CS 2770: Computer Vision

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Who am I?

B.S. Computer Science at **National University of Trujillo**
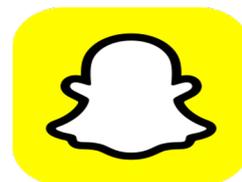

M.S. in Computer Science at **University of São Paulo** in **AI**

Who am I?

PhD in Computer Science at **University of Pittsburgh** in **Computer Vision**

Research scientist at Snap Inc.

Who am I?

**Assistant professor** at **Weber State University**

Teaching Assistant Professor at **University of Pittsburgh**

[Students' presentations]
Name, hobbies, and mention one thing that you expect to learn in this course ☺

Course intro: Syllabus

- Contact Information
  - Prof. Nils Murrugarra
  - nem177@pitt.edu
  - Please, add prefix "[CS 2770]" in all emails.
  - Website: https://nineil.github.io/courses/spring25_cs2770/

- Lectures:
  - Mon/Wed: 9:30am - 10:45am @ IS 405

- Office hours:
  - Mon: 11:00 am - 1:00 pm @ SENSQ 5419
  - Tue: 9:00 am - 11:00 am @ SENSQ 5419
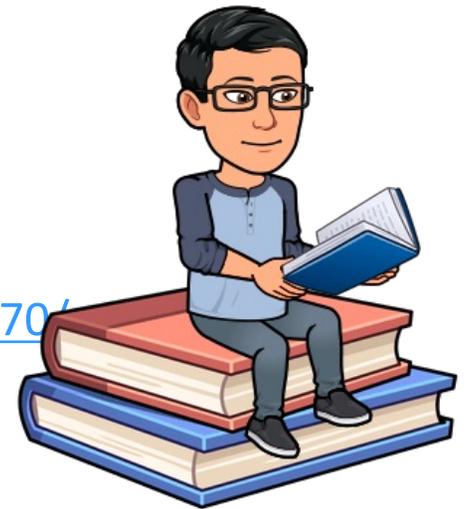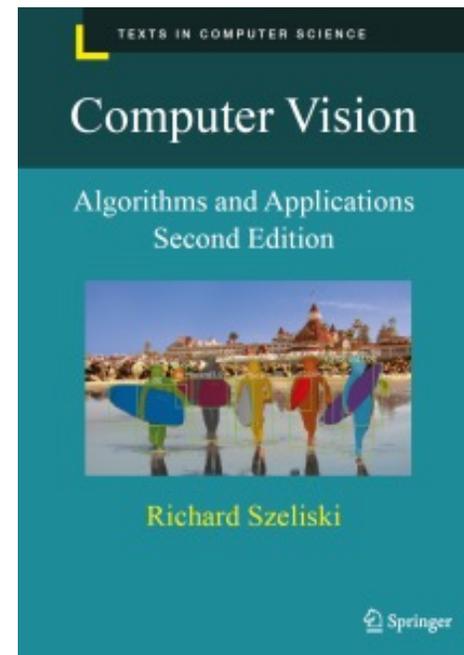
Course intro: Textbook

Computer Vision algorithms and applications
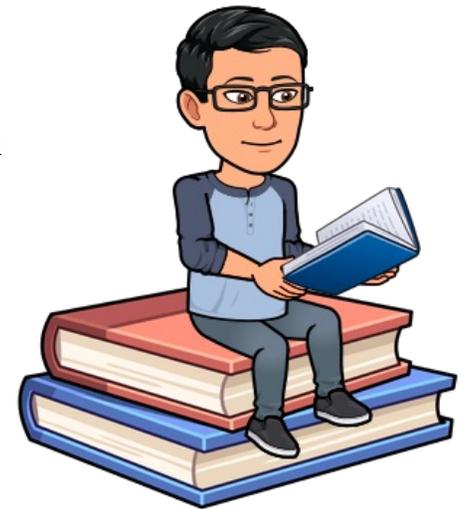
Edition: 2nd

By Richard Szeliski

ISBN: 978-3030343712

Year: 2022

Course intro: What to expect?

