

# COMPUTER VISION

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**3C Vision**  
**cues, contexts and channels**  
 Elsevier (April 2011)  
*V. Cantoni, S. Levialdi, B. Zavidovique*  
 Universities of Pavia, Roma, Paris XI

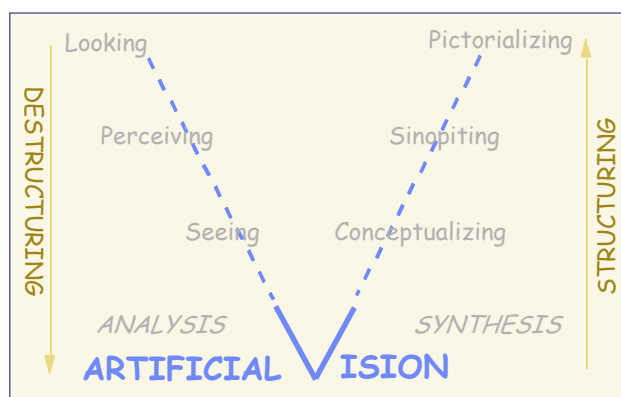


Michelangelo 1528

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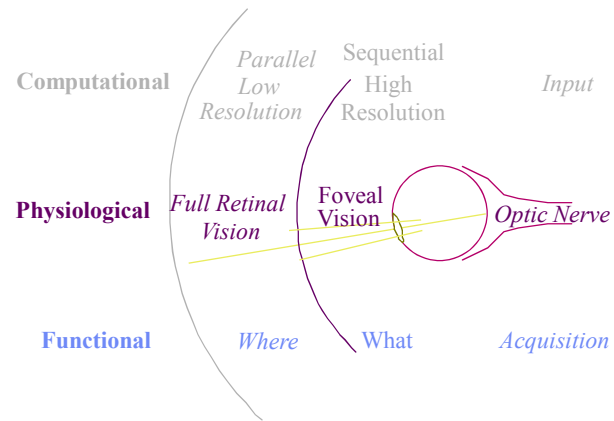
## Dual aspects of vision: analysis and synthesis

- Signal processing '50
- Computer Graphic '60
- Pattern Recognition '70
- Computer Vision '80
- Multimedia '90



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## Bio-vision schema for looking

