

CSE 152: Computer Vision

Hao Su

Lecture 0: Introduction



Credit: Manmohan Chandraker

Defining computer vision



Wall-E: Fact and Fiction (Minh Do, Princeton University)

Studying computer vision

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
PROJECT MAC

Artificial Intelligence Group
Vision Memo. No. 100.

July 7, 1966

THE SUMMER VISION PROJECT

Seymour Papert

The summer vision project is an attempt to use our summer workers effectively in the construction of a significant part of a visual system. The particular task was chosen partly because it can be segmented into sub-problems which will allow individuals to work independently and yet participate in the construction of a system complex enough to be a real landmark in the development of "pattern recognition".

Studying computer vision

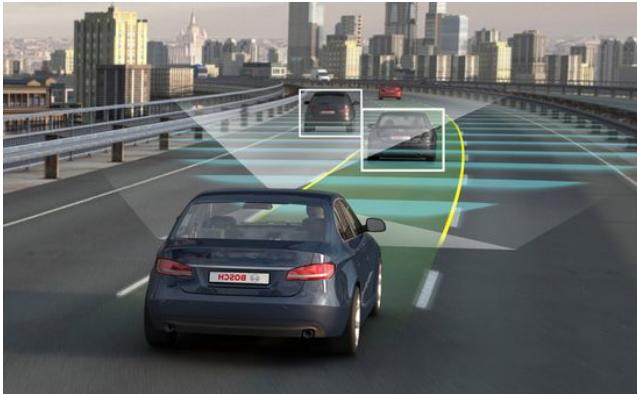
- Images are everywhere around us



Source: Domo

Studying computer vision

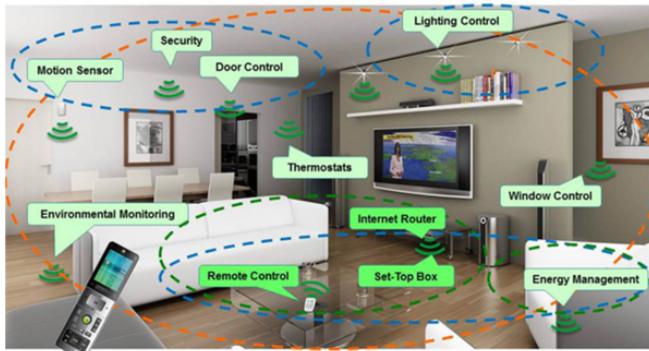
- Images are everywhere around us
- Rapidly emerging technologies



Autonomous driving



Gaming



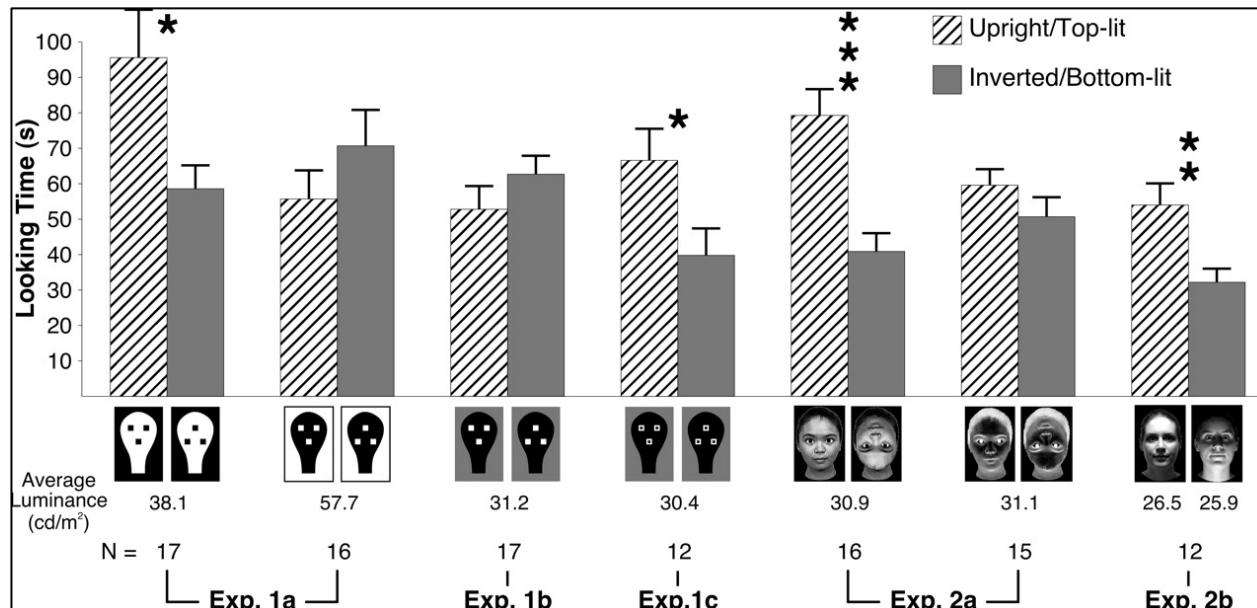
Smart homes



Factory automation

Studying computer vision

- Images are everywhere around us
- Rapidly emerging technologies
- Deep and attractive scientific problems
 - How do we recognize objects?
 - Why do newborn babies respond to face-like shapes?
 - Beautiful marriage of math, physics, biology, CS, engineering