- Material is based on previous iterations of Computer Vision course from Prof. Adriana Kovashka, and current courses from recognized US universities.

- Exams mainly cover this material

- We will do around 4 to 6 programming assignments

Course intro: What to expect?

- There will be a lot of work!

- However, you will learn a lot :). Please, ask questions in class and use my office hours as needed.

- I would like to help you much as possible.

Course intro: What to expect? [Warning #1]

- I've opted for shorter, more manageable HW assignments, but there is a lot of them

- I expect you'd be spending **4-6 hours** on each assignment

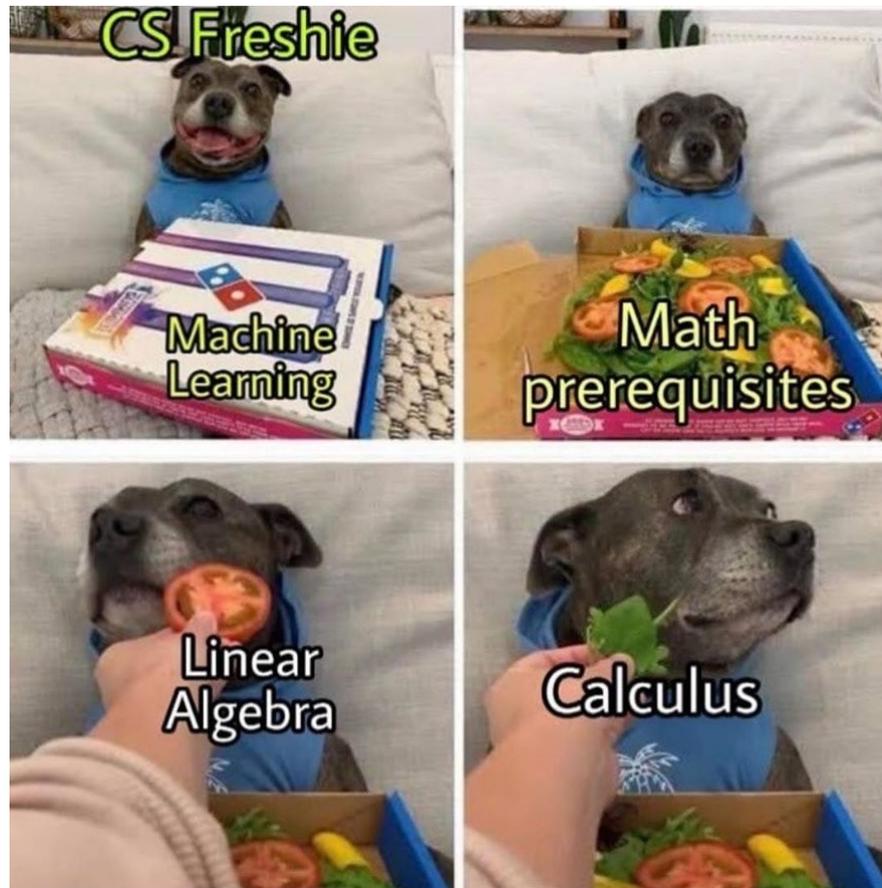- … But you get to understand algorithms and concepts in detail!

Course intro: What to expect? [Warning #2]

- Some parts will be **hard** and require that you pay close attention!

- **Use instructor's office hours**

- … You will learn a lot!

Course intro: What to expect?

H/T Kirk Pruhs

Course intro: programming assignments

- We will learn Python programming language.

- Exam and projects cannot be made up unless arrangements are made to take/submit them ahead of time. Late assignments will be accepted with a 10% penalty per day up to 3 days to provide for unforeseen circumstances.