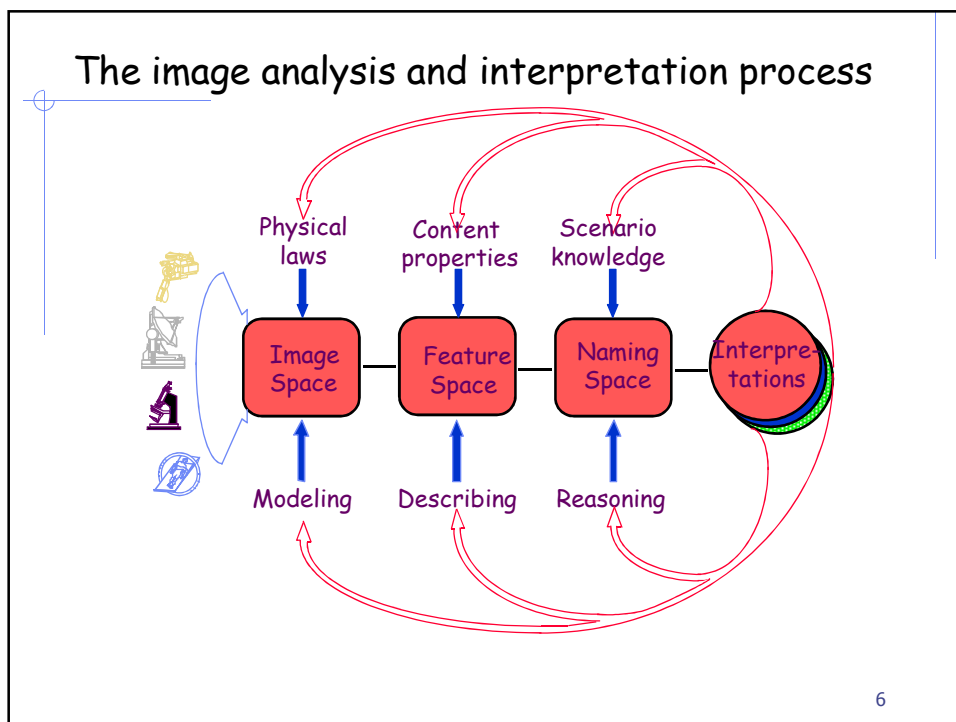
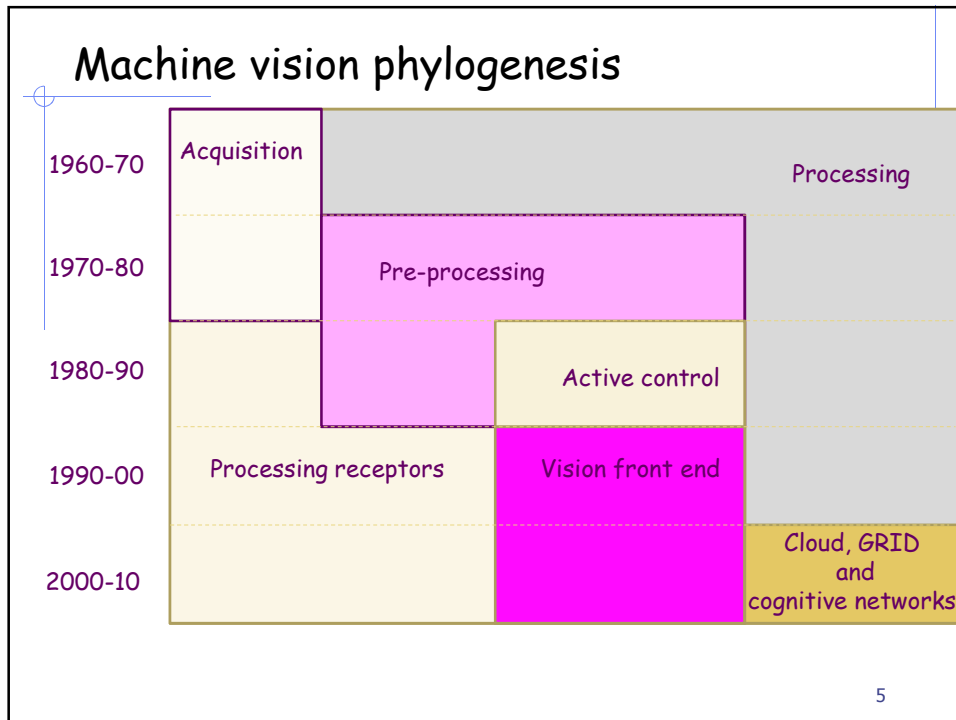


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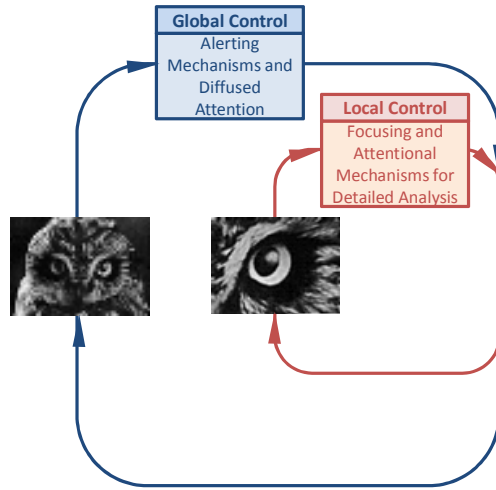
## Eye tracking

- Camera
- Infrared diodes
- Eyes are tracked by measuring how light is reflected by the retina and the cornea through the pupil
- In our experiments we used a sampling rate of 50 Hz, which means that gaze coordinates and pupil size are measured every 20 ms





