

Visual Perception

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PRESENTATION OVERVIEW

- Introduction
- Human visual system
- Different kinds of perception
- Characteristics of our visual system
- Some "tricks"
- Conclusions

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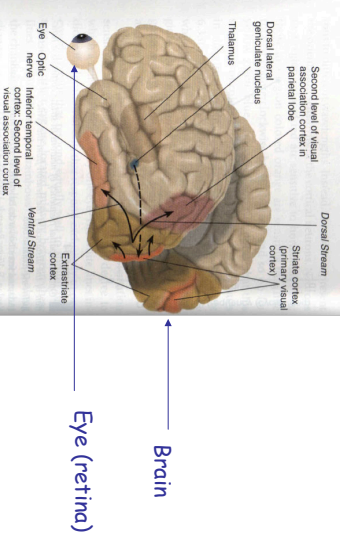
Definition

Perception is the process by which humans, and other organisms, interpret and organise sensation in order to understand their surrounding environment.

"Seeing plus cognition" (Arney, 1976)

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Human Visual System



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How do we perceive objects?

- Distance perception
- 3D perception (stereopsis)
- Size perception
- Motion perception
- Shape constancy
- Dark and light adaptation
- ...

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Distance Perception



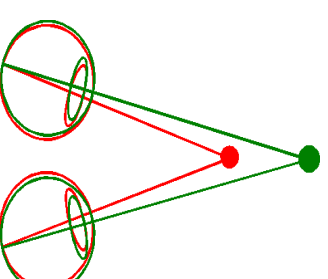
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Distance Perception cont.

- Visual angle
- Convergence
- Binocular disparity
- Motion parallax
- Colour and brightness

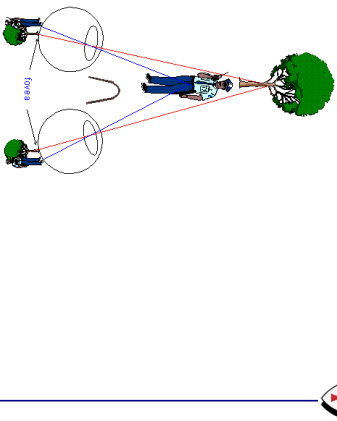
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Distance Perception: Convergence



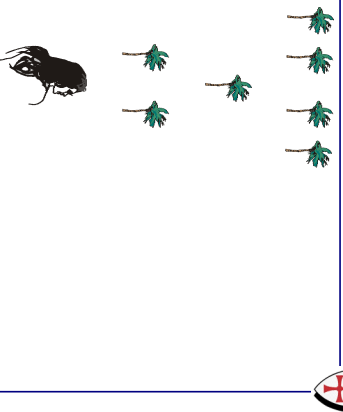
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Distance Perception: Binocular Disp.



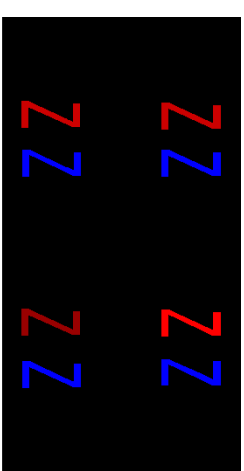
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Distance Perception: Motion Parallax



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Distance Perception: Brightness and Colours



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3D Perception: Stereopsis

- Fusion of two 2D-image to obtain one solid 3D-image
- It is a mental process (needs exercise)

■ **Stereoscope**



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3D Perception: Stereopsis cont.



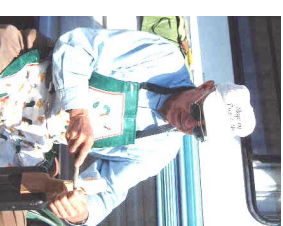
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Dark and Light Adaptation

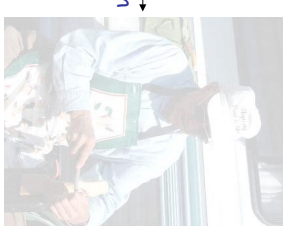
- When passing from a bright environment to a dark one and vice versa.
- Similar phenomena but different time course (30 min versus 1 min max)

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Dark and Light Adaptation cont.



Light
Adaptation



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Perspective

- When reproducing reality, perspective can help to give some depth
- Many tricks to manipulate the way we perceive depth:
 - Diminution low
 - Foreshortening
 - ...

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Perspective: Size and Foreshortening

Size



Foreshortening



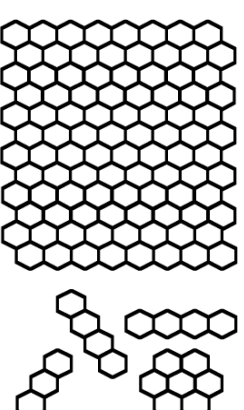
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Pattern and Shape Perception

- Our brains are constantly searching for structure in the patterns of light imaged on our retinas.
- This is an undetectable process.
- It works also with meaningless patterns.

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Perceptual Organization



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Figure/Ground Process (Rubin's image)



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Realistic Computer Graphics and VR



Realistic image synthesis is defined as the computation of images that are faithful representations of a real scene.



REALISM as a key-element

Conclusions



- To know how we perceive reality is very important to create realistic virtual environments.
- There are still unknown aspects on the human perception process, but we can use our knowledge in a useful way:
 - Optimised colour schemas for visualisation;
 - Save computational resources.
 - ...