Our Peripheral Vision is Poor

Our Peripheral Vision is Poor

- Again the notes here are heavily based on Jeff Johnson's book

- Designing with the mind in mind

Our Peripheral Vision is Poor

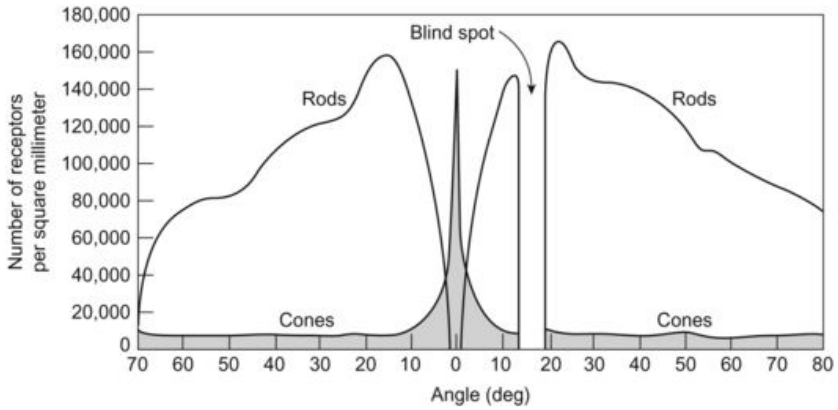
- In the previous lecture we saw that human vision in terms of colour is different from camera vision
- It also differes in terms of resolution
  - A camera has even resolution across its CCD
  - Whereas the eye has an uneven distribution of resolution

Our Peripheral Vision is Poor

- What we will end up covering today is the following
  - Why stationary objects in muted colours in the peripheral vision are not noticed
  - But motion is noticed in the peripheral vision

Our Peripheral Vision is Poor

- Resolution of the fovea compared to the periphery
  - The majority of the resolution within the human eye is right at the center where the fovea
  - The resolution rapidly drops from the center towards the periphery
  - Fovea is only 1% of retina but visual cortex devotes about 50% of processing power to it

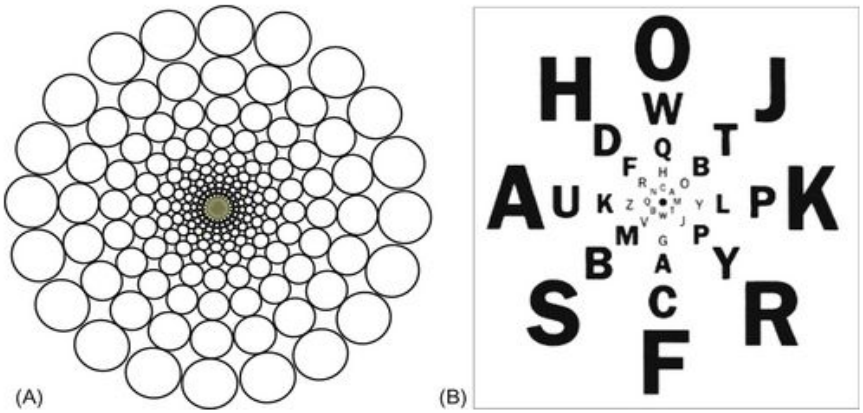


Our Peripheral Vision is Poor

- That's not all
  - Information on the fovea is not compressed
  - Information on the periphery is loss compressed
  - Resolution at the fovea is much higher than that of digital cameras
  - However towards the periphery the resolution is only a few dots per inch

Our Peripheral Vision is Poor

- On first observation of this you may think and wonder why we see the world as clearly as we do
  - The reality of the matter is that unconsciously we are making eye movements
  - To get as much of the world perceived by the fovea
  - The bits that aren't covered by the fovea are then filled in by the brain



Our Peripheral Vision is Poor

- How does it fill in the information?
  - Fills it in based on what we have come to know and expect
  - According to Clark's research from 1998
    - A high resolution model is not kept in the brain
    - Brain will order eyes to resample as necessary.

Our Peripheral Vision is Poor

- The research went a step further
  - Had a computer tracking the eye position of the user
  - Only showed text in the area where the user was focused
  - Random noise elsewhere
  - Not only do people read normally they do not notice the noise

Our Peripheral Vision is Poor

- To go a step further the fovea is the only area of the eye that has the required resolution for reading
  - And also the small area surrounding it
  - The rest of the visual field is incapable of reading
  - The end result is that reading requires a lot of eye movement

Our Peripheral Vision is Poor

- The distribution of cones also affects our colour perception as well as spatial resolution
  - Colours are much easier to distinguish in the center of vision as compared to the peripehery
  - Because there are more cones there

Our Peripheral Vision is Poor

- Interestingly there is also a spot in our vision where there is zero visual information
  - The blind spot
  - Where the blood vessels and the optic nevers leave the eyeball
  - No cones and rods there
  - You don't notice it because your brain fills in the gaps based on surrounding information

Our Peripheral Vision is Poor

- At this point you may wonder what use the periphery is
  - Contains very little information about our environment
  - However, it is there is provide low resolution information for guiding eye movement
  - May trigger the brain into changing eye focus
  - Useful as our eyes do not scan the environment randomly

