THE ILLUSION OF REALITY

• “Virtual reality works because reality is virtual”
  – Lawrence Stark, UC Berkeley

THE ILLUSION

• We experience a high-resolution spatial and temporal continuum when we look around the 3D environment we are in.

• This is an illusion!
THE ILLUSION

• The retinal image of the visual field is in focus only in a very small area: The fovea.

THE ILLUSION

• We need to sample the visual field, with saccades and fixations (~3 per sec.) to construct an image.

scanpaths and what we see
THE ILLUSION

- Sampled information is relatively sparse when you walk into a room. You see the typical things and think you have seen the whole room.

  ![Sampled Information](image1)

THE ILLUSION

- You can change the way that you see by changing perceptual filters.
- For example: “I want to see squares”...

  ![Squares](image2)

*I want to see squares*
I want to see circles

THE ILLUSION

- Fixating ~90% of the time.
- Checking and rechecking points of interest, as if gathering support for what we think we are seeing.
- It is hard to overcome strong presuppositions, such as what a room looks like...
... or what a vase looks like

(a) Scanpath for two faces
(b) Scanpath for vase
THE ILLUSION

• We see what is in our mind’s eye, and use sampled visual information to verify this.
• The scanpath is driven by our mental model. Change the model and the scanpath changes.
THE ILLUSION

• Our model can even make us see things that we don't have any sensory data for!

• That's a good thing, because we are actually missing some data...
THE ILLUSION

• Can you find your blind spot?

• Information is integrated across neighboring areas.

• It's image processing!
THE ILLUSION OF 3D WORLDS

3 D W O R L D S

• How do we perceive immersion in a 3D environment?

• Physiological cues
  – Stereoscopic cues
  – Static cues
  – Motion cues
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3 D W O R L D S

• How do we perceive immersion in a 3D environment?
  – Physiological cues
  – **Stereoscopic cues**
  – Static cues
  – Motion cues

But even if we close one eye we see the world in 3D – how can that be? (also on TV etc.)
3D WORLDS

- How do we perceive immersion in a 3D environment?
  - Physiological cues
  - Stereoscopic cues
  - Static cues
  - Motion cues
3D WORLDS

- How do we perceive immersion in a 3D environment?
  - Physiological cues
  - Stereoscopic cues
  - Static cues
  - Motion cues

To sum up - Paint the 3D world into the mind of the receiver:
  - Build a mental model with expected behavior.
  - Address the expectations.
  - Avoid contradictions.
  - Build layers of strong consistent cues.
spot the cues?

size occlusion shadows color texture gradient linear perspective

spot the cues?
Other interesting pictures...