

AI Summer School 2024

Medical Imaging Informatics

University of Pittsburgh

Digital Image & Digital Image Operations

Instructor: Ahmad P. Tafti, PhD, FAMIA

Learning Objectives

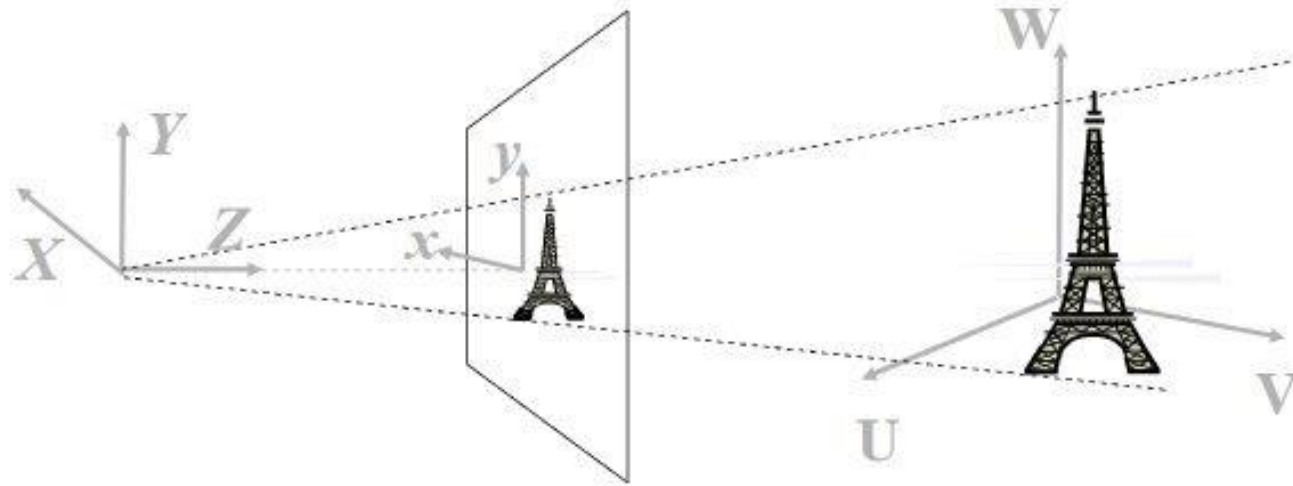
After completing this lecture, you should be able to:

- Demonstrate digital image formation
- Understand and explain B/W, Grayscale and RGB images
- Learn basic digital image operations and apply the operations

Outline

- Digital Image and Digital Image Processing
- Black and White, Grayscale, and RGB Images
- Basic Image Operation

Image Geometry



Forward Projection onto image plane.
3D (X,Y,Z) projected to 2D (x,y)

