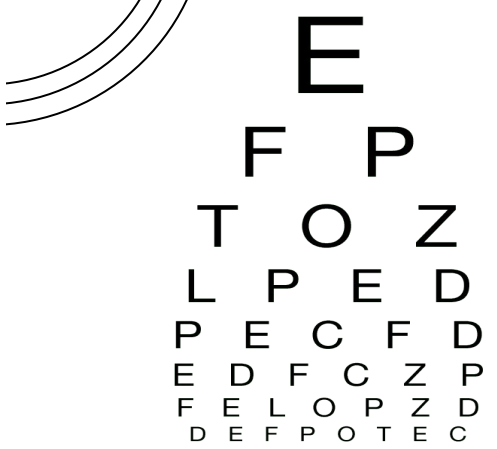
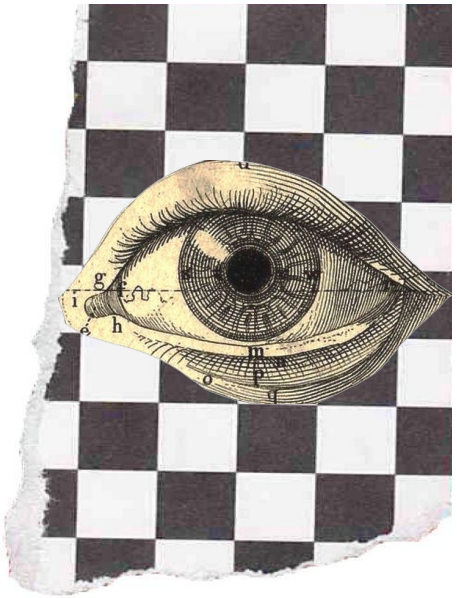
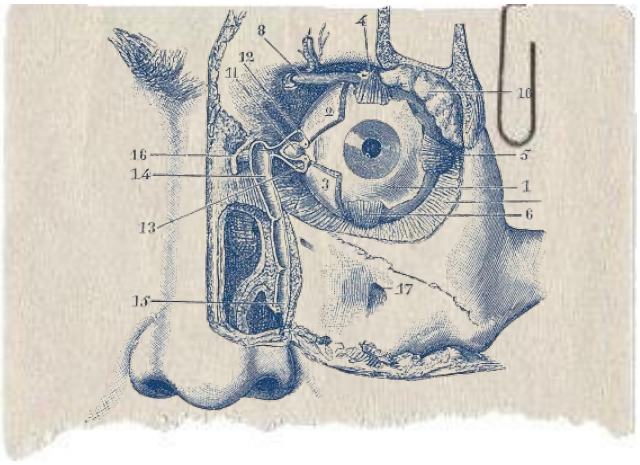
Rene, Elexcia, wesley, Lexx