Review Syllabus

Canvas Link:

https://canvas.pitt.edu/courses/288692/files/19184466?module_item_id=5376125

Motivation: Faces and digital cameras

Camera waits for
everyone to smile to take
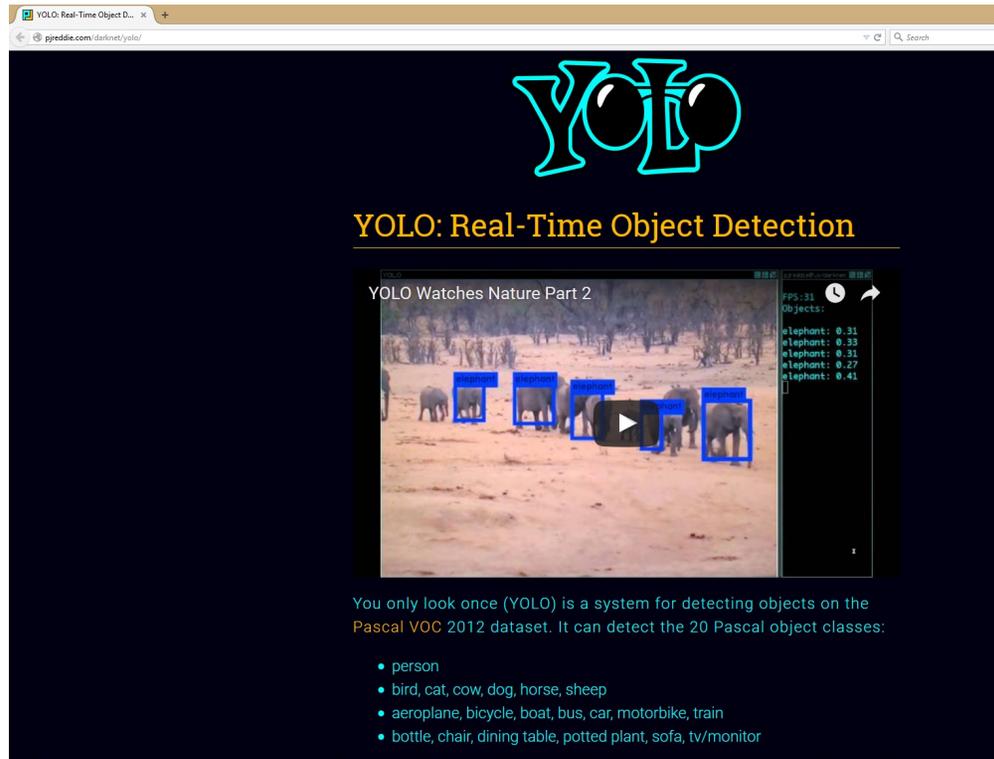a photo [Canon]

Setting camera focus via
face detection

Kristen Grauman

Motivation: Face recognition

Motivation: Optical Character Recognition
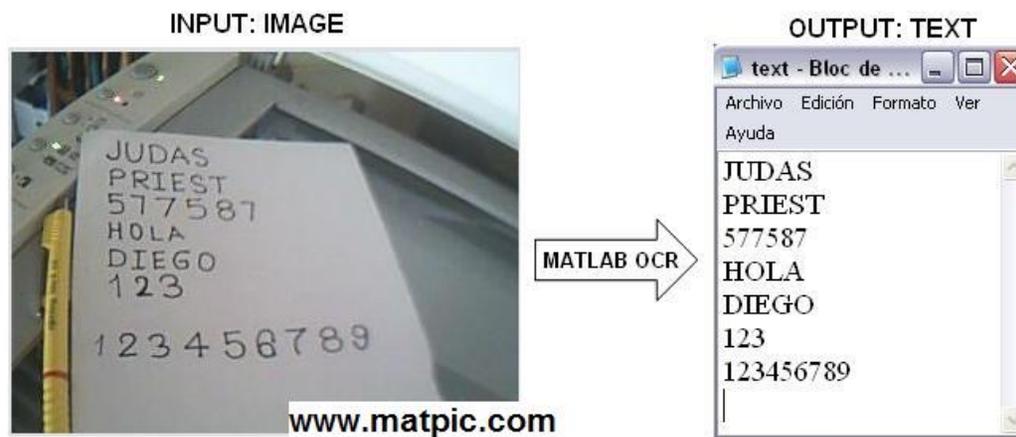
Motivation: Accurate object detection

