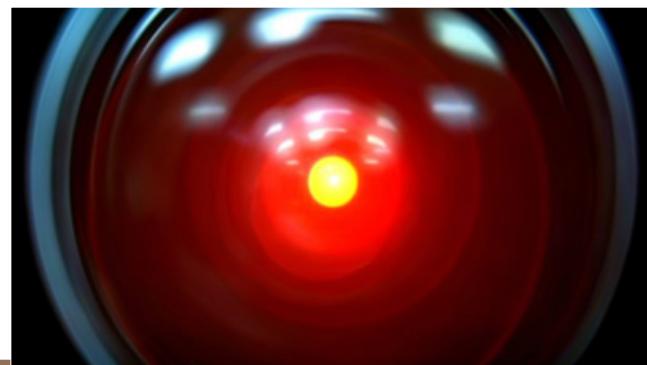
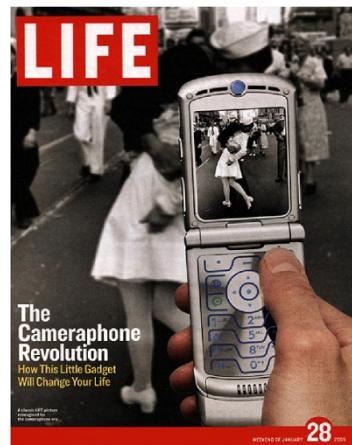




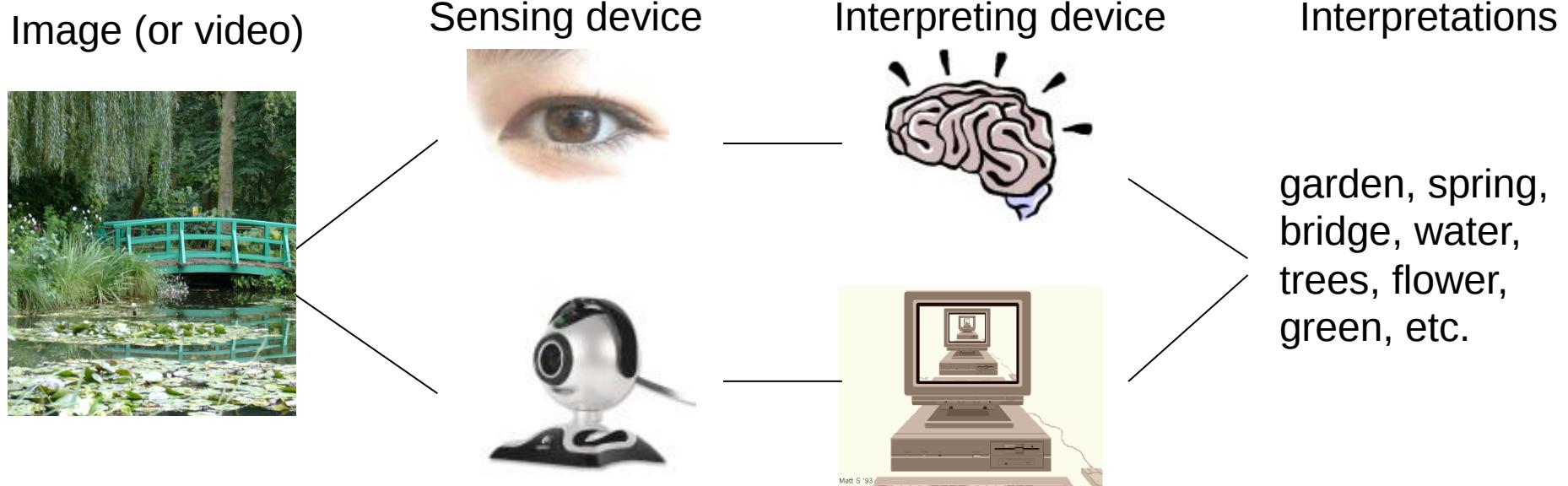
Intro a visión por computadora con GPUs

FaMAF, UNC (2015)

