CSE 190: Virtual Reality Technologies

LECTURE #5: HUMAN VISION

Announcements

Homework project 1 due Friday at 2pm

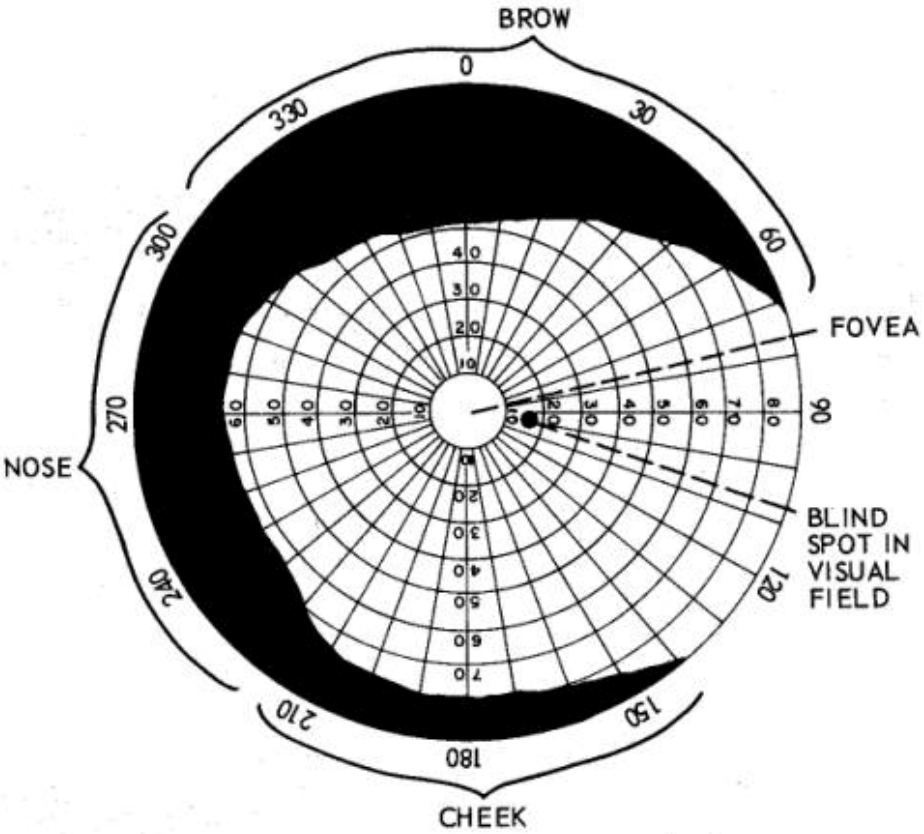
- To be demonstrated in VR lab B210
- One member of each team:
  Upload code to TritonEd by Friday 2pm

EdX Opportunity

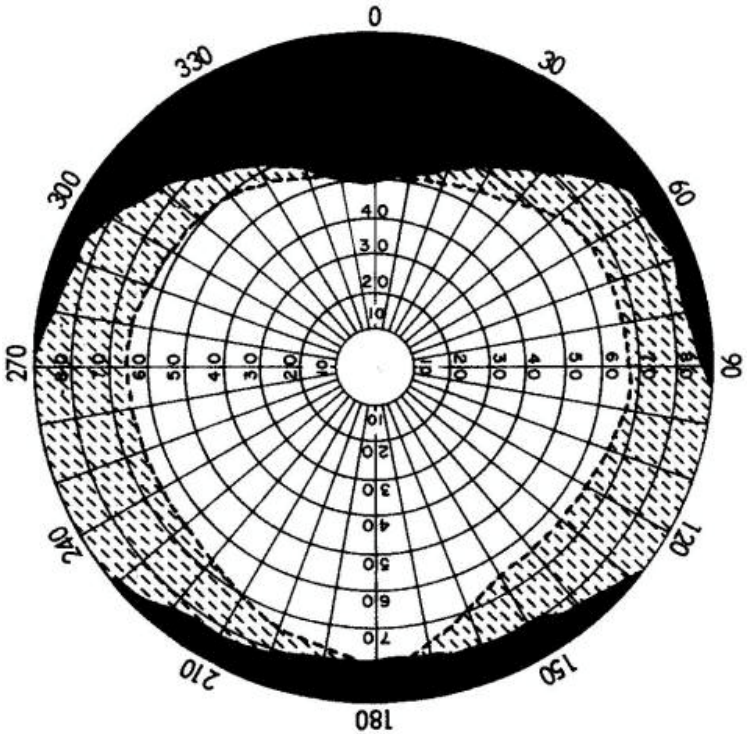
Do you love helping others learn about VR? The Center for Digital Learning is looking for 1-2 people to monitor the edX Creating VR Apps course (https://www.edx.org/course/creating-virtual-reality-vr-apps-uc-san-diegox-cse190x) for about 2 hours each week. You would monitor the discussion section where people ask technical questions about Unity, VR, and how to best approach projects. This is a low-commitment gig that pays $17/hr. If you're interested and will stick around UCSD for at least another year, please apply by Monday night (April 16)!

Human Vision

Visual Field / Field of View



monocular visual field



binocular visual field

Ruch & Fulton, 1960

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