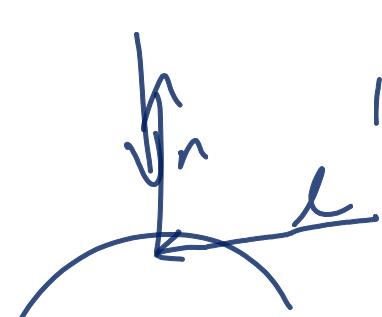


\tilde{I} perfect image.
 $\tilde{I}(x,y) = v$

$$0 \leq \tilde{I}(\cdot) < \infty$$

Lambertian Model is a classical model of surface reflectance.

→ The amount of light reflected off the surface varies with the cosine of the angle of incident light.

$$R(x) = \rho l(x)^T n(x)$$


inner product between $l(x) \cdot n(x)$

inner product between two unit vectors specifies the cosine of the angle between them



ρ is a scalar that captures surface properties...

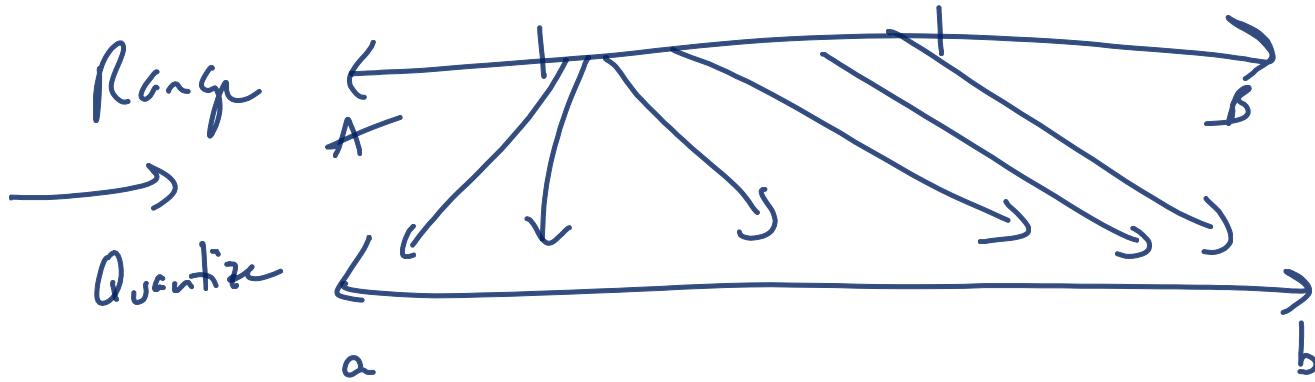
Digital Images

$$I: \mathbb{N}_0^2 \rightarrow \mathbb{N}_0$$

Map

Digitization is a projection
 $(\mathbb{R}^2 \rightarrow \mathbb{R}) \rightarrow (\mathbb{N}^2 \rightarrow \mathbb{N})$

8-bits long



$$\rightarrow I(x, y) \rightarrow$$

$$x \in \mathbb{N}_0 \\ y \in \mathbb{N}_0$$

$$\rightarrow I(\star) =$$

$$\star = \begin{bmatrix} x \\ y \end{bmatrix}$$

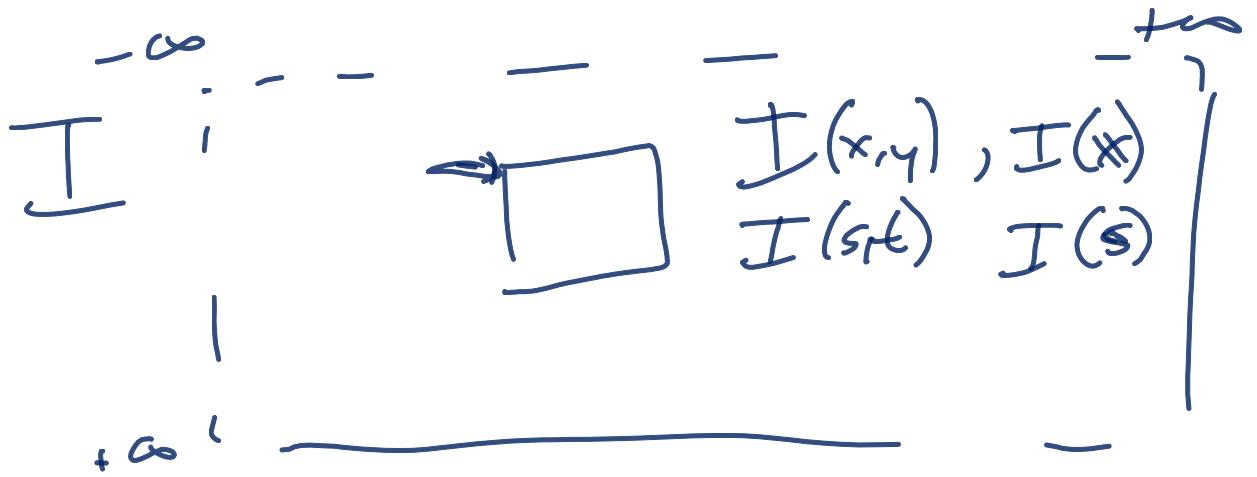
Discrete images are mathematical
form of digital images

A lattice of pixels



↳ indices into the domain of the function

for which we have a non-zero range

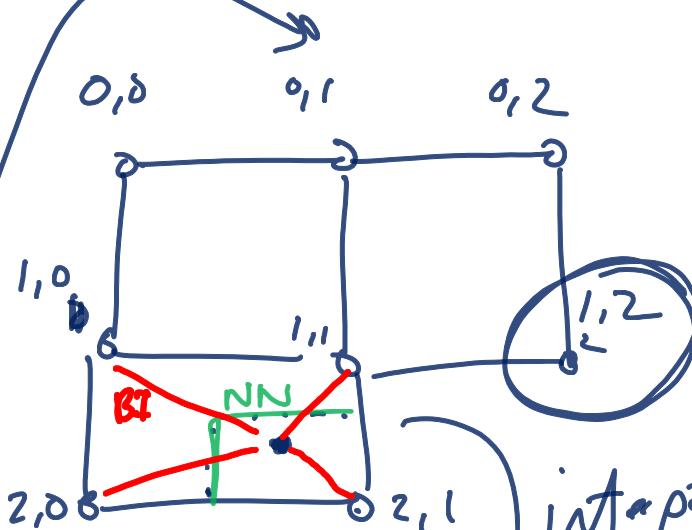


Continuous Image

$$I(1,2)$$

$$I(1,2)$$

$$I(0,1)$$



$$I(1.5, 1.075)$$

interpolation

Potts Model Example

Assumes

Images are piecewise constant

$$E(I) : (\mathbb{Z}^2 \rightarrow \mathbb{Z}) \rightarrow \mathbb{R}$$

Ising Model