Redmon et al., "You Only Look Once: Unified, Real-Time Object Detection", CVPR 2016

Motivation: Exploring photo collections

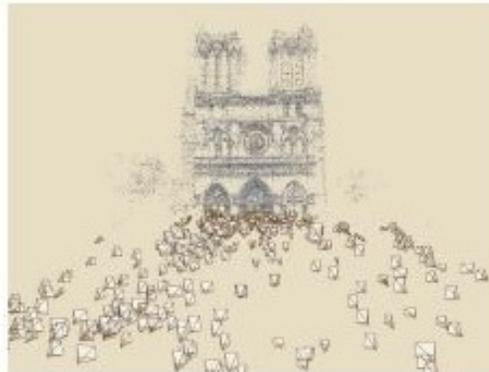Snavely et al.

Kristen Grauman

Motivation: Linking info with a mobile device
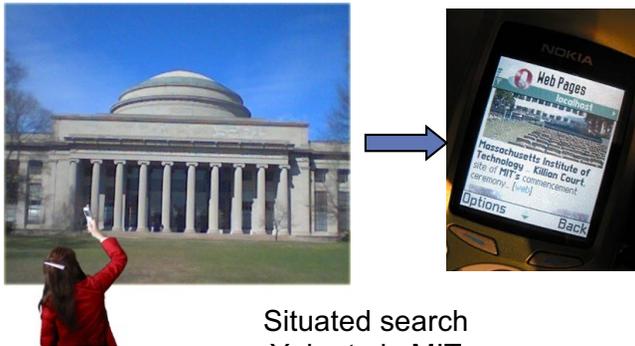
Situated search
Yeh et al., MIT

click

kooaba

MSR Lincoln

Kristen Grauman

Motivation: Transferring art styles

Gatys et al., CVPR 2016
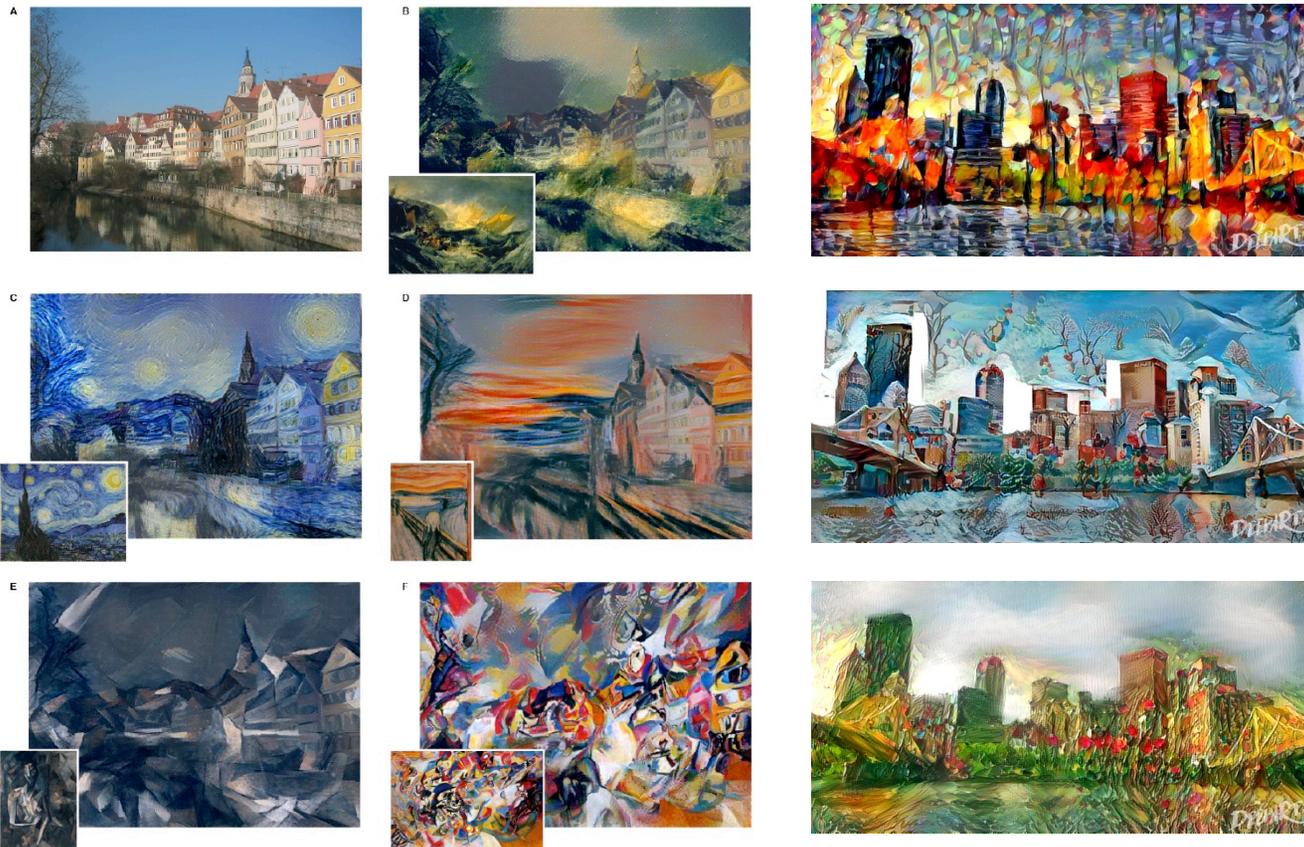
DeepArt.io – try it for yourself!