Image Geometry

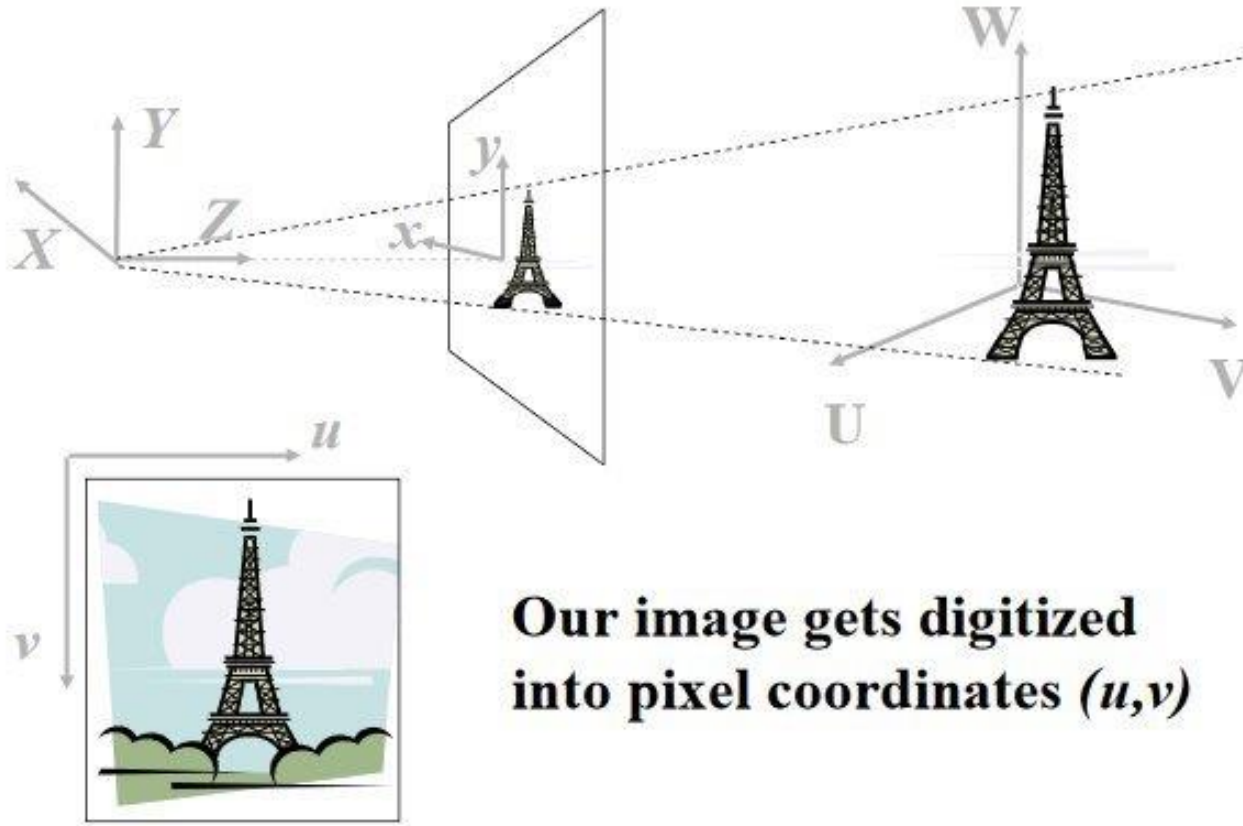
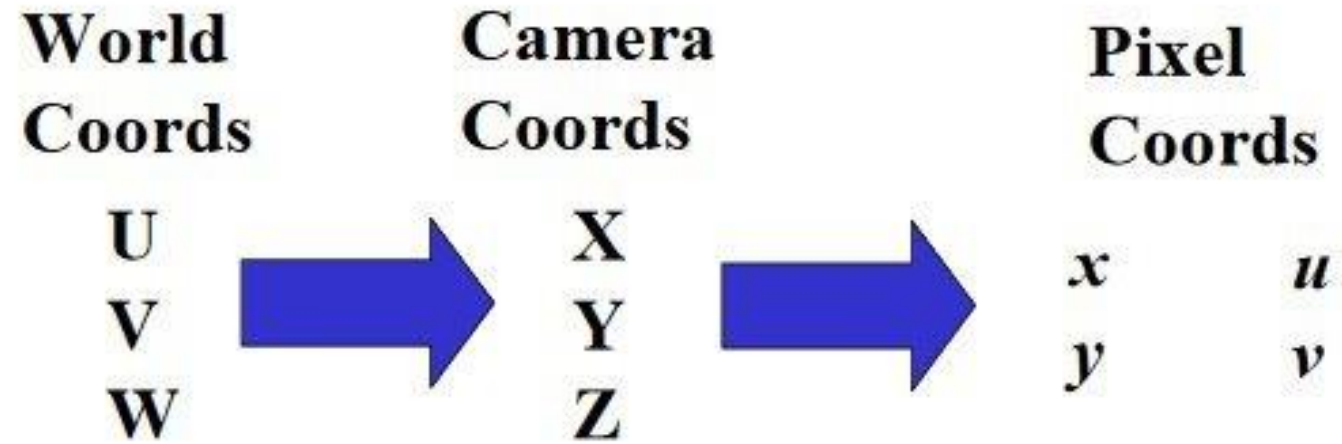


Image Geometry



Image; What we see and what computers see!