VISION

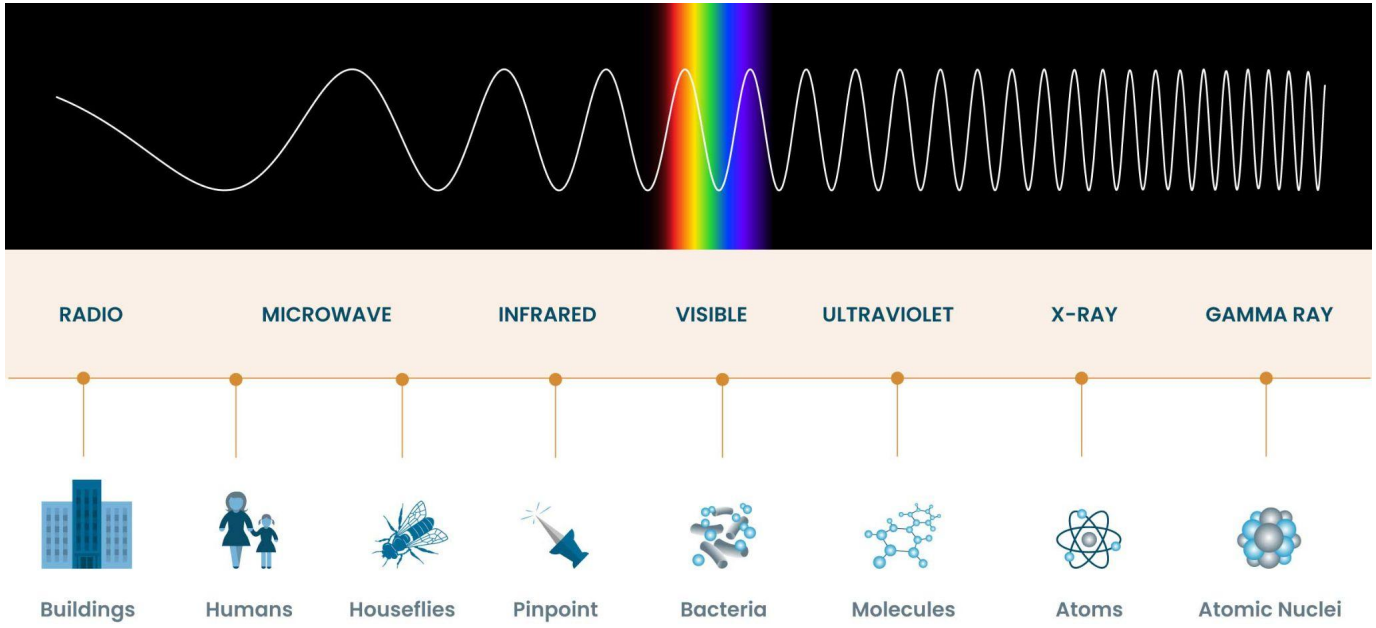




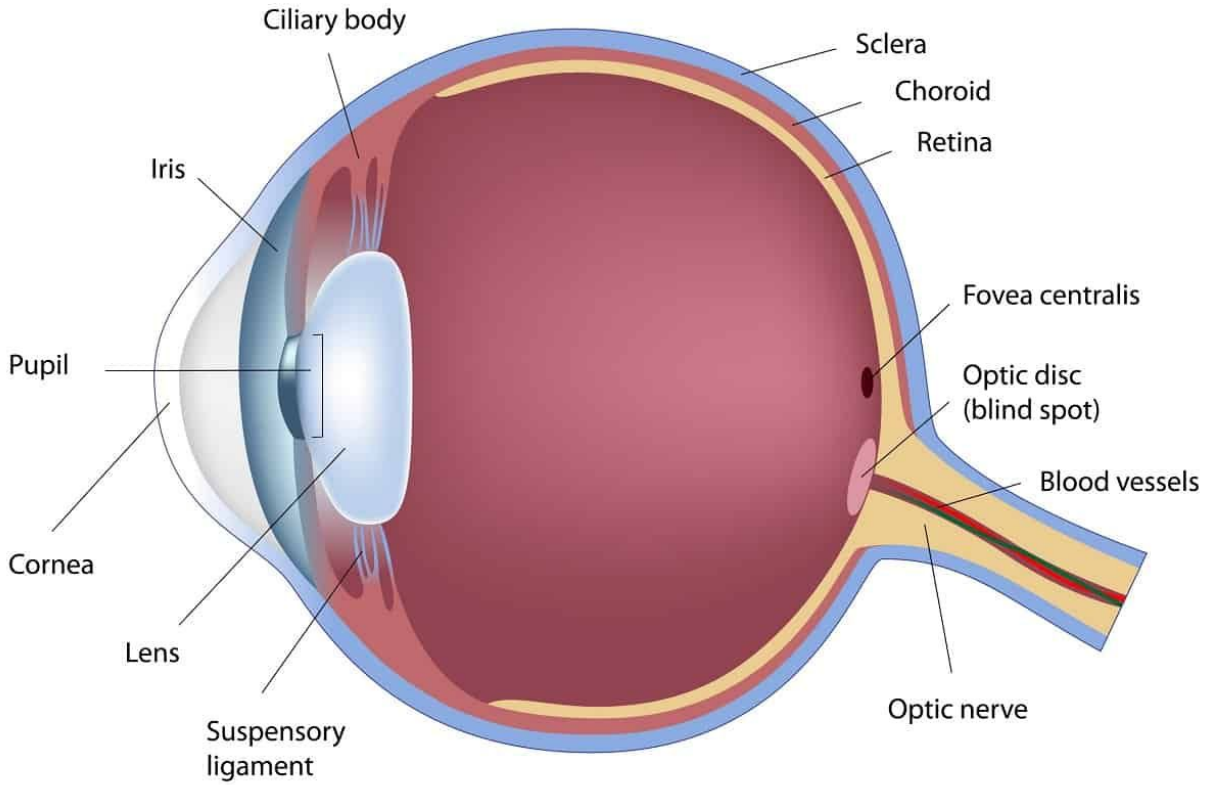
What is light

Light is a band of the electromagnetic spectrum that is visible to the human eye.