Motivation: Image Generation (faces)

| Input | Blond hair | Gender | Aged | Pale skin | Input | Angry | Happy | Fearful |

Choi et al., CVPR 2018
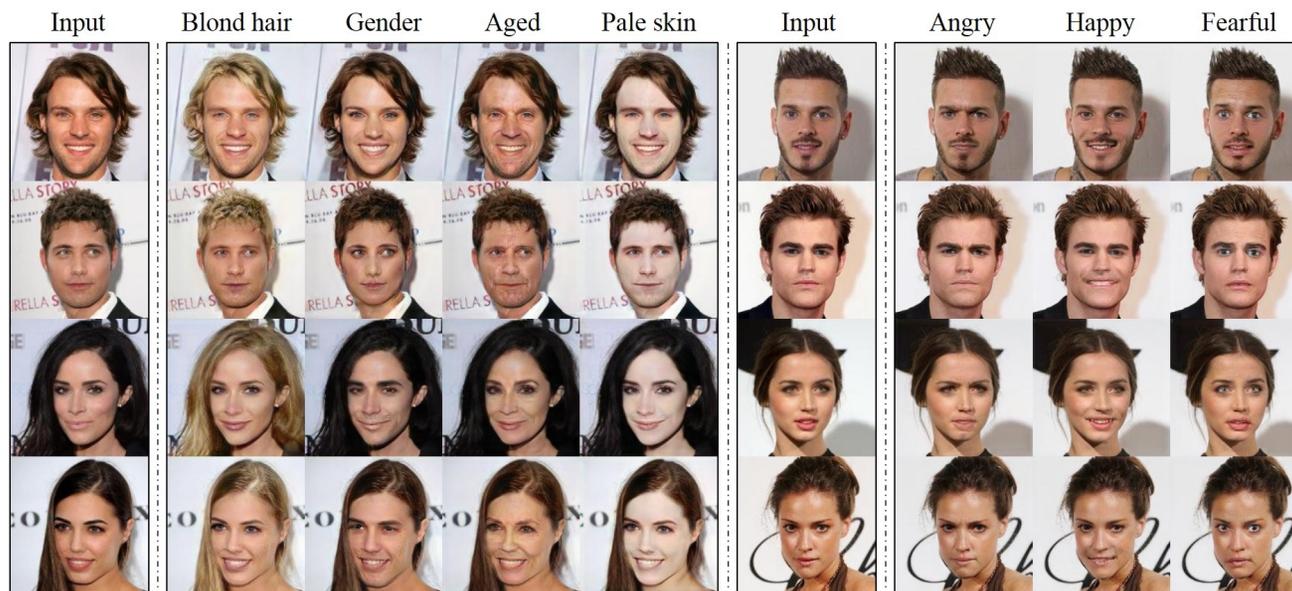
Motivation: Interactive Systems