Our Peripheral Vision is Poor

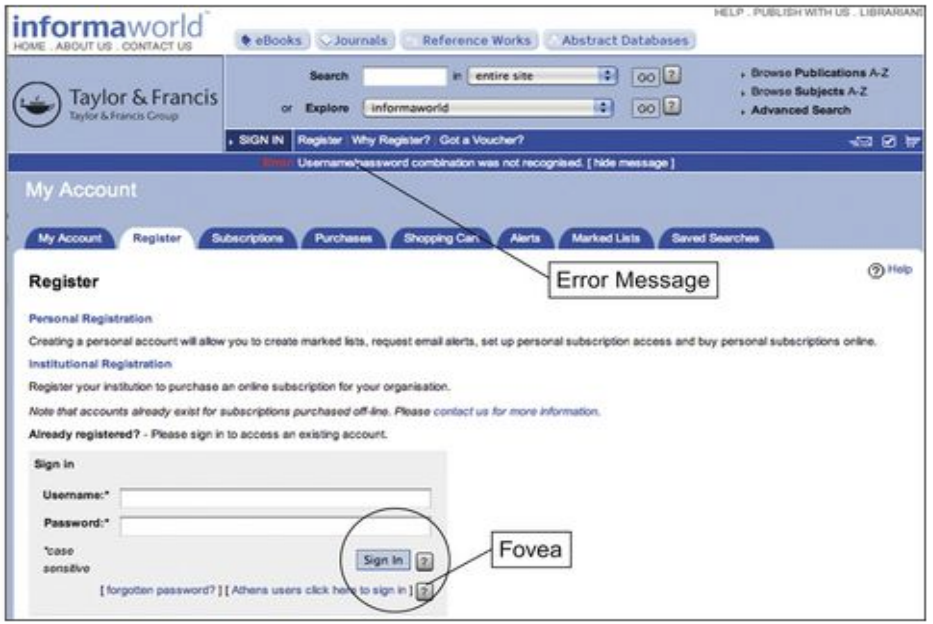
- Information that is used by the brain to plan what areas should be focused on next
- Also affected by goals
  - e.g. if you are looking for a red apple your periperhal vision will look for round red patches of colour
  - May or may not be the object you are looking for

Our Peripheral Vision is Poor

- An example of an object as seen in peripherial vision
  - Although it is low quality there is enough information there
  - To inform you brain that there is something the approximate shape of an animal
  - Brain will order viewing of that object to determine if it is harmful

Our Peripheral Vision is Poor

- Examples from user interfaces
  - Helps to explain why error messages are not noticed in applications
  - Error message is so far away from focus
  - Makes it difficult to notice and react to



Our Peripheral Vision is Poor

- Even when an error is shown close to the focused area there may be other objects that will prevent the error from being seen
  - Here is an error message that is closer
  - But not easily visible
  - Why?

Our Peripheral Vision is Poor

- 1) it is still in peripheral vision
  - As the fovea only comprises a 1cm to 2cm squared box
- 2) the error message is not the only thing in red
  - Look at the title

Our Peripheral Vision is Poor

- Common methods of making errors visible to users
- Put it where the user is looking
  - When interacting with a GUI people are predictable in where they look
  - Particularly in western cultures (top to bottom, left to right)
  - When using a pointer they will focus on pointer or to where it is going
  - When a user clicks a button they will focus on that button for a few moments then and after

Our Peripheral Vision is Poor

- Mark the error
  - Place an error message near to the area that it is refering to
  - Unless that error will be too far away
  - Might be other objects in the way

Our Peripheral Vision is Poor

- Use an error symbol
  - A particular favorite of IDEs including Eclipse
  - Gives an instant idea as to where the error may have occured
  - Might give your user a chance to fix it before they have to read the error message

Our Peripheral Vision is Poor

- Reserve red for errors
  - If at all possible when designing your GUIs try and reserve the colour red for errors
  - A colour that most people associate with error, danger, problems etc
  - Using it for other information may cause misinterpretation

Our Peripheral Vision is Poor

- Here is an example of a reworked page that will make users notice errors better when they occur

Our Peripheral Vision is Poor

- Here is an example from AOL
  - Where errors are shown right next to the area that they concern
  - Notice the text immediately below the text field
  - Following the viewing pattern of users

Our Peripheral Vision is Poor

- Dialog boxes
  - Heavy artillery that is to be used sparingly
  - An in your face approach
  - Interrupts the user's work and demands immediate attention
  - Should only be used when the error message denotes something critical

Our Peripheral Vision is Poor

- Even worse if they are modal dialogs
  - Users cannot interact with the application until the dialog is dismissed
  - Non modal will appear but can be ignored till later
  - Best example of a modal dialog is save before quit
    - As this is a critical condition

Our Peripheral Vision is Poor

- Use sound
  - Users will by reaction start to scan the screen for what caused the beep
  - Particularly if the error is a distance away from where it occured
  - Not great in open plan/noisy environments
  - Also users tend to mute their sound a lot

Our Peripheral Vision is Poor

- Flash or wiggle briefly
  - Particularly useful if in periperheral vision
  - Users will notice quickly
  - Again an in your face approach
  - Will break user work flow
  - Should be no longer than .25 or .5 of a second