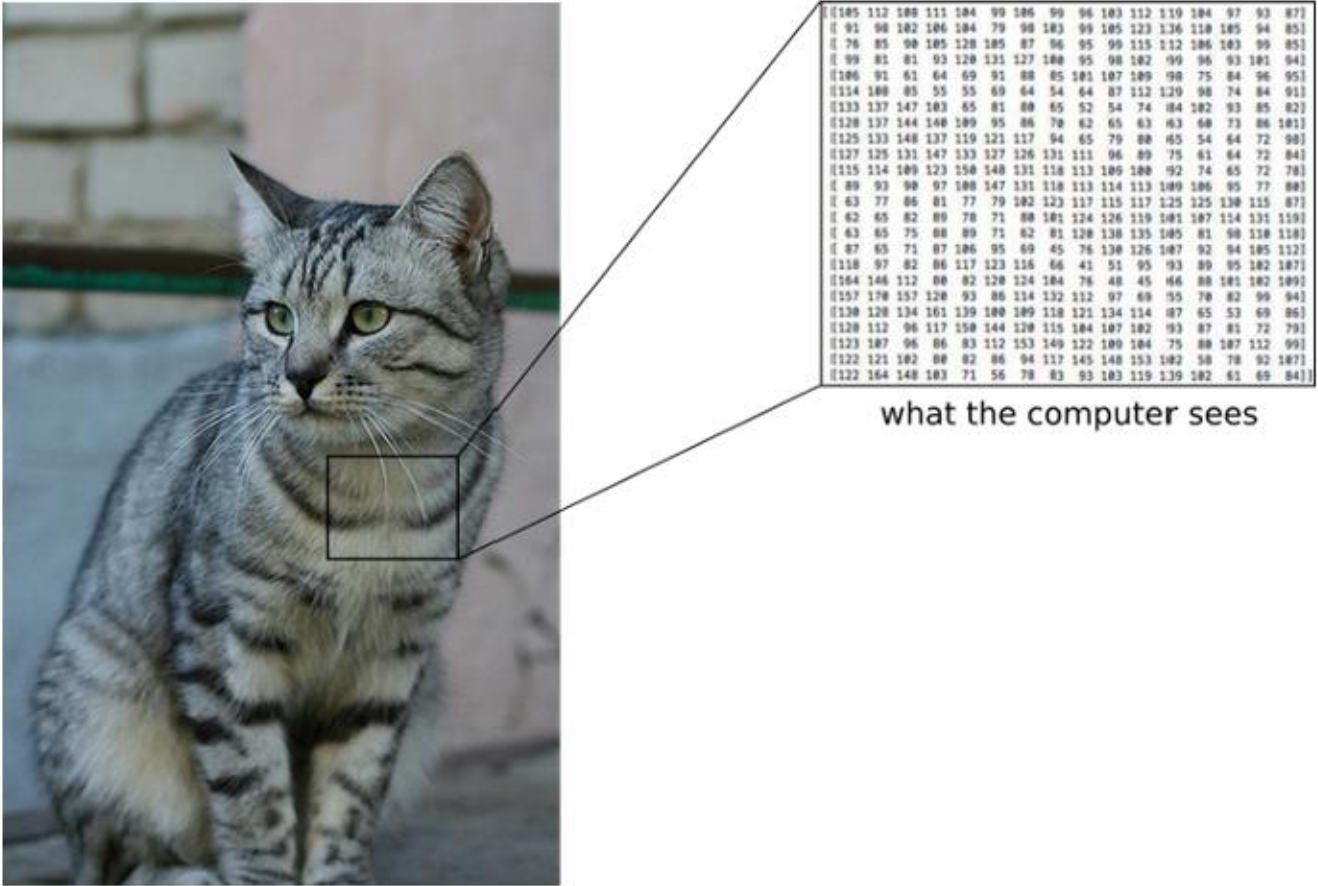