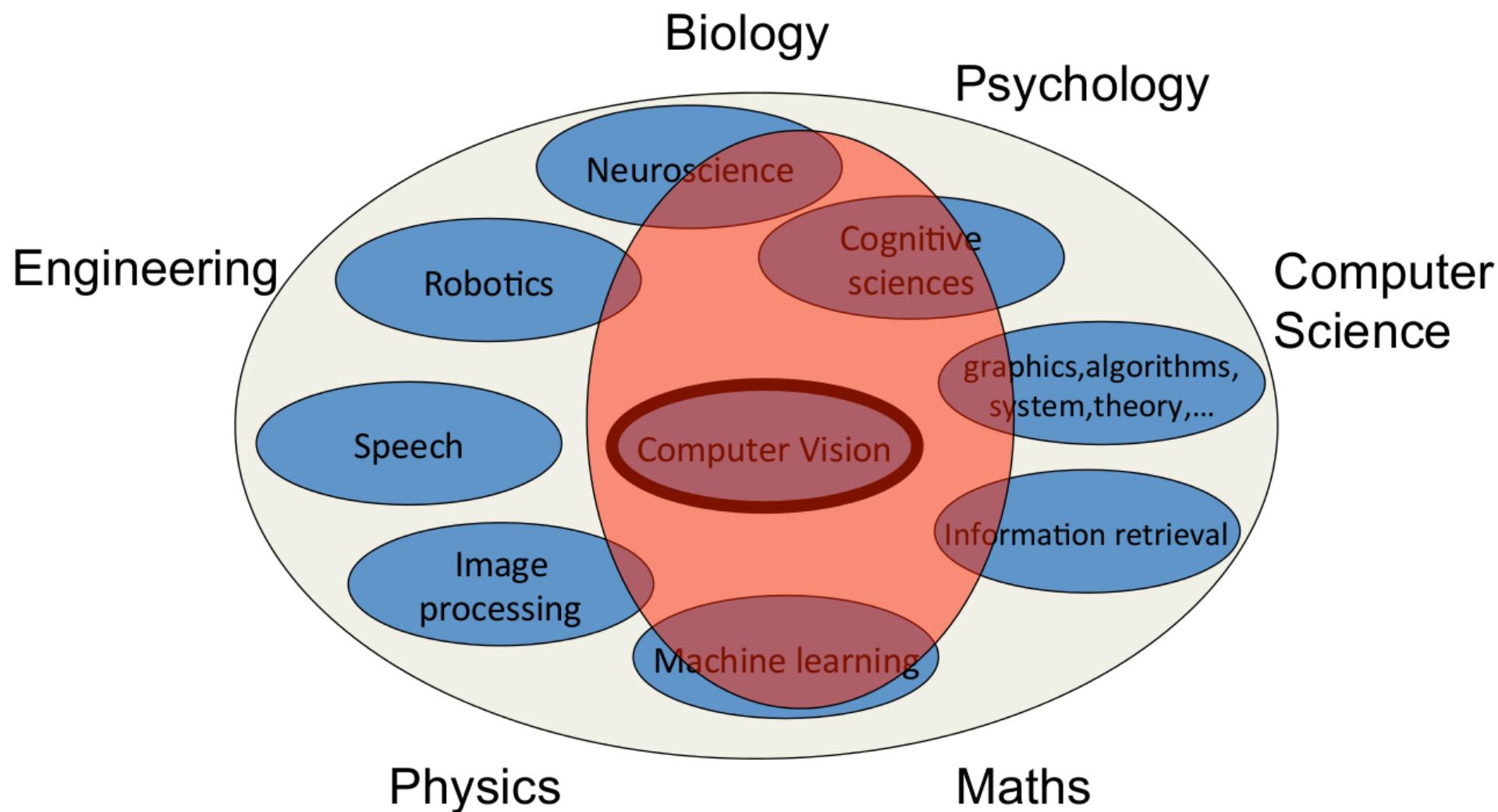


cred. slides: Fei-Fei Li

What is (computer) vision?



What is it related to?



The goal of computer vision

- To bridge the gap between pixels and “meaning”



What we see

0	3	2	5	4	7	6	9	8
3	0	1	2	3	4	5	6	7
2	1	0	3	2	5	4	7	6
5	2	3	0	1	2	3	4	5
4	3	2	1	0	3	2	5	4
7	4	5	2	3	0	1	2	3
6	5	4	3	2	1	0	3	2
9	6	7	4	5	2	3	0	1
8	7	6	5	4	3	2	1	0

What a computer sees

1981: Nobel Prize in medicine

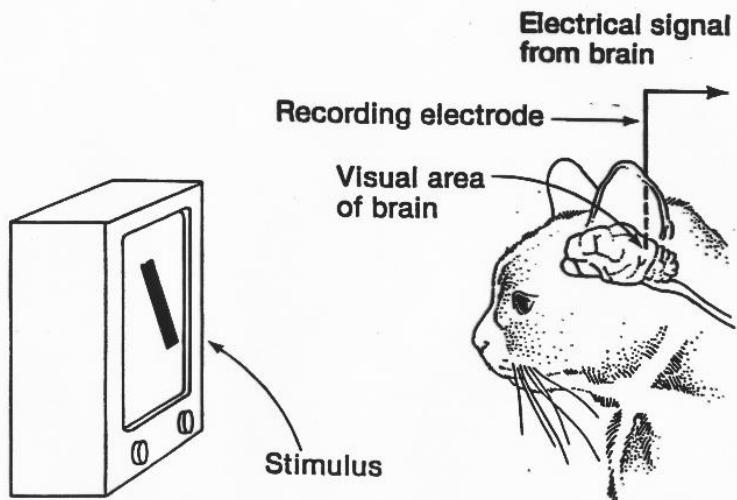


David H. Hubel



Torsten N. Wiesel

David H. Hubel and Torsten N. Wiesel "for their discoveries concerning information processing in the visual system".



<https://www.youtube.com/watch?v=Yoo4GWiAx94>

Origins of computer vision: an MIT undergraduate summer project

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

PROJECT MAC

Artificial Intelligence Group
Vision Memo. No. 100.