Between 380-750 nm



Anatomy of the Eye



Eye Anatomy Explained

Cornea- The outermost, clear layer of the eye

Iris- The colored part of the eye that controls the dilation and constriction of the pupil

Pupil-The opening in the Iris that light passes through

Lens- Transmits light and focuses it on the Retina

Retina-The back of the eye which contains layers of photoreceptors

Fovea- Where the lens focuses light when directly looking at an object, also where the cones are located

Eye Anatomy Explained Cont.

Ciliary Body-An area found behind the iris that secretes aqueous humor and has a muscle that controls the shape of the lens.

Sclera- The white fibrous outer tissue of the eye.

Choroid-A thin layer of tissue that separates the sclera and retina.

Optic Disk-A small round section in the back of the eye where the Optic Nerve and Retina attach

Optic Nerve-A bundle of nerve fibers that send visual signals to the brain for perception

The Photoreceptor cells

-The cells in your eyes that respond to light.

- 2 kinds of cells in the human eye.

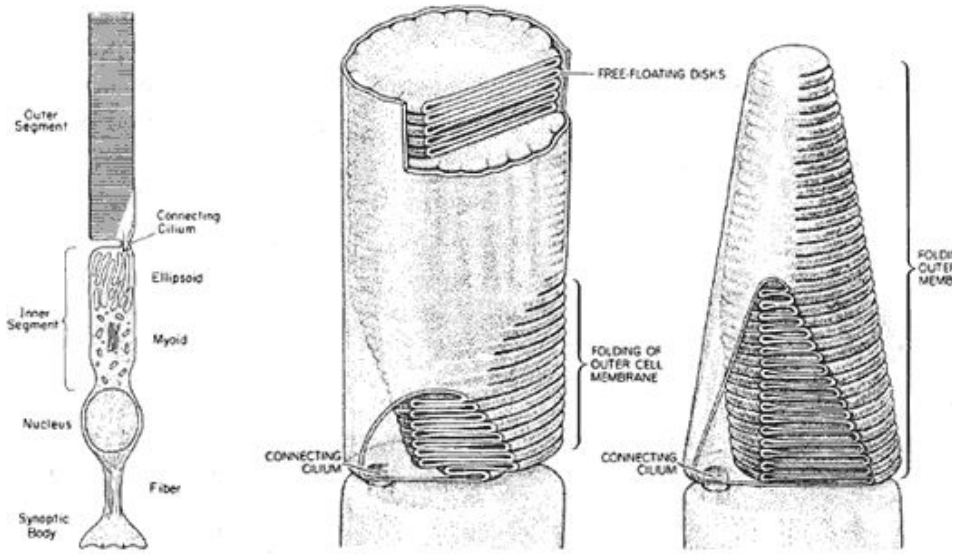
- Rods and Cones.

-Rods are responsible for low light vision

and lack color vision and spatial acuity.

-Cones are active at higher light levels.

And are responsible for color vision and spatial acuity.