KINECT for XBOX 360

Shotton et al.

Yong Jae Lee

Motivation: Video-based interfaces

YouTube Link

Human joystick
NewsBreaker Live

Assistive technology systems
Camera Mouse
Boston College

Kristen Grauman

Motivation: Computer Vision for Medicine

fMRI data
Golland et al.

Image guided surgery
MIT AI Vision Group

Kristen Grauman
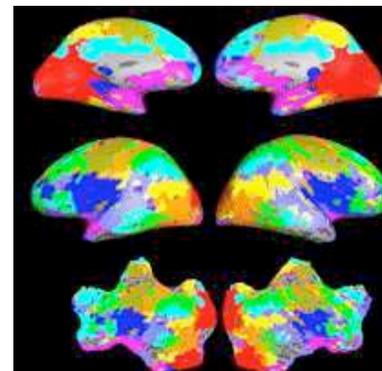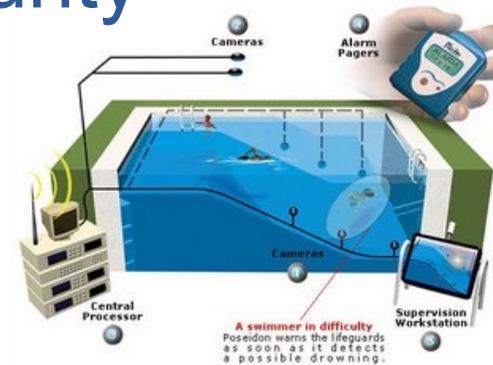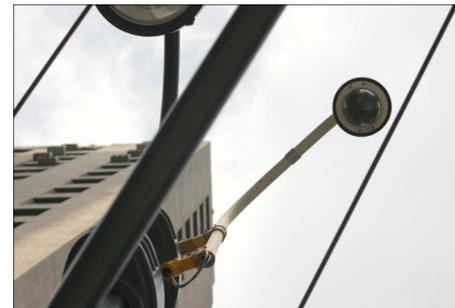
Motivation: Safety and security
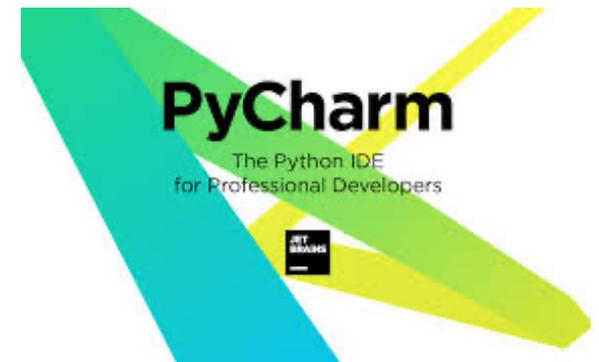

Navigation, driver
safety

Monitoring pool
(Poseidon)

Pedestrian detection
MERL, Viola et al.

Surveillance

Kristen Grauman

Setup Environment

- Create Github Account
- Install Github Desktop
- You may use any IDE for Python
  - I use Pycharm: https://www.jetbrains.com/pycharm/
  - Apply for your educational free license: https://www.jetbrains.com/community/education/#students

Setup Learning Environment

Installation and learning environment:
https://github.com/nineil-pitt/cs2770_spring25