July 7, 1966

THE SUMMER VISION PROJECT

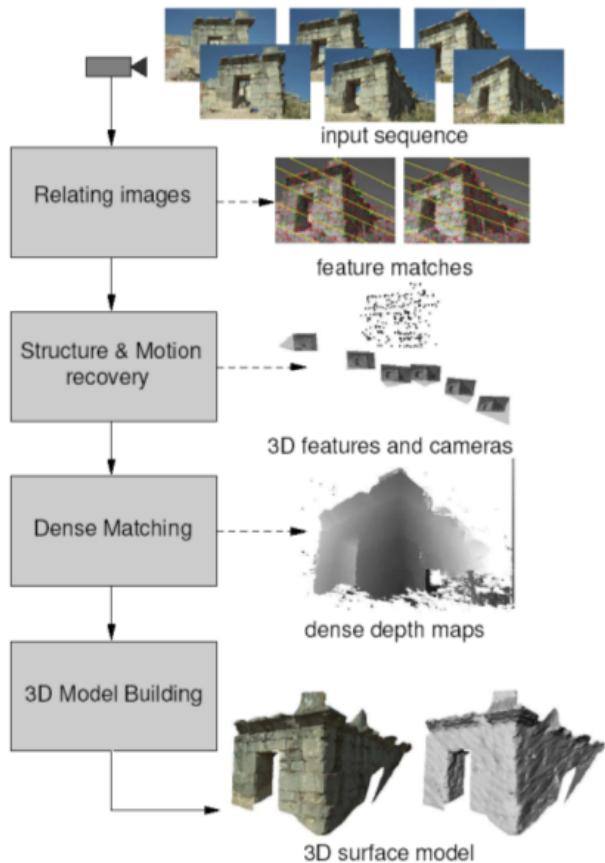
Seymour Papert

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".

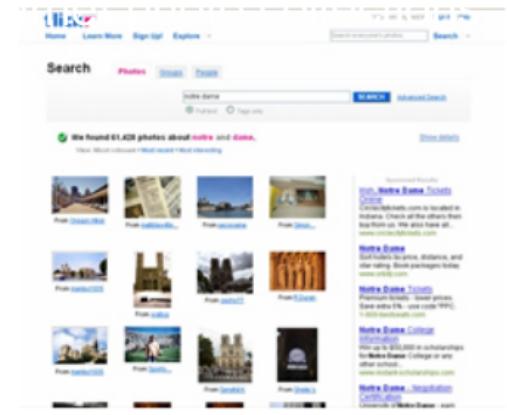
What kind of information can we extract from an image?

- Metric 3D information
- Semantic information

Vision as measurement device

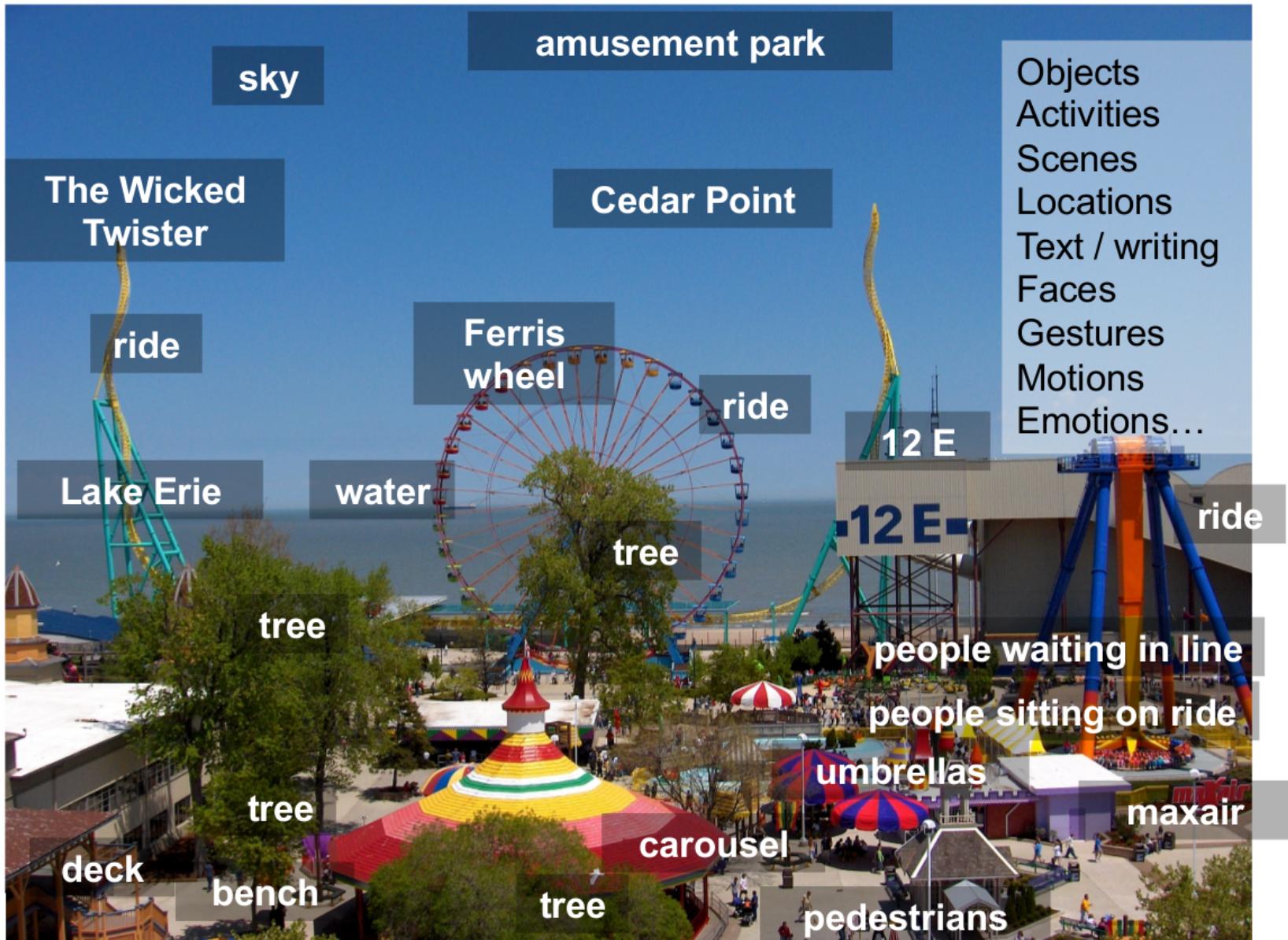


Pollefeys et al.