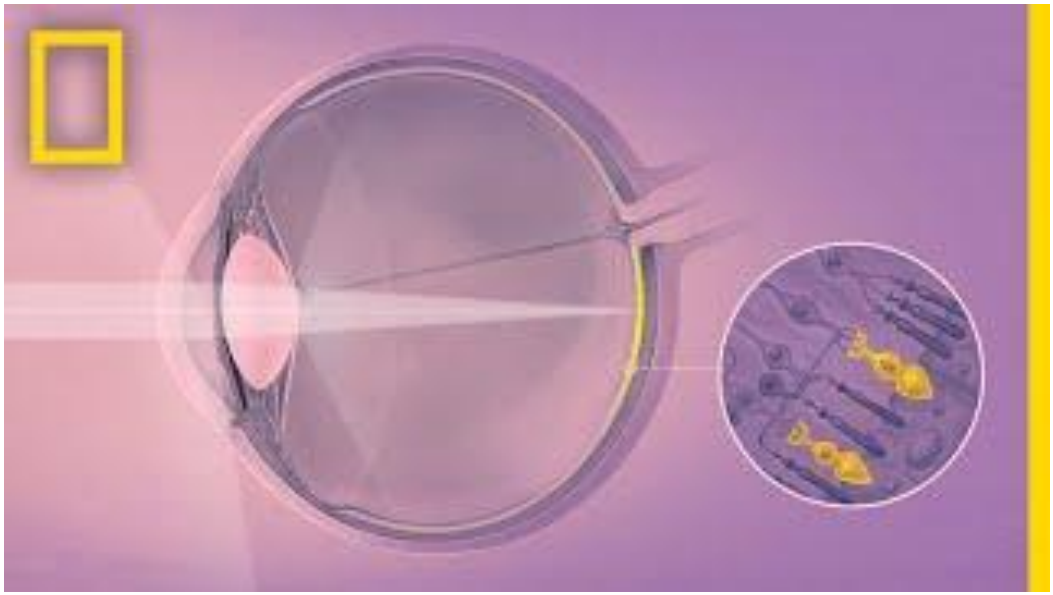
At the left is a generalized conception of the important structural features o vertebrate photoreceptor cell. At the right are shown the differences betwe the structure of rod (left) and cone (right) outer segments. These diagrams from Young (1970) and Young (1971).

Wesley

How Does Vision Work

Light enters the eye through the cornea, a dome-shaped lens, and the pupil, controlled by the colored iris, allowing it to focus. The retina then converts that focused light into electrical impulses. The optic nerve sends those impulses to the brain for interpretation.

From the Eyes to the Brain

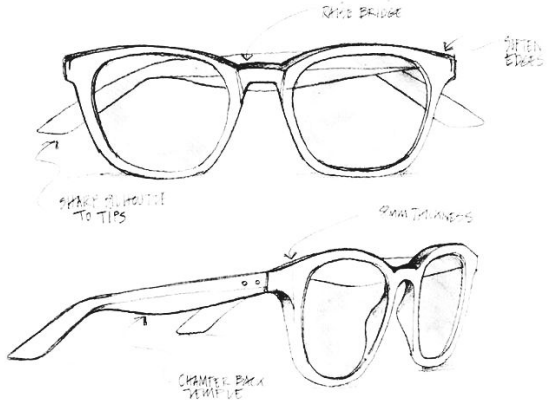


Vision while Using glasses

Eyeglasses are wearable accessories and medical devices that help you see. They adjust light before it enters your eyes, making up for what your eyes can't do. They help you see clearer at variable distances

But if you have a refractive error (either in one or both eyes), the affected eye(s) can’t bend beams of light correctly, making things look blurry and out of focus.

Elexcia



What can glasses help with

There are four main types of refractive errors that eyeglasses can help:

- Nearsightedness (myopia). Objects close up are clear, but objects farther away are blurry.
- Farsightedness (hyperopia). Objects far away are clear, but objects close up are blurry.
- Tilted or distorted areas of vision (astigmatism). Your vision is blurry close up and far away. It can also cause visible “starburst” rays coming off lights (especially at night).
- Trouble focusing up close due to age (presbyopia).

Vision using Contacts

Lexx

Contacts are known as thin lenses that are used to improve and enhance clearer vision. They are placed on the outer layer of the eye, on top of the cornea.

Most people refer to contacts rather than glasses because of the quicker convenience of them to enhance their eyesight.

Did you know?

Not everyone sees the same colors. Color blindness comes in different types.

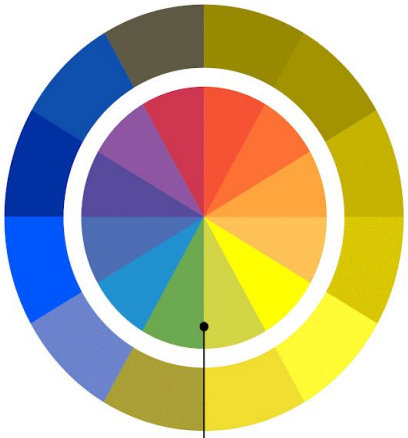
- ☆ Deuteranopia is the inability to see green.
- ☆ Protanopia is the inability to see red.
- ☆ Tritanopia is the inability to see blue.

