Depth Perception

Outline

- Examples of misperceived depth
- Re-creation of depth
- Depth cues
  - Definition
  - Types
- Examples of depth cues
  - Partial occlusion
  - Relative size
- Examples of depth cues
  - Texture gradients
  - Linear perspective
  - Shading
  - Stereopsis / binocular disparity
  - Motion parallax
  - Visual angles

Perception of Depth

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Perception of Depth

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Ponzo Illusion

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Are the Table Tops the Same Shape and Size?

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Depth Is Recreated

- The retina (the back of the eye where light is changed into neurological events that the brain can understand) is functionally a two dimensional surface
- Since all visual information enters the visual system through the two retinae, the third dimension (depth) is not directly represented

Depth Cues

- The perception of depth is created by the visual system
- Any source of information that the visual system uses to create the perception of depth is called a depth cue

Depth Cues

- Oculomotor Cues
  - Accommodation
  - Convergence
- Visual Cues
  - Monocular Cues
  - Binocular Cues
- Motion Cues
- Static Cues
  - Occlusion
  - Relative Size
  - Texture Gradients
  - Linear Perspective
  - Shading
- Motion Parallax
- Kinetic Depth Effect
- Stereopsis
Static, Monocular, Visual Cues: Partial Occlusion

T-junctions

Static, Monocular, Visual Cues: Relative Size

Static, Monocular, Visual Cues: Texture Gradients

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Motion, Monocular, Visual Cues: Motion Parallax

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Static, Binocular, Visual Cue: Stereopsis

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Static, Binocular, Visual Cue: Stereopsis

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Neural Basis of Stereopsis

- Cortical binocular cells
- Selective stimulation of kittens
- Stereoblind humans

Stereograms

Visual Angle

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**Visual Angle**

Visual Angle (°) ≈ \( \frac{57.3 \times \text{Object Size}}{\text{Viewing Distance}} \)

Visual Angle (°) = \( 2 \tan^{-1}\left(\frac{\text{Object Size}/2}{\text{Viewing Distance}}\right) \)

[http://elvers.us/perception/visualAngle/]