Goesele et al.

Vision as a source of semantic information

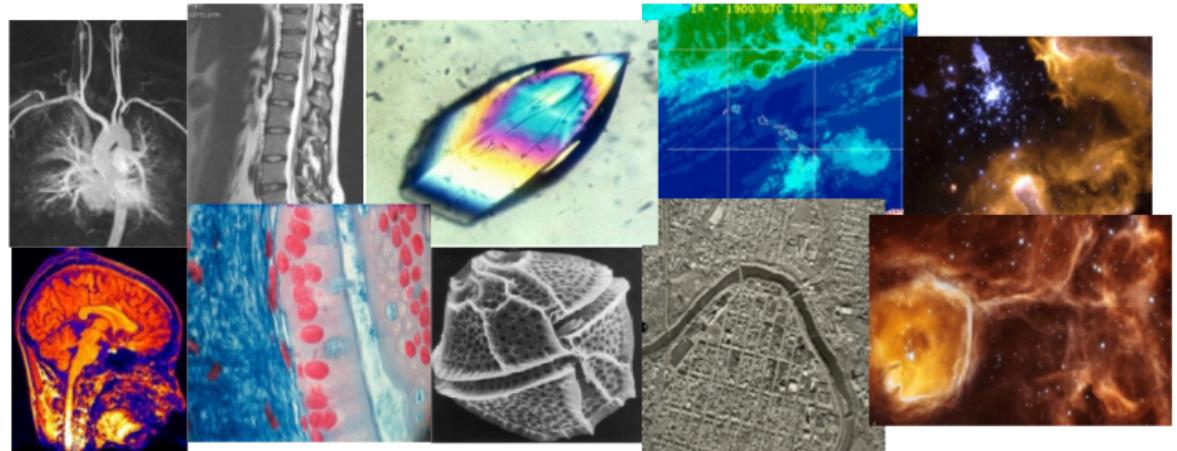


Why study computer vision?

- Vision is useful: Images and video are everywhere!



