Computer Vision (CSE P 576)

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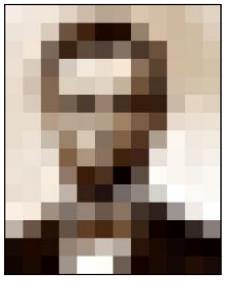
Webpage:

http://www.cs.washington.edu/education/courses/csep576/11sp/

Today

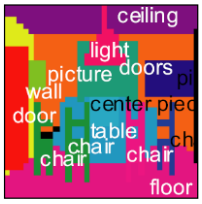
- Computer vision overview
- Course overview
- Image filtering
- Image sampling
- Edge detection?

What do computers see?



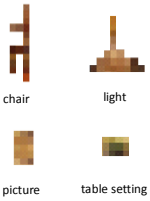
What do humans see?

What do humans see?



Torralba et al. PAMI 2008

What do humans see?

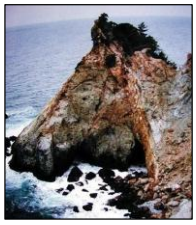


Torralba et al. PAMI 2008

What do humans see?

René Magritte, ***Les valeurs personnelles***, 1952

What do humans see?



What do humans see?

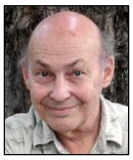
How hard is computer vision?

Marvin Minsky, MIT
Turing award,1969

"In 1966, Minsky hired a first-year undergraduate student and assigned him a problem to solve over the summer: connect a television camera to a computer and get the machine to describe what it sees."

Crevier 1993, pg. 88

How hard is computer vision?



Marvin Minsky, MIT
Turing award,1969

Gerald Sussman, MIT

"You'll notice that Sussman never worked in vision again!" – Berthold Horn

Computational photography

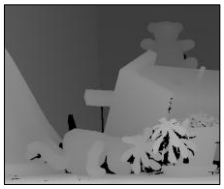
Vs.

Ansel Adams

Computational photography

Agarwala et al., Siggraph 2006

Depth



Cameras

Course overview

- Emphasis on practical approaches
  - What is important to industry
- Gain intuition
- Less emphasis on “academic” problems

Syllabus

Week	Topics	Reading	Assignments
1 March 28	Introduction Filtering Sampling Edge detection	Filtering: Szeliski (pp. 89-104) Sampling: Szeliski (pp. 127-131) Edge detection: Szeliski (pp. 210-219)	
2 April 4	Geometric transformations Interest point detection Patch descriptors	Geometric transformations: Szeliski (pp. 29-54) Interest points and descriptors: Szeliski (pp. 183-209)	
3 April 11	Image formation Cameras Displays Segmentation		
4 April 18 (Rick)	Feature-based alignment Creating panoramas Structure from motion		First assignment due: Image filtering and detecting edges.
5 April 25	Stereo vision Optical flow		

Syllabus

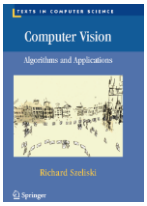
Week	Topics	Reading	Assignments
6 May 2	Computational Photography • High dynamic range imaging • Super-resolution • Alpha matting/compositing • Blur removal • Poisson blending		Second assignment due: Detecting interest points and creating panoramas.
7 May 9	Image-based rendering 3D reconstruction Structured light • Kinect (Part 1)		
8 May 16	Object instance recognition Hashing Face detection		Third assignment due: Stereo vision and optical flow.
9 May 23	Object category recognition		
10 May 30	No classes		
11 June 6	Kinect (Part 2) Advanced topics TBD		Fourth assignment due: Face detection

Grading

- Four assignments (25% each)
  - Mix of coding and written answers.
  - Using Qt (cross platform UI in c++) qt.nokia.com
  - Use of interactive UIs for exploring and gaining intuition

1. Filters and edge detection
2. Creating panoramas
3. Computing depth from stereo
4. Face detection

Book (optional)



Good reference for latest works, and basic approaches.

Covers many areas not talked about in class.

Free online.

http://szeliski.org/Book/