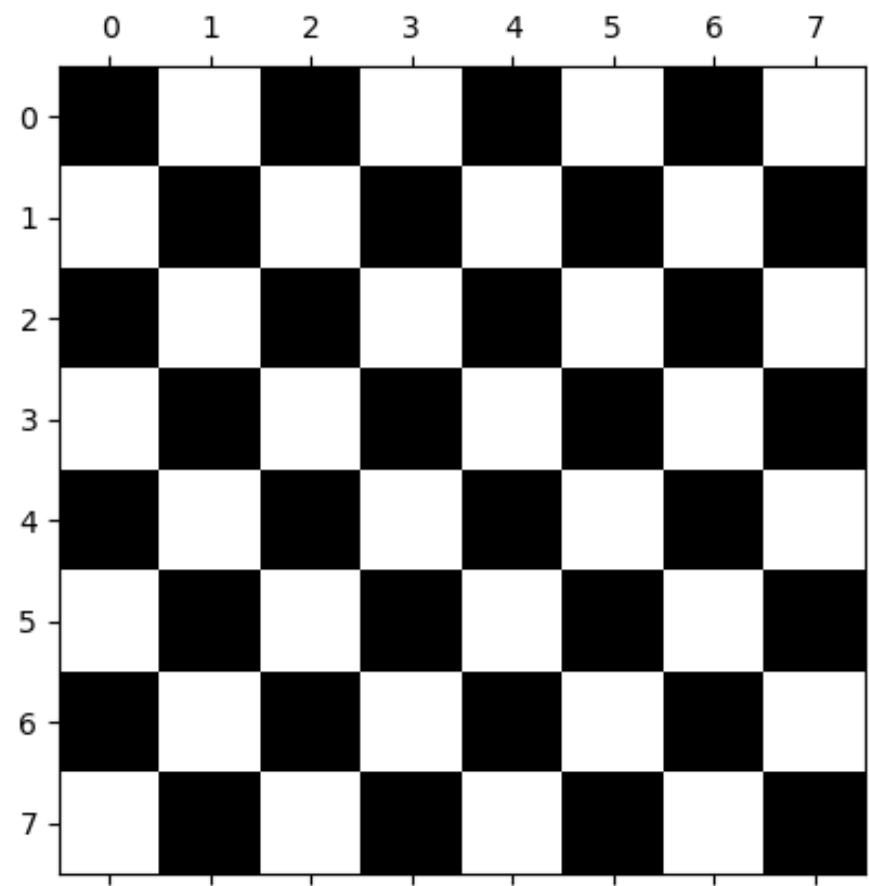