[Farroni et al., 2005]

Organizing Computer Vision

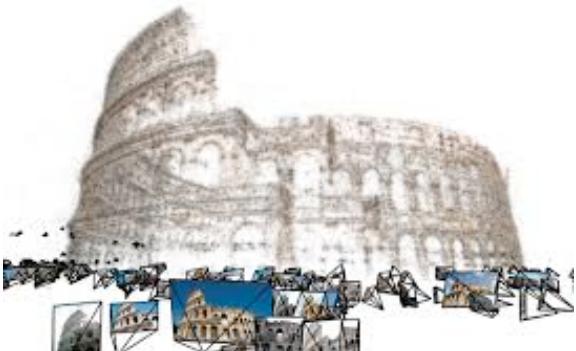
Broad classes of vision applications

Sense

Understand

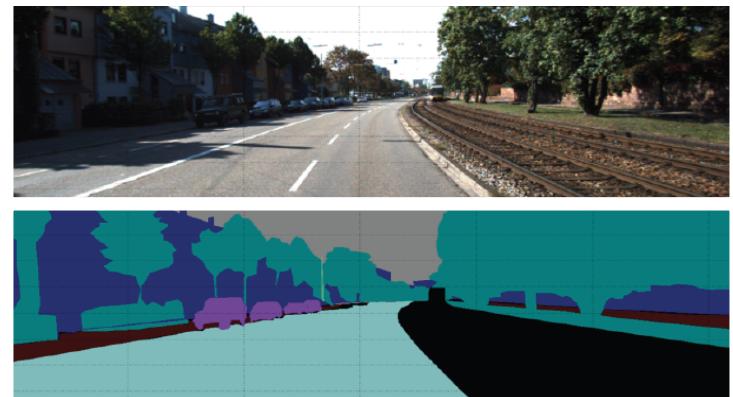
Interface

Reconstruct



Recognize

Reorganize



Broad classes of vision applications

Sense

Understand

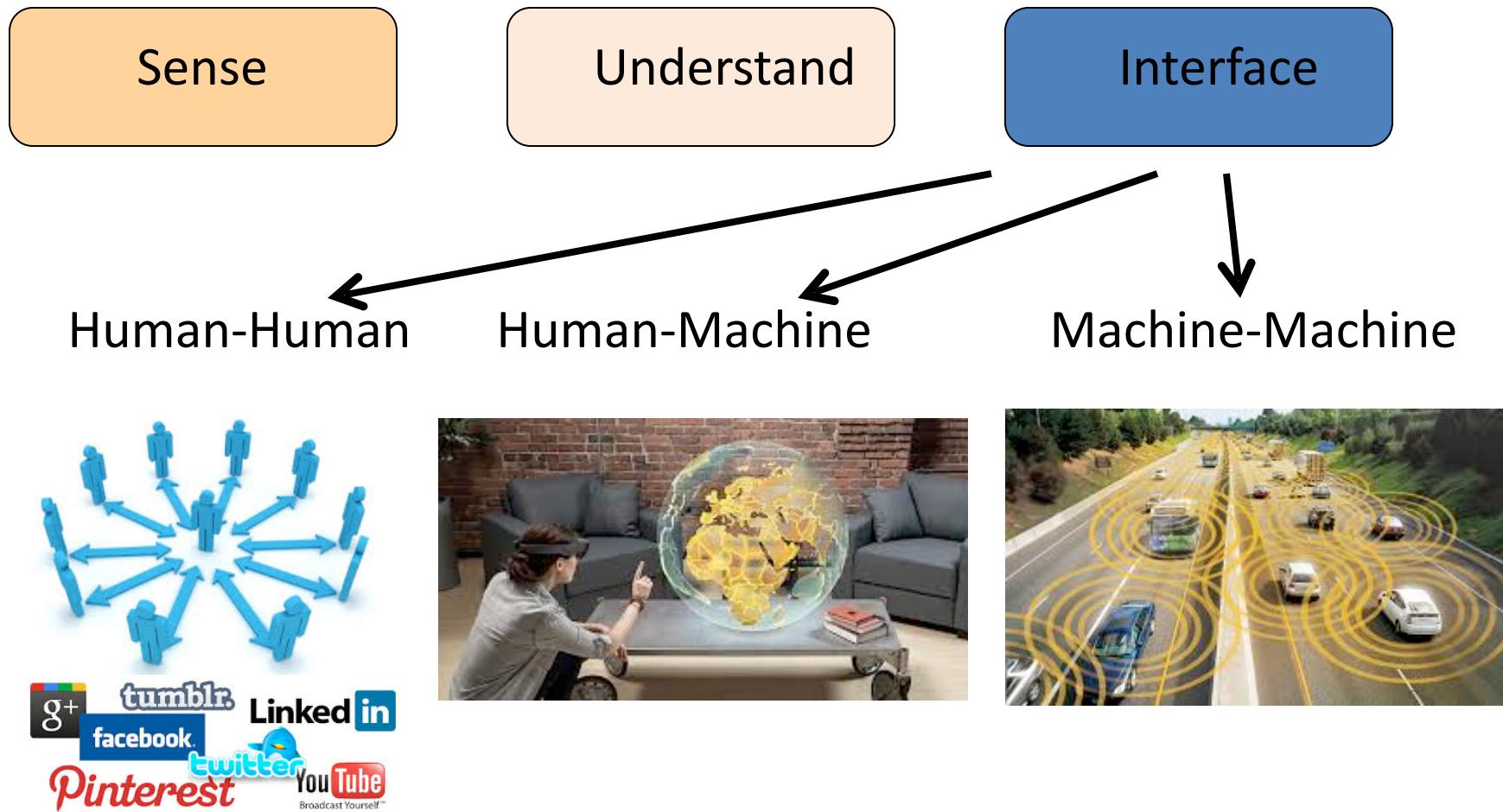
Interface

Scenes

People



Broad classes of vision applications



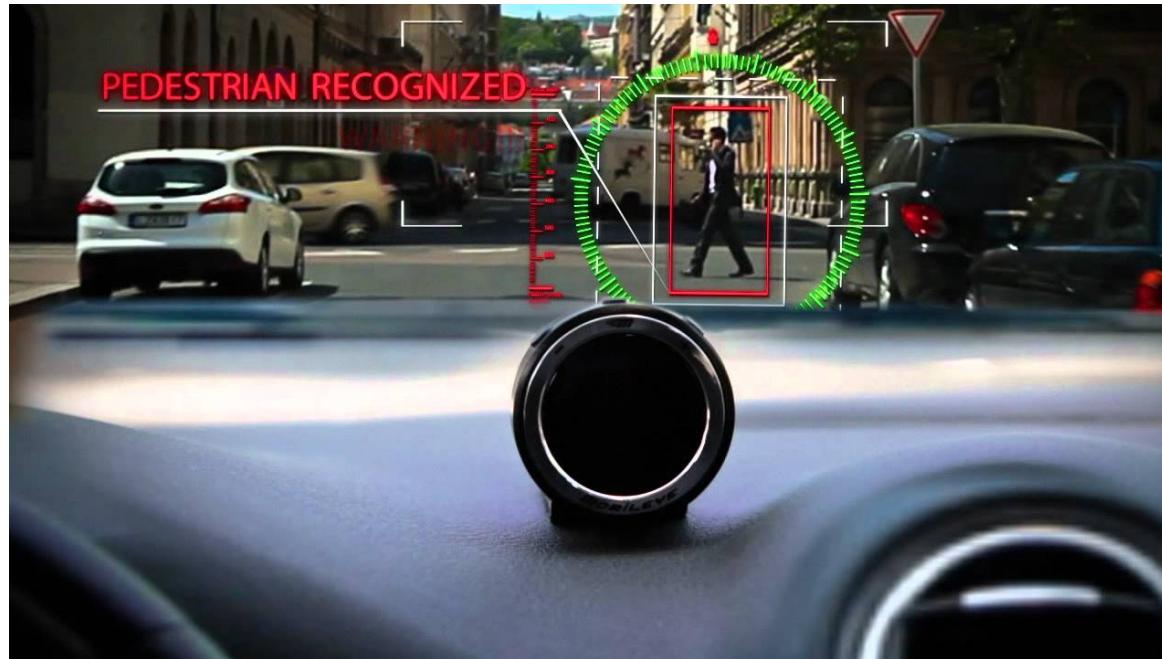
Significant progress in recent years

Sense

Understand

Interface

Advanced Driver Assistance Systems



A Few Topics That We Will Study

- Cameras and image formation
- Feature detection and matching
- Structure from Motion
- Multiview stereo
- Optical flow
- Image classification
- Object recognition
- Object detection
- Semantic segmentation
- Support Vector Machines
- Deep Neural Networks

Take-home message

- Computer vision is a key branch of AI
- Enables several modern applications around us
- A lot of highly visible and high-impact activity
- Huge industry interest
- This is a great time to study computer vision!

Course Details

Course details

- Homework assignments
 - Easy problems based directly on class discussions
 - Harder problems may require additional reading
 - Programming in Python might be required
 - Submit PDF to Gradescope before deadline
- Mid-term
- Final exam
- Participation
 - Ask questions, answer questions, engage in discussions

Course details

- Class webpage:
 - <https://ucsd-cse-152.github.io/>
- Instructor email:
 - haosu@eng.ucsd.edu
- Grading
 - 40% final exam
 - 40% homework assignments (4)
 - 20% mid-term
- Aim is to learn together, discuss and have fun!

Course details

- TAs:



Zhiwei Jia



Rishikanth
Chandrasekaran



Stephen Guerin



Zhenyu Bi

- TA office hours (class webpage)
- Piazza for questions and discussions (class webpage)

Test of Background