Surveillance and security

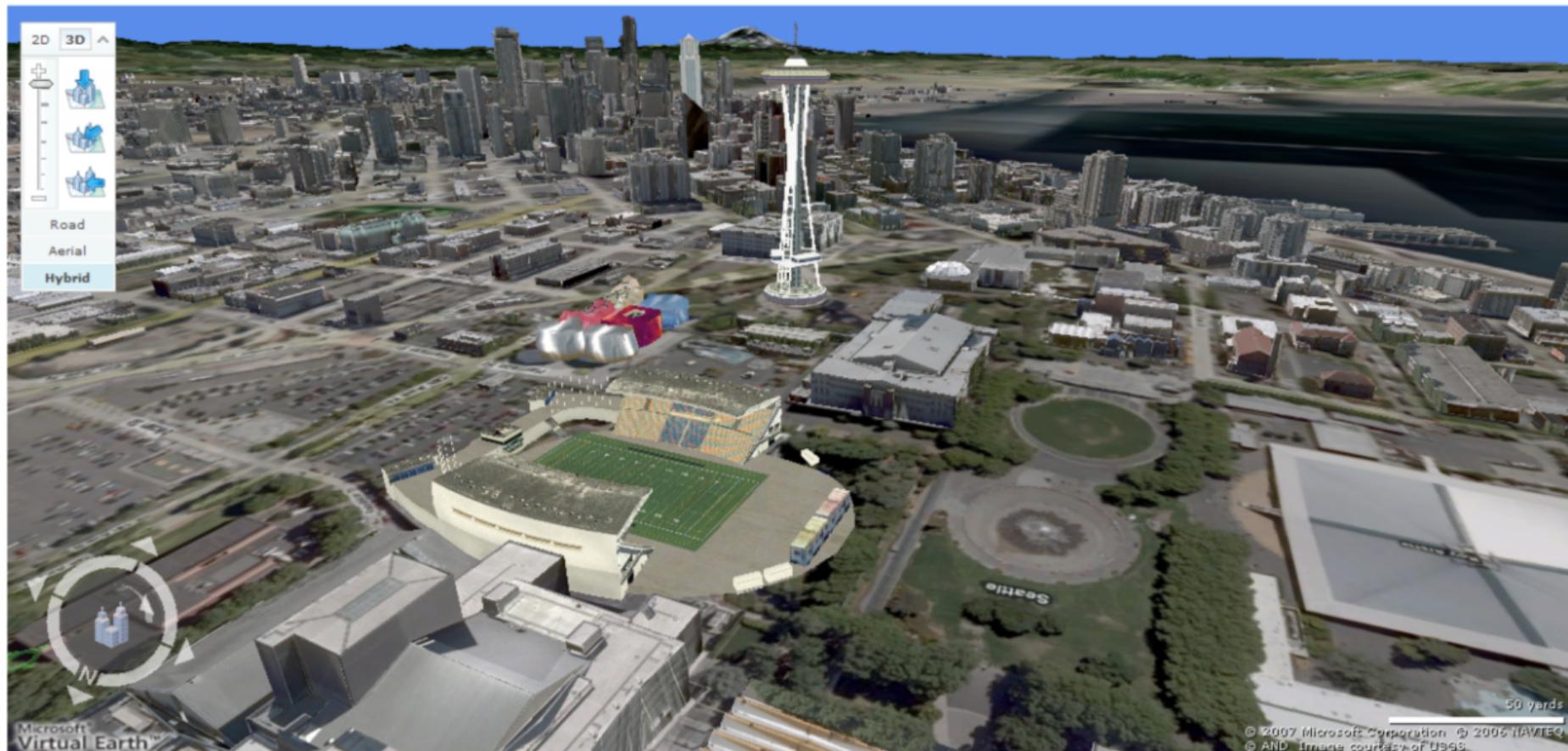


Medical and scientific images

Special effects: shape and motion capture



3D urban modeling



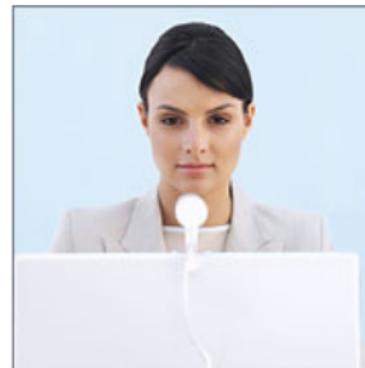
[Bing maps](#), Google Streetview

Source: S. Seitz

Biometrics



Fingerprint scanners on
many new laptops,
other devices



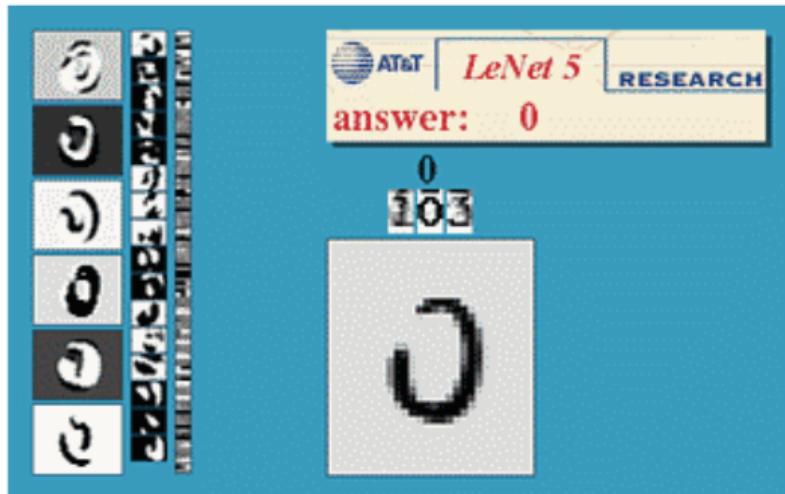
Face recognition systems now beginning
to appear more widely
<http://www.sensiblevision.com/>

Source: S. Seitz

Optical character recognition (OCR)