Image from: <https://bam098.medium.com/image-classification-c8bcb1d7811e>

Black and White Image



Pixel Values: 0 or 1

Grayscale Image



Pixel Values: 0 -255

RGB Image

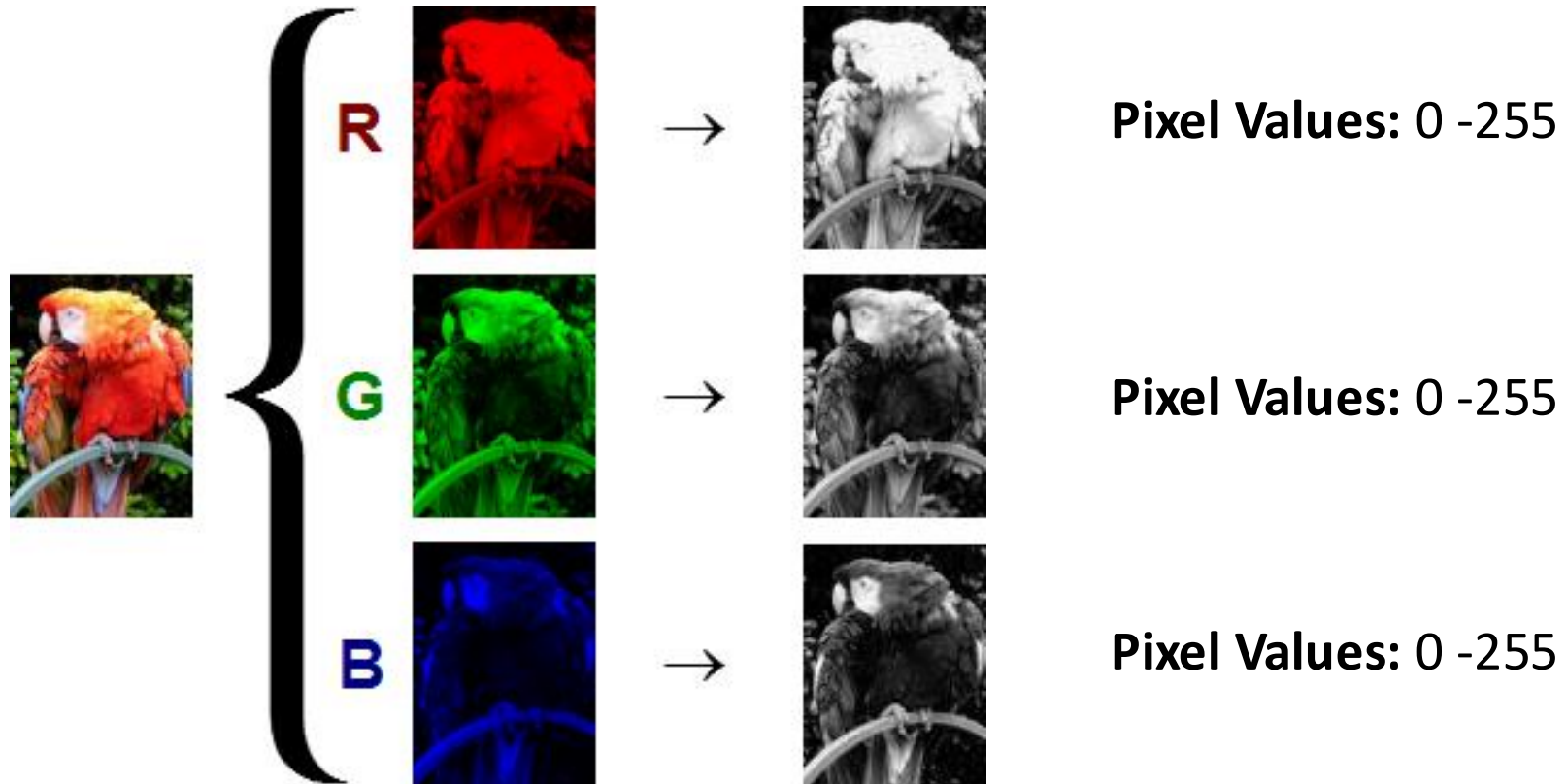


Image Operation: Thresholding

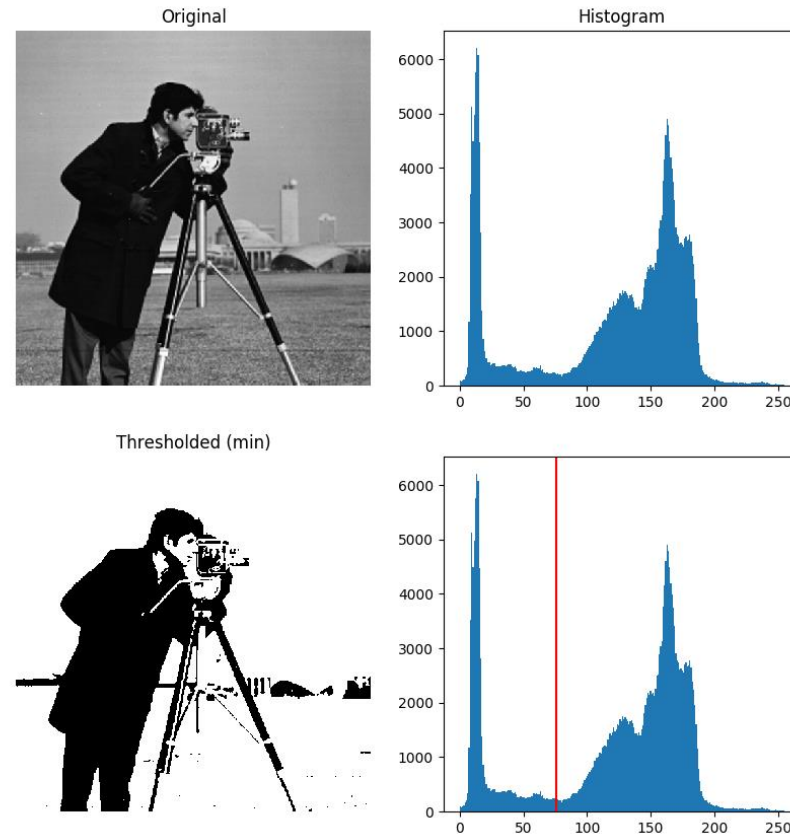


Image from: <https://scikit-image.org>

