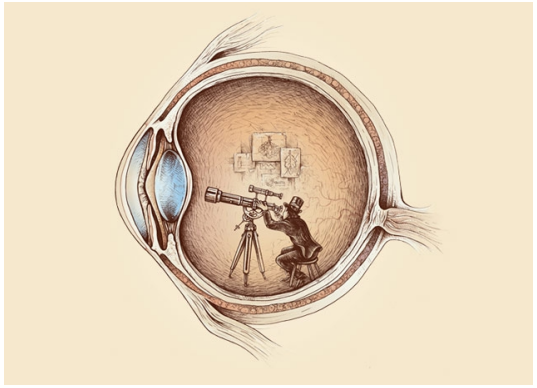


# Introduction to Computer Vision

CSE 327 Spring 2012

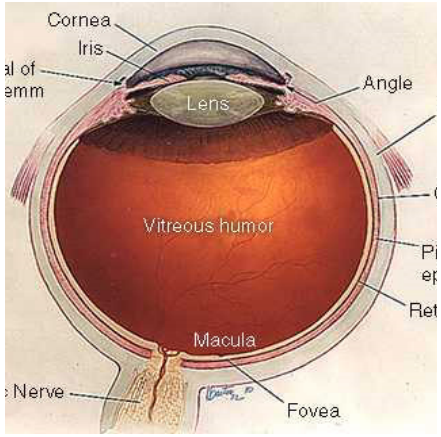
Prof. Alex Berg

# Why Vision?

# Why Vision? Light!

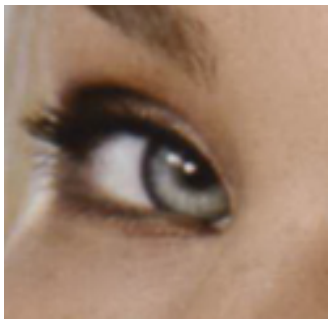
# Why Vision? Light!

It is how we see other people, navigate our environment, communicate ideas, entertain, and **measure** the world around us.

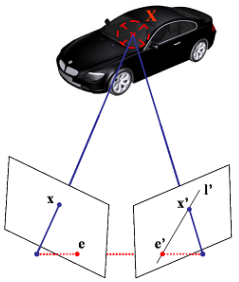


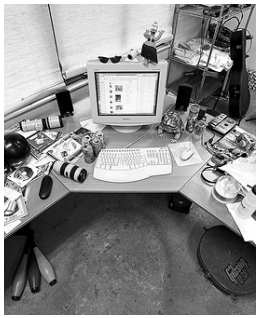

# Why is light good for measurement?

Microscopy



Surveillance





3D Analysis / Navigation

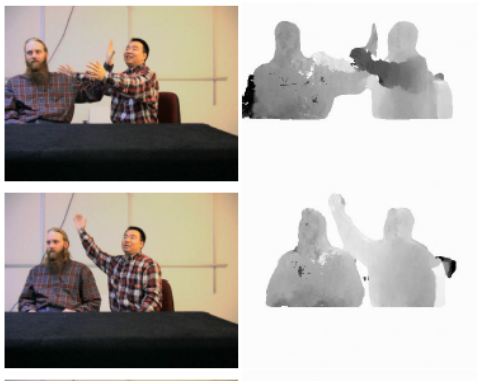
Remote Sensing

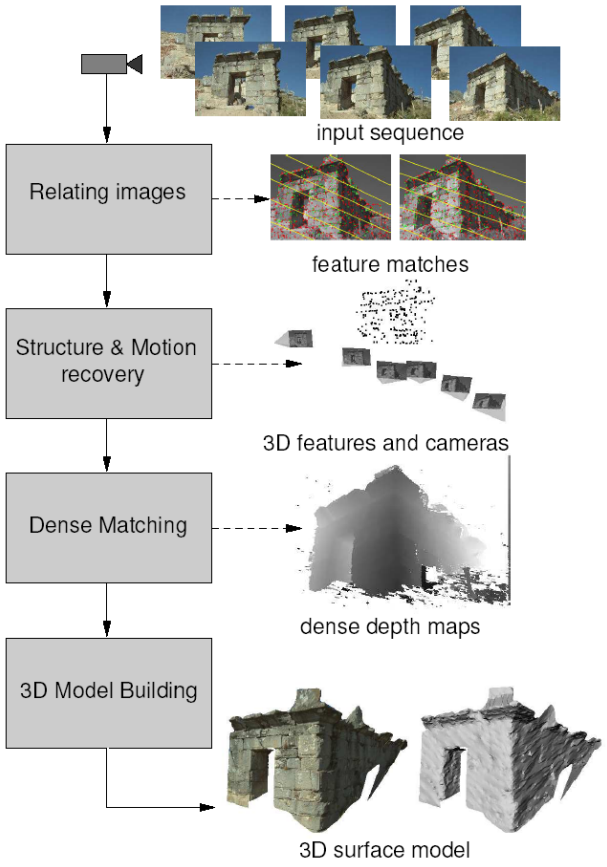
- Plentiful, sometimes free
- Interacts with many things, but not too many
- Goes generally straight over distance
- Very small → high spatial resolution
- Fast, but not too fast → time of flight sens
- Easy to detect → cameras work, are chea
- Comes in flavors ( wavelengths )

# What is computer vision?

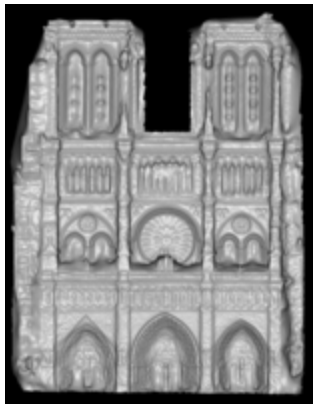
Computer vision is the study of extracting information from visual data.

# Vision as measurement device









Slide Credit: Svetlana Lazebnik

# Vision as a source of semantic informatio


slide credit: Fei-Fei, Fergus & Torralba

# Object categorization

# Scene and context categorization

# Qualitative spatial information


slide credit: Fei-Fei, Fergus & Torralba

# Kinect

video 1

video 2

video 3

video 4

In action…

# Human Vision

Really quite good!

# Human Vision

# A quick experiment


3ashq Al5ail


Zashq Alsail


10638

# Human Vision

Web Demos

# Human Vision

- Amazingly good, fast, accurate
- Sometimes wrong, never in doubt
- Can study behavior and physiology
- Build & test  computational models

# Computer Vision Curriculum

- Study the physics of image formation
  - visible light to x rays, cameras to microscopes to kinect
- Study human vision
- Study the geometry of imaging
- Develop systems to recognize and measure the world through visual data
  - cells to people to planets,
- Develop systems to organize visual data
  - e.g. web search, medical imagery, surveillance

# Course

- 40% Reading, Attendance, Class Participation
- 20% Homework
- 20% Midterm
- 20 % Project + Presentation

- Text Book: Computer Vision:Algorithms+Applications, by R. Szeliski
- **Matlab + Image Processing Toolbox** for programming
- (open to whatever you like python, c++, etc.)

# Office hours

- Feel free to come by for office hours T/H 3:40-5:20 after class in my office 1418 Computer Science. It is the most efficient way to ask questions and discuss the course.
- Course web page:

  http://acberg.com/undergrad_vision

# Other computer vision classes

Exist…

# For Next Class

- Find a way to access matlab in one of the labs or on your own computer
- Look over a matlab tutorial e.g.
  - http://www.cs.unc.edu/~lazebnik/spring11/matlab.intro.html
- Read chapter 1 in the textbook