Conceptual Framework

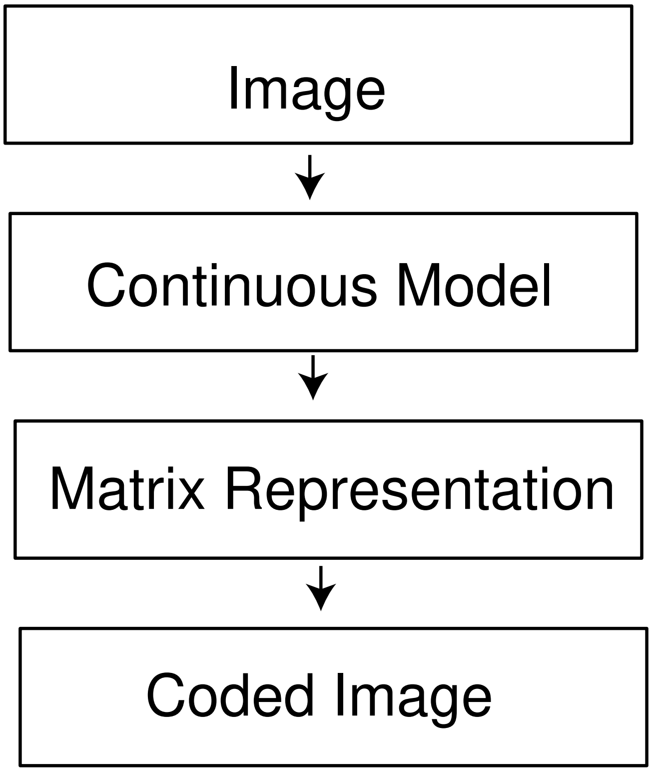


Image Model

- Image

  $$f : U \subset \mathbf{R}^2 \to \mathbf{R}^n$$

- Domain

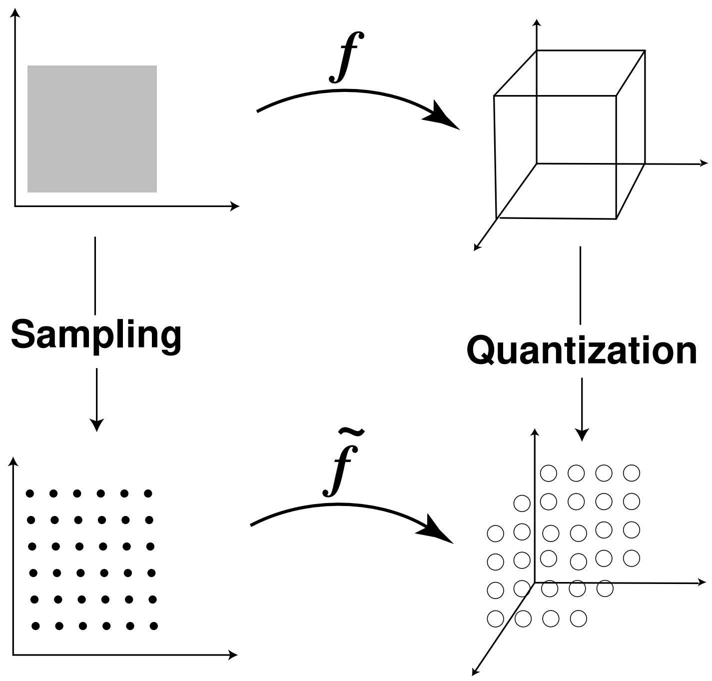
  $$U$$

- Range

  $$C = \mathbf{R}^n$$

  – (color space)

Discretization



Matrix Representation

Image $\leftrightarrow$ Matrix

$A_{m\times n} = \{a_{ij}\},\ i = 1, m,\ j = 1, n$

- Pixel

  $a_{ij} = f(u, v)$

  $a = (a_1 \cdots a_k)$

- Resolution
  - Spatial (m, n)
  - Color (number of bits a)

Image Structure

- Chanels
  - RGB
  - Z
  - Alpha
- Color Map

Quantization

- Quantization Cell
- Error

  (perceptual metric)
- Types
  - Uniform
  - Adaptive
- Median Cut Algorithm
  - Recursive Subdivision

Dithering

- Problem
  - Contouring
- Solution
  - Distribute Error
- Trade-off
  - Spatial $\leftrightarrow$ Color
- Classification
  - Pattern Type
  - Dot

Coding

- Raw
- Run Lenght Encoding
- JPEG

Exhibition

- Gamma Correction
- Gamut Mapping

Imaging Systems

- Video
  - Raster Pattern
  - YIQ / RGB
- Film
  - Grain Pattern
  - YMC
- Print
  - Halftone Pattern
  - YMCB

Calibration

- White Point
- Gray Balance
- Gamma Correction
- Color Purity

Compatibility

- Universal Format
- Cross Rendering

  (Gamut Transformation)
  - Color Cliping
  - Color Compression
  - Dithering