

CSE 190: Virtual Reality Technologies

LECTURE #6: HUMAN VISION

VR Content Presentations

Dale Tubat: DragonBall Z VR/AR

- https://www.youtube.com/watch?v=K_zpjTcn40E

Prasanth Abraham: Gravity Pull - VR Puzzle Game

- <https://play.google.com/store/apps/details?id=com.VRMersive.GravityDrop&rdid=com.VRMersive.GravityDrop>

Nathan Nguyen: BAMF VR

- <https://play.google.com/store/apps/details?id=com.MWB.BAMF&hl=en>
- https://www.youtube.com/watch?v=TvIV2Pt_pNc

Eric Duong: Houston Rockets Locker Room Tour

- <https://www.youtube.com/watch?v=54NFfToTsrQ>

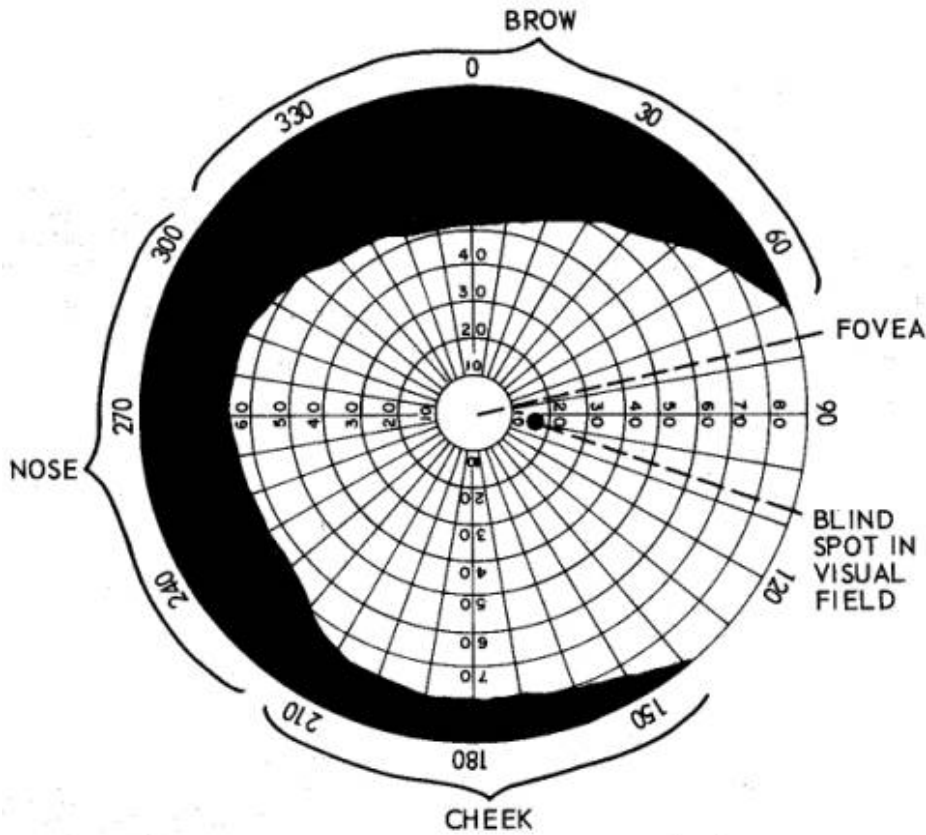
Announcements

Homework project 1 due tomorrow at 2pm

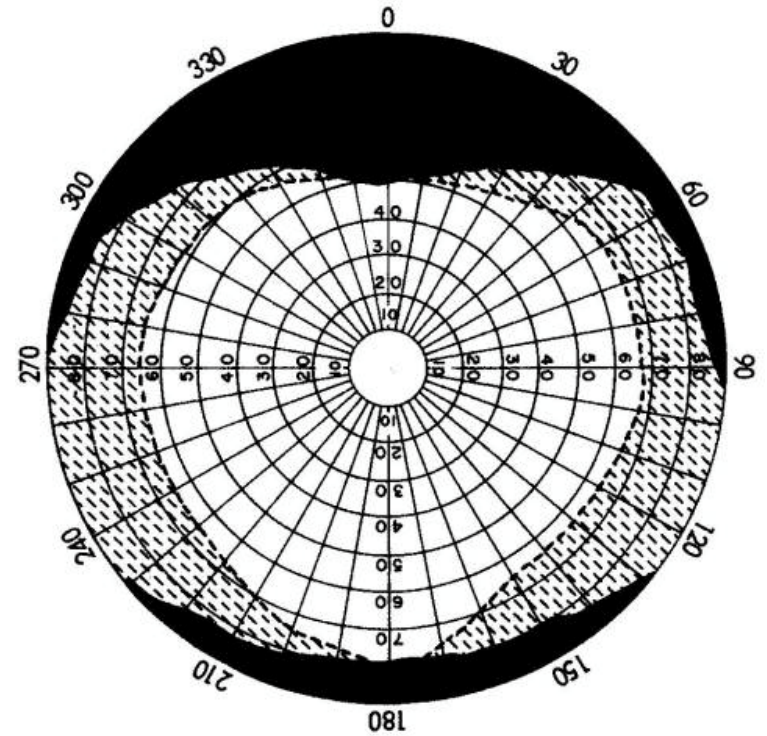
- To be demonstrated in VR lab B210
- One member of each team:
Upload code to TritonEd by Friday 2pm
- Even hours grading starts at 2pm
- Odd hours grading starts at 3pm

Human Vision

Visual Field / Field of View



monocular visual field



binocular visual field

Retina VR Display

Resolution per eye:

145° x 135° with 150 pixels/degree resolution

→ 21,750 x 20,250 pixels = 440 Mpixels

Transmission of retina quality VR video in stereo: 528 Gbytes/sec

Full sphere: 1.7 Tbytes/sec = 13 Tbit/sec

With 300x compression: 45 Gbit/sec

Presents challenges to:

- Capture or render stereo panoramas
- Compress and transmit retina VR video over network
- Drive display pixels

Summary:

Human Visual System

Pixel resolution: 150 pixels/degree

Horizontal field of view: 145° per eye

Vertical field of view: ~135°

Stereoscopic vision

Temporal resolution: ~60-150 Hz (varies with brightness)

Dynamic range: 100:1 (retina), 1 billion:1 (with iris)

Colors: HDR (32 bit color depth)

Accommodation range: ~8cm to infinity