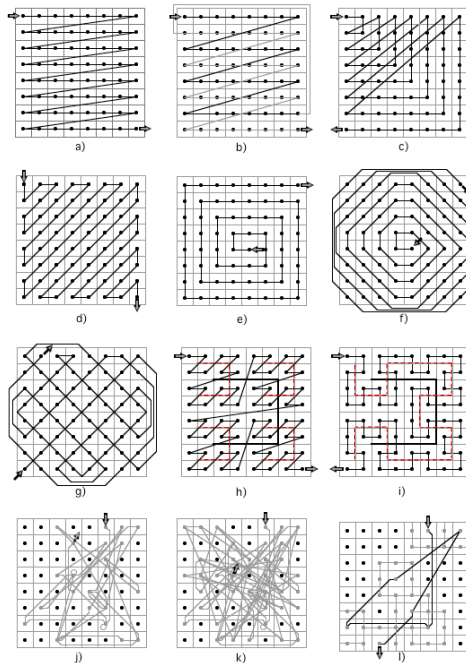
# Visual Attention



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# Scanning strategies

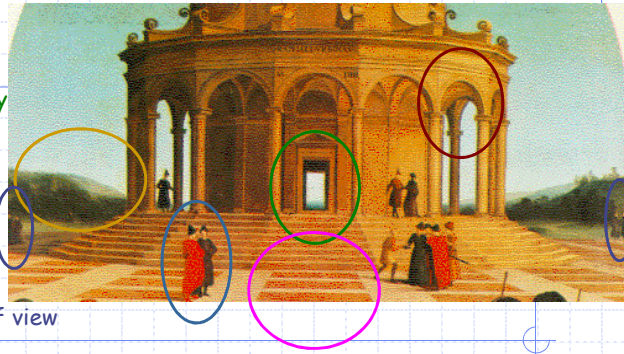
- input and output points are shown with arrows



## Visual cues - The human headway

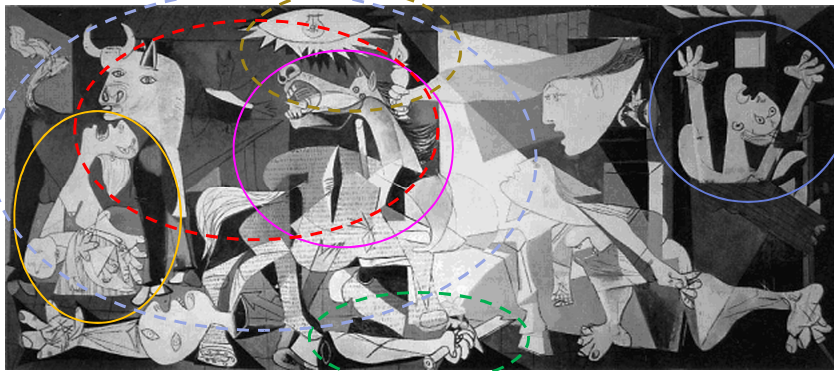
- Overlapping objects
- Quantized scenes
- Perspective geometry
- Depth from shading
- Multi-presence
- Depth from texture
- Height in the field of view

Lo spozalizio della Vergine Raffaello Sanzio - Pinacoteca di Brera



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## The role of context



- |                    |                               |                          |
|--------------------|-------------------------------|--------------------------|
| • Direct Retrieval | • Recognition-Based Retrieval | • Search-Based Retrieval |
| • Metadata         | • Literature motif            | • Form contrast          |
| • Explicit cues    | • Image motif                 | • Justaposed components  |
|                    | • Extended motif              | • Paradox and surprisal  |
|                    |                               | • General set up         |

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## Filling the channels



- Icons and Metaphores
- Content structure
- Role rendering
- Social interaction

**Multimedia exploitation:**  
 Don Juan has inspired many art pieces ranging from paintings (Auguste Leroux) and books (Lydia Flem), up to movies (Federico Fellini, Joseph Losey, Carlos Saura, etc.), even music (Richard Strauss), theater plays (Molière) and operas (Wolfgang Amadeus Mozart) and many intellectuals (Ernst Hoffmann, Alexander Pushkin, Søren Kierkegaard, George Bernard Shaw, Albert Camus, etc.)