Module 8 Discussion

In this module we focus on image formation and processing, the way a computer perceives the world through computation, so that we can manipulate, navigate, or recognize an object.

The way I’ve seen it is apparent when creating an elaborate graphic, we use layers, and add transparency to some areas. I’ve done graphics at a more advance level and when you want to achieve a special effect that you’ve never seen before, its usually by just making a series of elaborate layers that have simple changes of contour, hues, and textures. So I can see how trying to interpret an image for a computer would be to reverse the process.

In a partially observable environment , A sensor model is used for Vision.

Its components are : An Object model & Rendering model

Objects display the description & Rendering describes the accurate features/measurements of each object created hence rendered.

We know that by refraction , light can fool the perspective and actually cause things to even disappear, so we must take that into consideration, as well as shadowing, reflection, and image blur when computing an image rendering.

The principle of trichromacy – states that for any spectral energy density, no matter how complicated, it is possible to construct another spectral energy density consisting of a mixture of just three colors – such that a human can’t tell the difference between the two.

Normally the 3 are RGB colors for computer vision algorithms.

1st Each surface is modeled with three R/G/B intensities

2nd Apply Lamberts cosine law to each to get 3 R/G/B pixel values

3rd The model Predicts correctly that the same surface will produce different colored image patches under different-colored lights.

The goal of edge detection is to abstract away from the image a more compact abstract representation that shows the edge contours in a way that can be interpreted separately from discontinuities. (e.g. reflectance discontinuity, illumination discontinuity(shadow). .

Edges correspond to locations in images, where the brightness undergoes a sharp change.

Texture is the visual feel of a surface

Optical flow is when an object is showing an apparent motion in the image.

-describing the direction and speed of motion of features in the image

Edge Detection applications:

In computer vision:

-object recognition

-line drawing analysis

-motion algorithms

In image analysis:

-segmentation

-enhancement

Segmentation is the process of breaking an image into regions of similar pixels.

* Each pixel can be associated with certain visual properties, such as brightness, color, and texture.

Appearance is what an object tens to look like

The world is effected by illumination , the world affects -> image

The image affects -> Retinotopic Representation

The Retinotopic Representation is built image & with Knowledge About the World we can control its attention on Retinotopic Representation.

The Retinotopic Representation build the Features known as Shape, Motion, Color.

The Knowledge About the World interacts with the Features.

The Context interacts & grabs stable Features and relates that with Knowledge About the World.

Techniques for processing images

* Anisotropic diffusion
* Hidden Markov models
* Image editing
* Image restoration
* Independent component analysis
* Linear filtering
* Neural networks
* Partial differential equations
* Pixelation
* Principal components analysis
* Self-organizing maps
* Wavelets