

Administrivia

If you don't have a CS account, get one!

Once you have a CS account, run "apply", ASAP.

Course page is now up: <http://www.cs.arizona.edu/classes/cs477/spring08>
(Linked from instructor's home page <http://kobus.ca>)

Lectures and assignments will require either connecting from a UA machine, OR a login id ("me") and password ("vision4fun").

Office hours (**tentative**) on T/R 5-5:30 and Friday 11:30-12 (not every week) by electronic signup.

login id ("public") and password ("meetkobus").

Also, if you coming from off campus, you will need

login id ("me") and password ("pw4cal") to start.

Eight machines in 9th floor lab (gr01-gr08) will be available for this course (only).

What is (computer) vision?

“ ..., vision is the process of discovering from images what is present in the world, and where it is.

... our brains must be capable of representing this information ... ”

Marr 82, page 3.

Visual Representation



Semantic Representation



A tiger lying in the grass

Is vision computational?

Why study Computer Vision?

- Images and movies are everywhere
- Fast-growing collection of useful applications
 - building representations of the 3D world from pictures
 - automated surveillance (who's doing what)
 - movie post-processing
 - automated analysis of scientific data
- Various deep and attractive scientific mysteries
 - how does object recognition work?
- Greater understanding of human vision

More Applications

Image and video retrieval and data mining

Robotics

Defect spotting

Driving aids, autonomous flight

Surveillance, identification

Graphics, Virtual Reality, Printing

Computer Vision in Context

Part of Artificial Intelligence

Connected to
cognitive psychology
perceptual psychology
robotics
databases
imaging science

Key methods
math
stats
programming
empirical science

Graphics versus Vision

Graphics

model of the world --> images

Vision

images --> model of the world

Vision Systems

Biological

eye + brain

Man made

camera + computer

Computer Vision History

(Nope, it does not work yet)

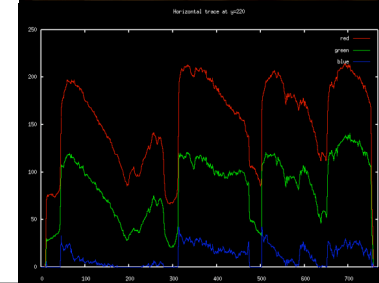
Properties of Vision

- One can “see the future”
 - You can avoid getting hit by an approaching object

Properties of Vision

- 3D representations are easily constructed
 - There are many different cues.
 - Useful
 - to humans (avoid bumping into things; planning a grasp; etc.)
 - in computer vision (build models for movies).
 - Cues include
 - multiple views (motion, stereopsis)
 - texture
 - shading

Shading Cues



Properties of Vision

- People draw distinctions between what is seen
 - “Object recognition”
 - This could mean “is this a fish or a bicycle?”
 - It could mean “is this George Washington?”
 - It could mean “is this poisonous or not?”
 - It could mean “is this slippery or not?”
 - It could mean “will this support my weight?”
 - Great mystery
 - How to build programs that can draw useful distinctions based on image properties.