Technology to convert scanned docs to text

- If you have a scanner, it probably came with OCR software

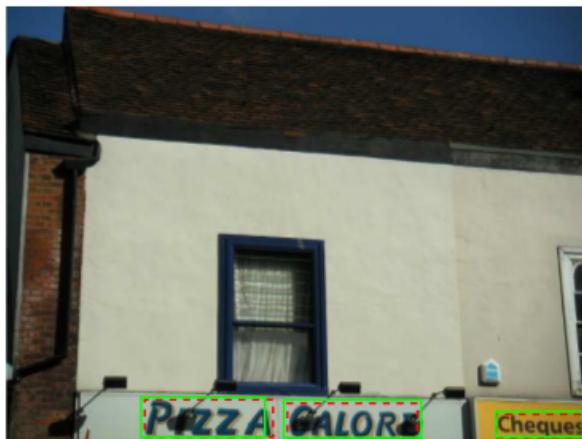


Digit recognition, AT&T labs



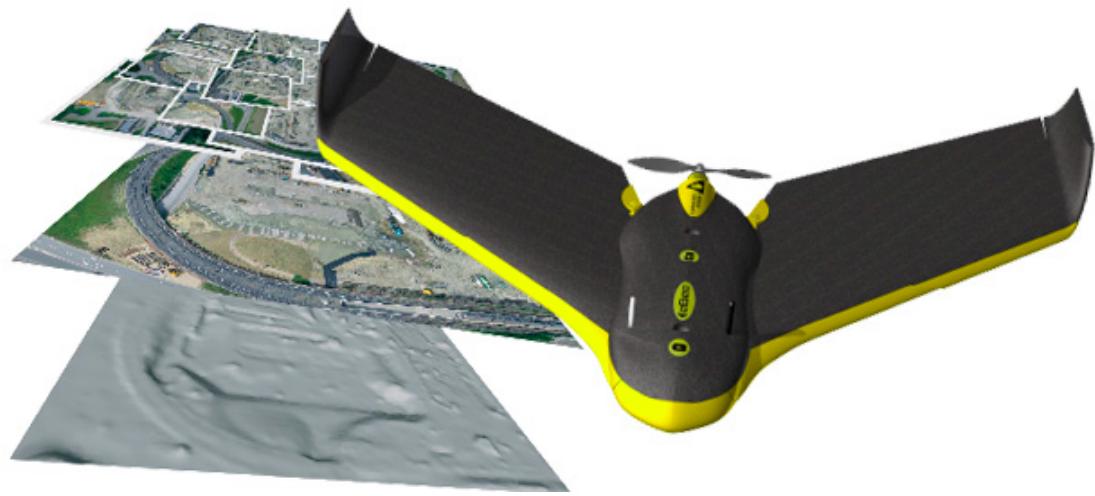
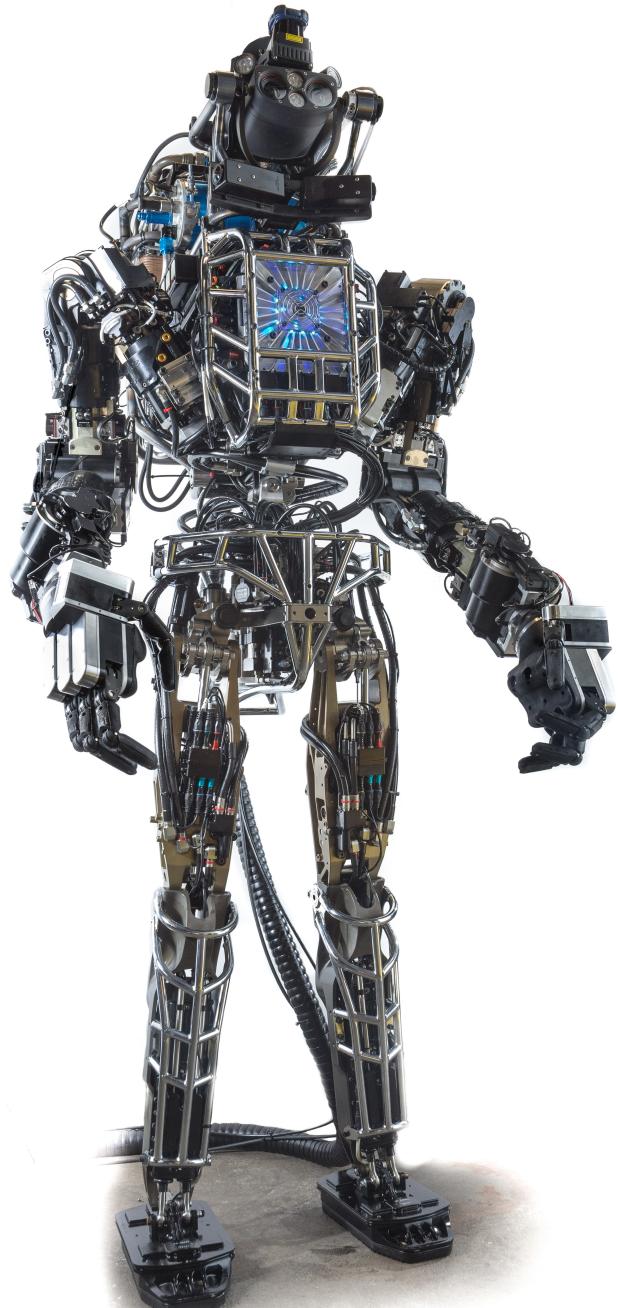
License plate readers

http://en.wikipedia.org/wiki/Automatic_number_plate_recognition



Toys and Robots





Mobile visual search: Google Goggles

Google Goggles in Action

Click the icons below to see the different ways Google Goggles can be used.



Landmark



Book



Contact Info.



Artwork



Places



Wine



Logo



Mobile visual search: iPhone Apps

snaptell

Query Images



Perspective



Zoom



Rotation



Coverage



Lighting



Logos



Occlusion



Blur

kooaba

Matched Image



Automotive safety

► manufacturer products consumer products ◀◀

Our Vision. Your Safety.

rear looking camera forward looking camera side looking camera

> EyeQ Vision on a Chip

[> read more](#)

> Vision Applications

Road, Vehicle, Pedestrian Protection and more

[> read more](#)

> AWS Advance Warning System

[> read more](#)

News

> [Mobileye Advanced Technologies Power Volvo Cars World First Collision Warning With Auto Brake System](#)

> [Volvo: New Collision Warning with Auto Brake Helps Prevent Rear-end](#)

[> all news](#)

Events

> [Mobileye at Equip Auto, Paris, France](#)

> [Mobileye at SEMA, Las Vegas, NV](#)

[> read more](#)

- Mobileye: Vision systems in high-end BMW, GM, Volvo models
 - “In mid 2010 Mobileye will launch a world's first application of full emergency braking for collision mitigation for pedestrians where vision is the key technology for detecting pedestrians.”

Source: A. Shashua, S. Seitz

Vision-based interaction (and games)