People with protanopia can see similar to people those who have deuteranopia because the cones that help us perceive green and red overlap.

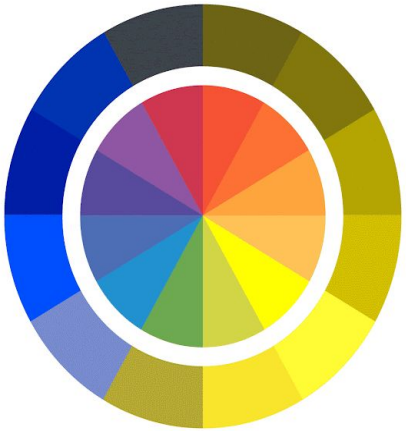
Color Blindness examples

Red–green colour blindness

Deuteranopia



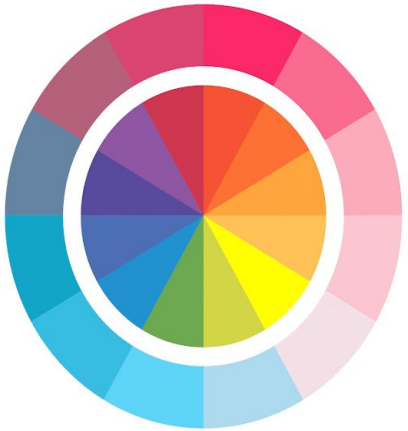
Protanopia



Normal colour vision

Blue–yellow colour blindness

Tritanopia



Complete colour blindness

Monochromatism

Principles of Perception

Proximity-Objects that are close to each other are perceived as together

Similarity-Objects that are similar in appearance are perceived as belonging to the same group

Continuity-When presented with a series of dots or lines people tend to perceive the continuous pattern rather than separate parts

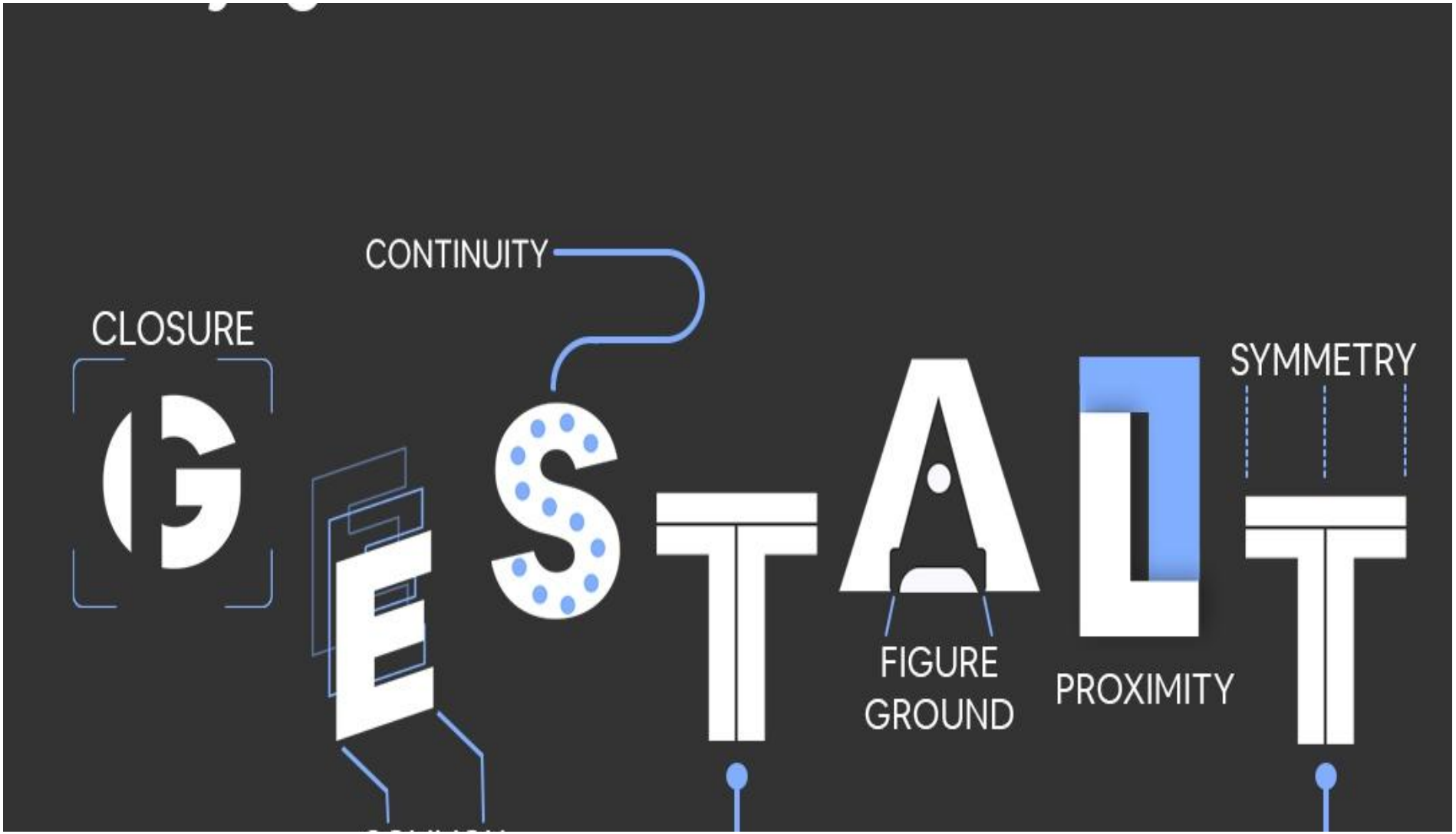
Closure- when presented with incomplete information people tend to perceive a whole figure or fill in the missing parts.

