Computer Vision (CSE 455)

Staff

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Web Page

- http://www.cs.washington.edu/education/courses/cse455/03wi/

Handouts

- course info
- signup sheet

Today

Overview of Computer Vision

Overview of Course

Image Filtering

Readings for this week

- Forsyth & Ponce, chapters 8.1-8.2
  - http://www.cs.washington.edu/education/courses/490cv/02wi/readings/book-7-revised-a-indx.pdf
- Intelligent Scissors
  - http://www.cs.washington.edu/education/courses/490cv/02wi/readings/book-7-revised-a-indx.pdf

Every picture tells a story

Goal of computer vision is to write computer programs that can interpret images

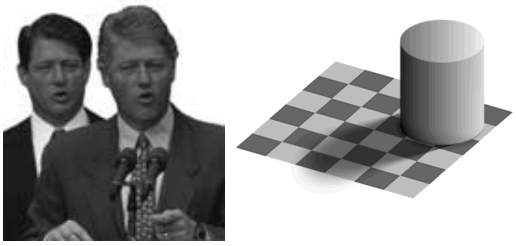
Can computers match human perception?

Not yet

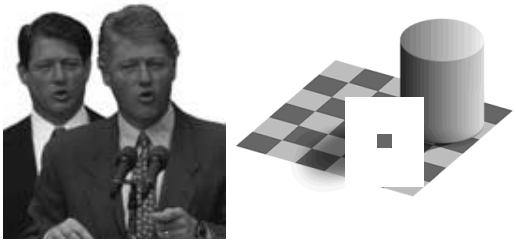
- computer vision is still no match for human perception
- but catching up, particularly in certain areas

Perception

Perception



Perception



Low level processing

Low level operations

- Image enhancement, feature detection, region segmentation

Mid level processing

Mid level operations

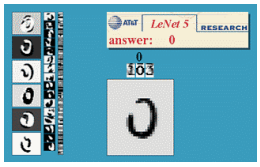
- 3D shape reconstruction, motion estimation

High level processing

High level operations

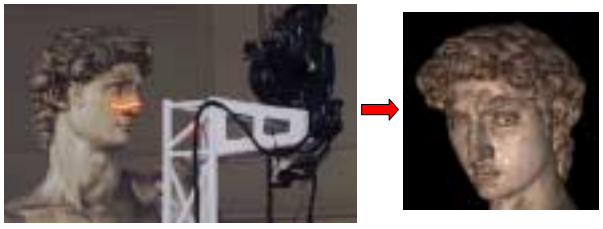
- Recognition of people, places, events

Application: Document Analysis



Digit recognition, AT&T labs
http://www.research.att.com/~yann/

Applications: 3D Scanning

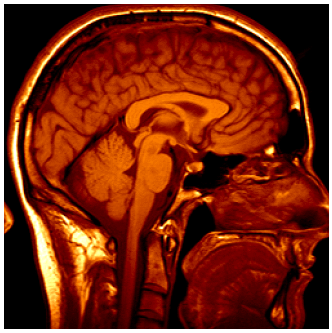


Scanning Michelangelo's *"The David"*

- The Digital Michelangelo Project
  - http://graphics.stanford.edu/projects/mich/
- UW Prof. Brian Curless, collaborator
- 2 BILLION polygons, accuracy to .29mm

Applications: Motion Capture, Games

Application: Medical Imaging



Applications: Robotics

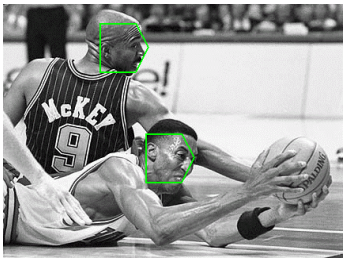
Project 1: Intelligent Scissors

Project 2: Panorama Stitching

http://www.cs.washington.edu/education/courses/455/02wi/projects/project2/artifacts/cdtwigg/marygates.html

Project 3: Single View Modeling

Project 4: Face Recognition



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Grading

Programming Projects (70%)

- image scissors
- panoramas
- single view modeling
- face recognition

Midterm (15%)

Final (15%)

General Comments

Prerequisites—*these are essential*!

- Data structures (CSE 326)
- A good working knowledge of C and C++ programming
- Linear algebra
- Vector calculus

Course does not assume prior imaging experience

- computer vision, image processing, graphics, etc.

Emphasis on programming projects!