shadow

away from
sun direction

orthogonal to
sun direction

Surface normals
My work: Timelapse Visualization
Some current work...
Some current work...
Questions?
What to expect from this course

• We will not (cannot) cover everything you just saw.

• There will be more **math** than the shiny pictures let on. We will use lots of Linear algebra and some calculus.

  • I'll try to give reminders/primers as we go.

  • I don't always know what you don't know - please **tell me** if I'm using stuff you haven't seen.

• More on the specifics of what we'll cover next time.
Course Logistics

• Course website is the syllabus:
  https://facultyweb.cs.wwu.edu/~wehrwes/courses/csci497p_20f/

• Remote logistics:
  • Lecture: Discord (you are here!)
  • Recordings of my screen, webcam, and voice will be available
  • In-class exercises: break out into "Group *" channels
  • Office hours: Zoom meeting with waiting room (may change - stay tuned)
Course Logistics

• Course website is the syllabus:
  https://facultyweb.cs.wwu.edu/~wehrwes/courses/csci497p_20f/

• Assessment:
  • Programming projects (45%)
  • Written homeworks (20%)
  • Take-home midterm (15%)
  • Take-home final (20%)
Policies

• Late work: 3 free slip days; after that, get in touch ahead of time and I'm usually flexible.

• I want your feedback - email, office hours, or via anonymous Google Form linked from the syllabus.

• Inclusive classroom
Questions?
Breakout Groups

Find your group number...

- In-class breakout group 0
  - 4 students
  - Sean Barret
  - Andrew Dunn
  - Quinn Pedersen-W...

- In-class breakout group 1
  - 4 students
  - Benjamin Bruland
  - Kieran Devany
  - Nicholas Mitchell
  - Jack Stratton

- In-class breakout group 2
  - 4 students
  - F. Payton Guthrie
  - Alec Jackson
  - Aaron Jumpa
  - Daniel Shtunyuk

- In-class breakout group 3
  - 4 students
  - Austin Morin
  - David Nghiem
  - Christopher Rempe
  - Alistair Turcan

- In-class breakout group 4
  - 4 students
  - Ian Cullum (He, him...)
  - Josh Kovac
  - Trevor Ortega
  - Roberto Palma

- In-class breakout group 5
  - 4 students
  - Tom Clewes
  - Angie Luty
  - Andy Nguyen
  - Douglas Woods

- In-class breakout group 6
  - 4 students
  - Cameron Comnenos
  - Walker Herring
  - Evan Smith
  - Anna Zivkovic

- In-class breakout group 7
  - 4 students
  - Raleigh Hansen (Sh...
  - Carter Schmidt
  - John Swanberg
  - Raiden Van Bronkh...
Norms

In your groups, please discuss the following:

• What norms would you like to establish for this course?
  
  • Things to ponder:
    
    • Discord etiquette (in and out of class)
    
    • Tone and climate
    
    • Expectations for Scott
  
• Also consider: how should the discord server be set up? Do we need a #memes channel? What else?

• Post your responses in #norms. I'll distill the results into a list, and we can have ongoing discussion / modifications in the #norms channel as needed.