Figure-Ground-People tend to perceive objects as either figure(foreground) or background based on various visual cues.

Principles of Perception Cont.

Common Fate- Objects that move in the same direction or that share a trajectory are perceived as belonging together

Symmetry- Objects that are symmetrical are perceived as aesthetically pleasing .


CONTINUITY
CLOSURE
SYMMETRY
FIGURE
GROUND
PROXIMITY

How do computers see

Image Acquisition- Digital sensors which produce data that the computer can process.

Pre-processing-Before analyzing the images the computer might perform tasks like brightness and contrast adjustment to enhance the image.

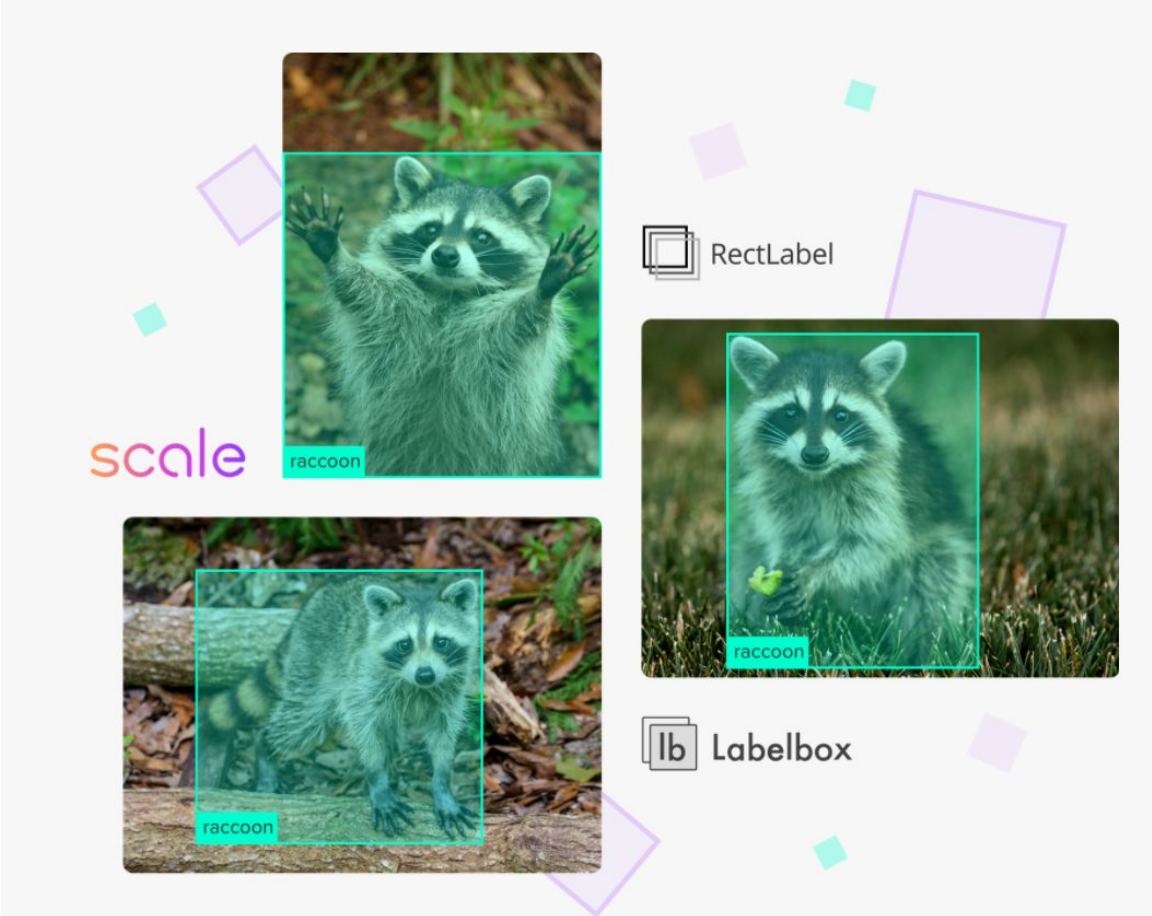
