Our Peripheral Vision is Poor DWTMIM Ch 5

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Difference in Resolution

Pixel density

- 6-7 million retinal cone cells per eye
- Focused in what is called the *fovea*
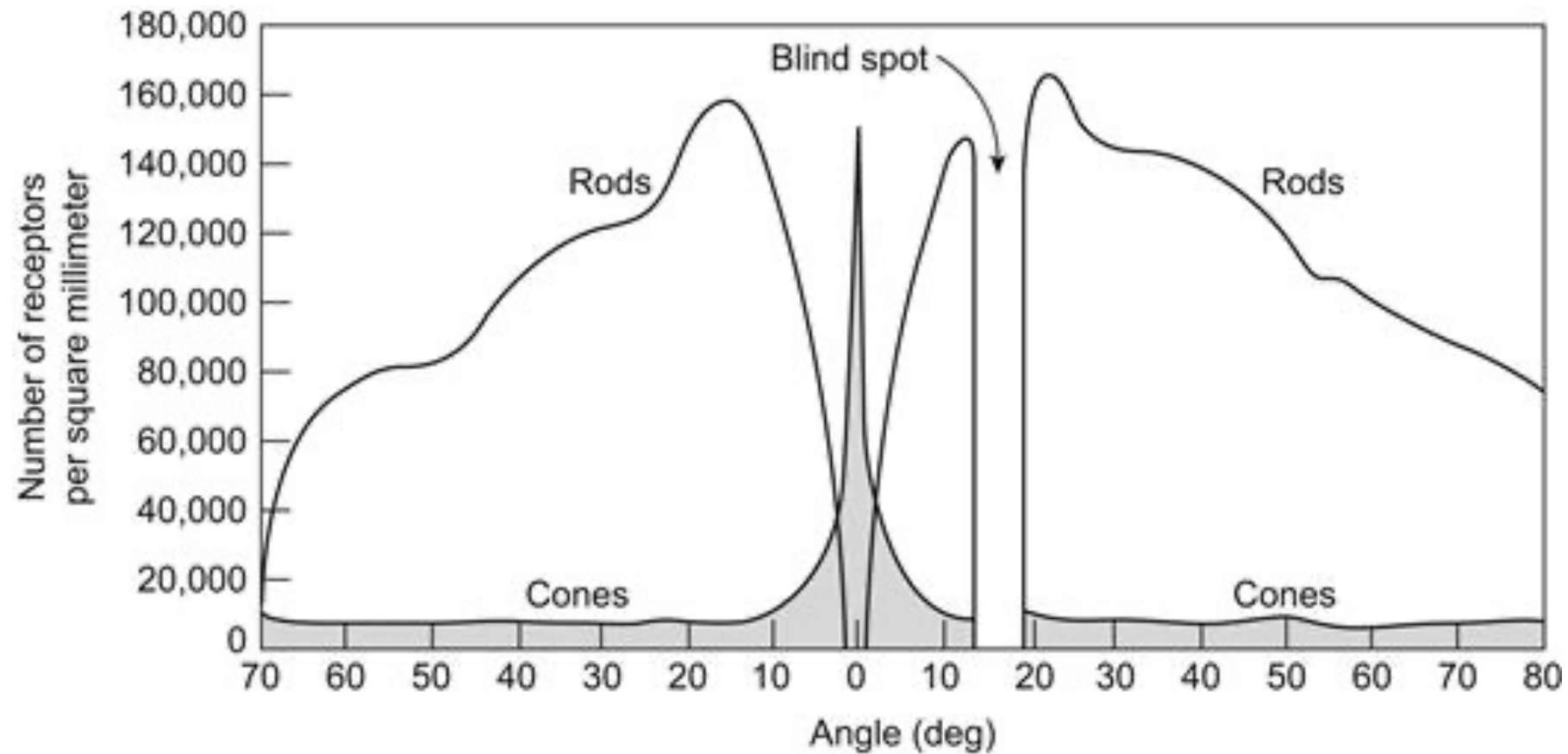- *158,000 v 9,000*

Data compression

- Fovea v peripheral
- 1:1 vs x:1
  - Compression and data loss

Processing resources

- Fovea is about 1% of the retina but takes about 50% of visual processing power
- The other 99% of the retina takes the rest

Rods v Cones

Why we Don't Need High-Res Peripherals

- An elaborate illusion built by the brain
  - The eyes are constantly moving and gathering information for the brain to build the illusion
  - A nonsensical page except where you're looking would be the same as reading a normal document
    - Our peripheral eyesight is 20/200 or legally blind

Then What are the Peripheries for?

- 3 important functions
  - Guides fovea
    - A way to detect the important things for our fovea to look at
  - Motion detection
    - Motion is a huge point of interest
  - Night vision
    - The majority of the eye is dominated by rods, so in low light conditions, the periphery helps with night vision.

Relation to GUI Design

Notifying users of errors or other messages usually goes unnoticed because the message was displayed in the periphery. There is only a 1–2 centimeter area on screen which is in the fovea

RETURNING CUSTOMER LOGIN

Login ID not found.

Login ID: fooo

Password:

☐ Remember my Login ID for faster logins.

LOGIN

Methods to avoid Missed Messages

- Put it where the user is looking
  - If the message is displayed where the fovea is looking the user will see it

- Mark the error
  - Mark the error prominently. Put it next to what the error refers to unless that moves it too far from where the user might look

- Use an error symbol
  - Error symbols are more likely to be picked up, even In the periphery

- Reserve red for errors
  - If possible, use red only for errors

A Worst-Case Solution

Pop-up Message

- Interrupts user workflow and can annoy the user
  - Annoyance rises with modality
- Ad block may block popups, so user may lose info if not careful

Use Sound

- In quiet workplaces like offices, lots of beeping would be impossible to work in
- In loud workplaces like factories, beeps would never be heard, and messages would never be noticed

Wiggle or Blink Briefly

- Just a little bit of motion can get the users attention to a message
- A lot of users today have become numb to blinking and flashing due to so many ads
- ¼ to ½ a second

O(n) for Vision

O(n)   O(1)

L Q R B T J P L F B M R W S G T H U J L U 9 J V Y I A
F R N Q S P D C H K U T L Q R B T J P L F B M R W S
 G T H U J L U 9 J V Y I A3 L C T V B H U S E M U K
E X C F T Y N H T D O L L8 F R N Q S P D C H K U T
G V N G R Y J G Z S T 6 S W Q E L F G H B Y I K D 9
3 L C T V B H U S E M U K G V N G R Y J G Z S T 6 S
W Q E L F G H U Y I K D 9E X C F T Y N H T D O L L8

Other "Pop" Factors

- Motion

- Font weight (i.e boldness)

- Color

Anything that distinguishes an object from similar surrounding objects

Designing with Pop

- Designing so that icons are distinguished is hard but not impossible

- Do not get too fancy
  - A distinctive color and shape is enough to get the users attention

Thank You!