Image Acquisition & Representation

Computer Vision Detection:

- Detection - "Are there x"
- Verification - "Is that y"
- Identification - "Is that a picture of x"
- Organisation
- Scene and context categorization
- 3D layout, depth ordering

Computer Vision Challenges:

- Orientation
- Illumination
- Occlusion
- Scale
- Deformation
- Background clutter
- Object intra-class variation
- Local ambiguity
- The world behind the image

Modelling a spatial brightness pulse:

$$\int_{-\infty}^{-\infty} \delta(t)dt = 1 \qquad \delta(t) = \lim_{\epsilon \to 0}[y_\epsilon(t)]$$

Sifting Property:

$$\int_{-\infty}^{\infty} f(t)\delta(t)dt = f(0) \rightarrow \int_{-\infty}^{\infty} f(t)\delta(t-\alpha)dt = f(\alpha)$$

The sifting property can be used to express a 2D image function as a linear combination of 2D Dirac pulses located at points (a,b) that cover the whole image plane.

Ideally the optical system should map point information to points. However optical systems are not ideal. Each point will have some spread which will be represented by a point spread function. An image is the sim of the PSF of all its points.

Point spread function:

$$g(x,y) = f(x,y) * (h,x) \qquad h(x,y) = PSF$$

Colour Spaces:

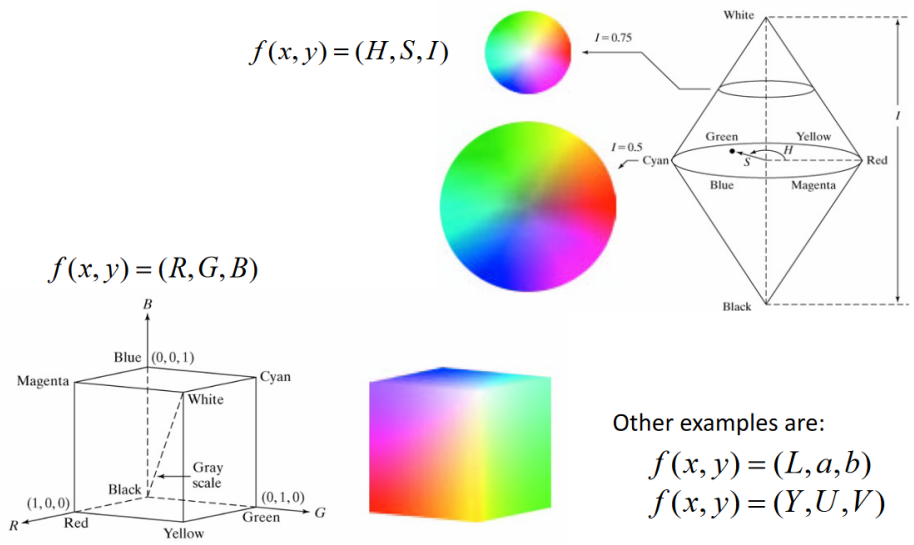

Figure 1: Untitled

The effect of spare sampling is aliasing, anti-aliasing can be achieved by removing all spatial frequencies above a critical limit. Removing sharp edges.