Image Operation: Thresholding

Class Activity: What about an application(s)?

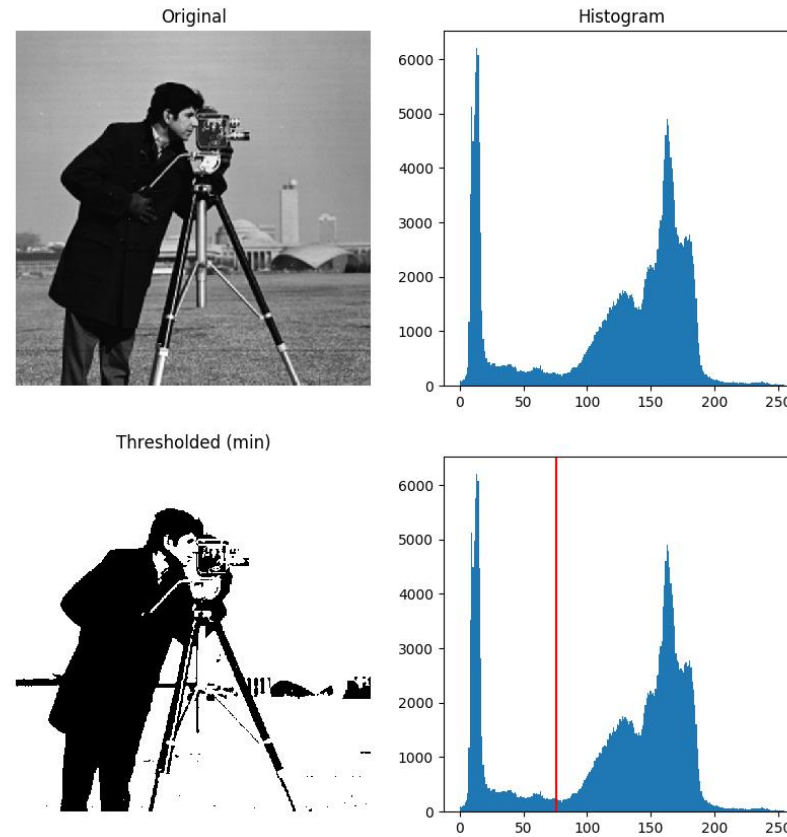


Image from: <https://scikit-image.org>

Image Operation: Addition



+



=



Image Operation: Subtraction



Image Operation: Flip



Image Operation: Resizing



Image Operation: Rotating



Thank you!

Questions!