Feature Extraction- The computer will identify specifics

of the image that could include corners, textures, and shapes.

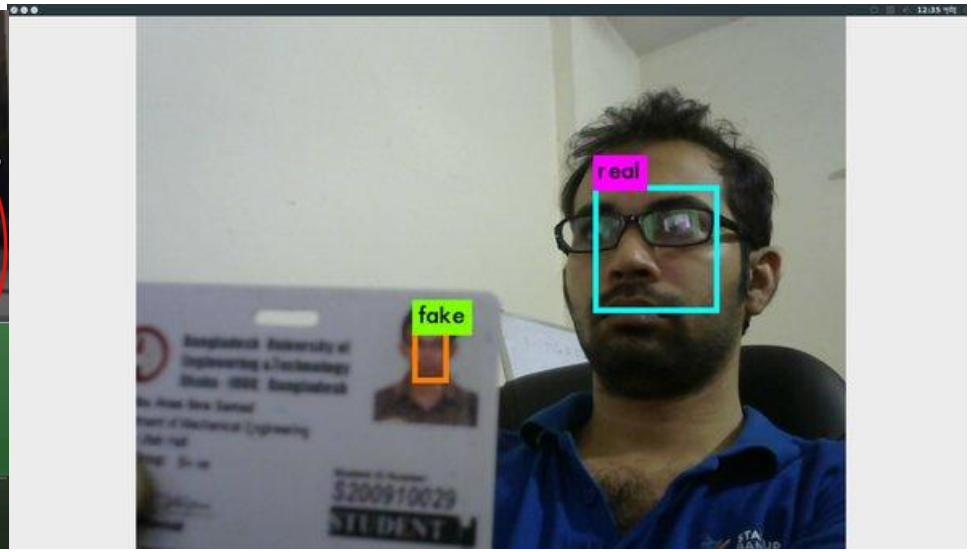
How do Computers see Cont.

Pattern Recognition- Using algorithms and machine learning, the computer will compare the specifics of the picture to things it has been trained to recognize.

Object Detection/Recognition-Once the computer recognizes patterns or objects,it can now point out specific objects or categories.



Modern Applications



Modern Applications Cont.

https://pimeyes.com/en

Works Cited

https://docs.google.com/document/d/1p64mEwBD85pYRcupaILJzLlLMlUjr0prdyJ1hG5qSpQ/edit