Microsoft's Kinect

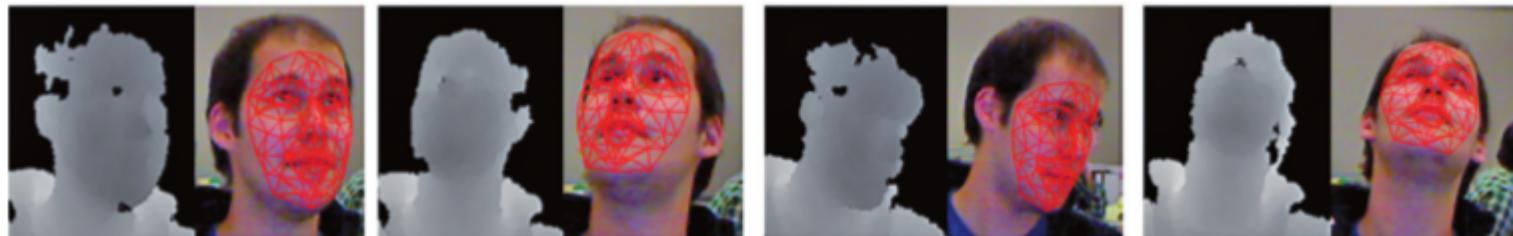
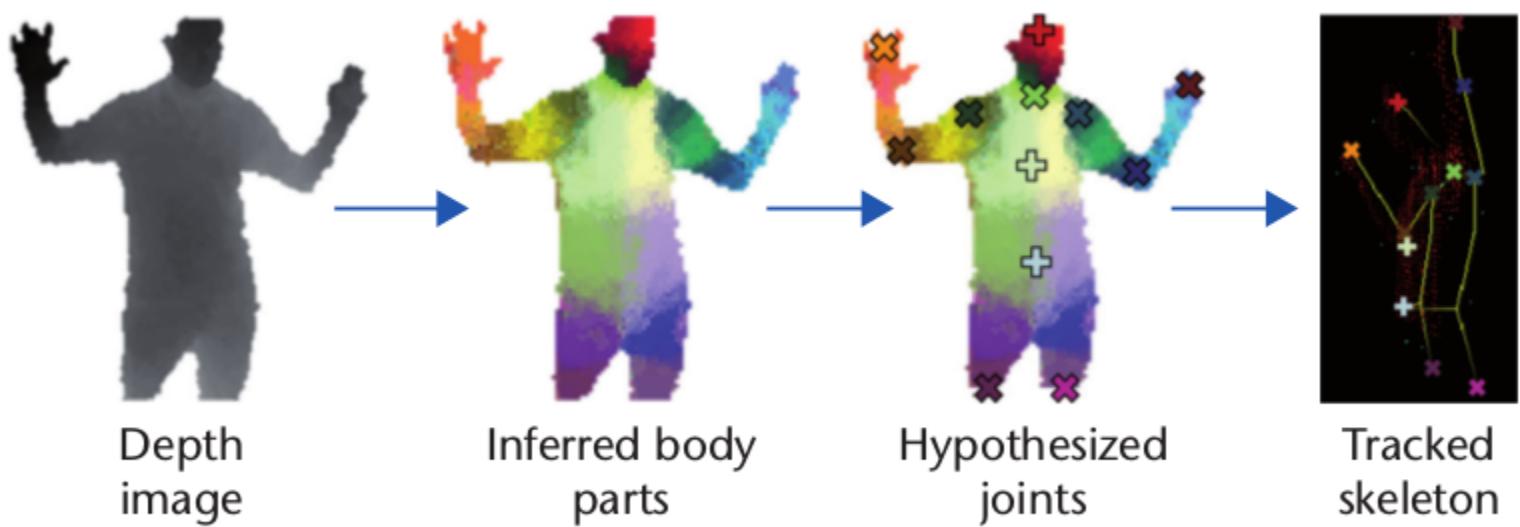
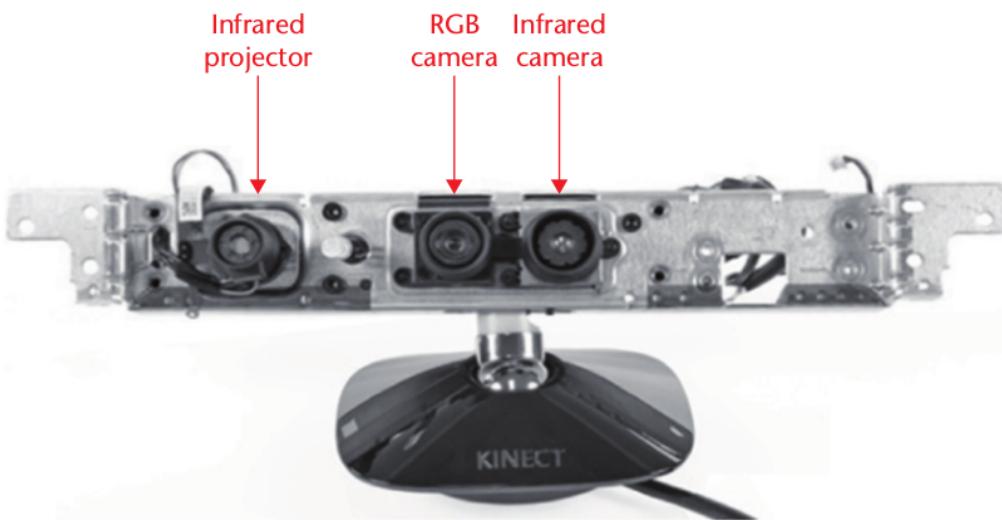


Sony EyeToy



Assistive technologies

Source: S. Seitz



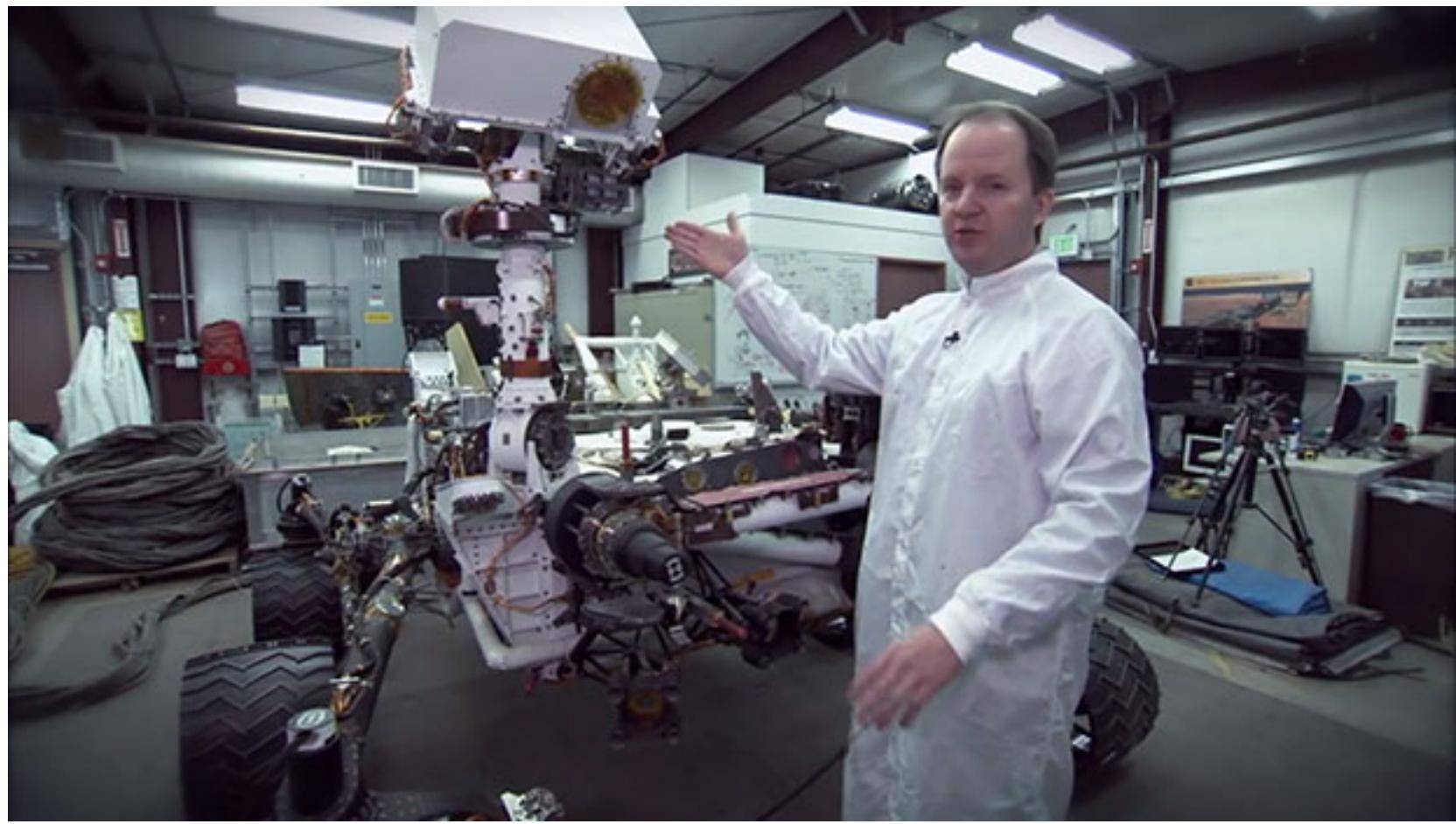
Vision for robotics, space exploration

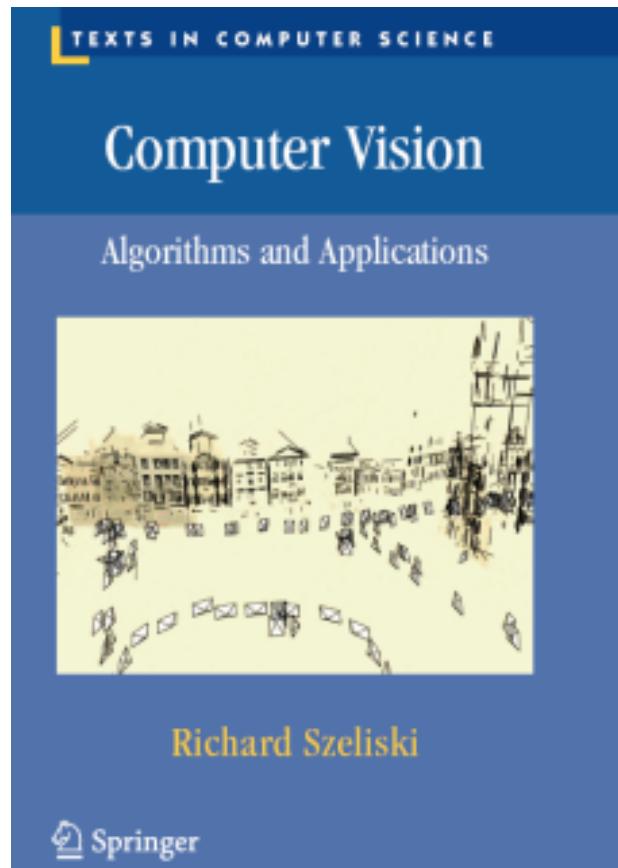


[NASA's Mars Exploration Rover Spirit](#) captured this westward view from atop a low plateau where Spirit spent the closing months of 2007.

Vision systems (JPL) used for several tasks

- Panorama stitching
- 3D terrain modeling
- Obstacle detection, position tracking
- For more, read “[Computer Vision on Mars](#)” by Matthies et al.





<http://szeliski.org/Book/>