AI Summer School 2025

Medical Imaging Informatics

University of Pittsburgh

Digital Image & Digital Image Operations

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Pitt SHRS School of Health and Rehabilitation Sciences

Computational Pathology & AI Center of Excellence

IEEE COMPUTER SOCIETY

Learning Objectives

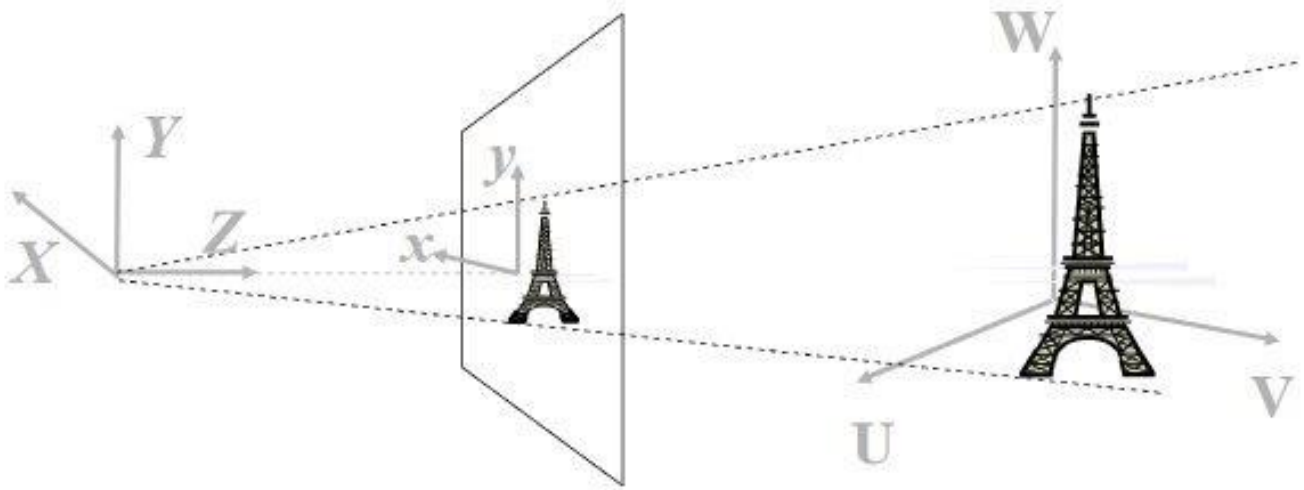
After completing this lecture, you should be able to:

- 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

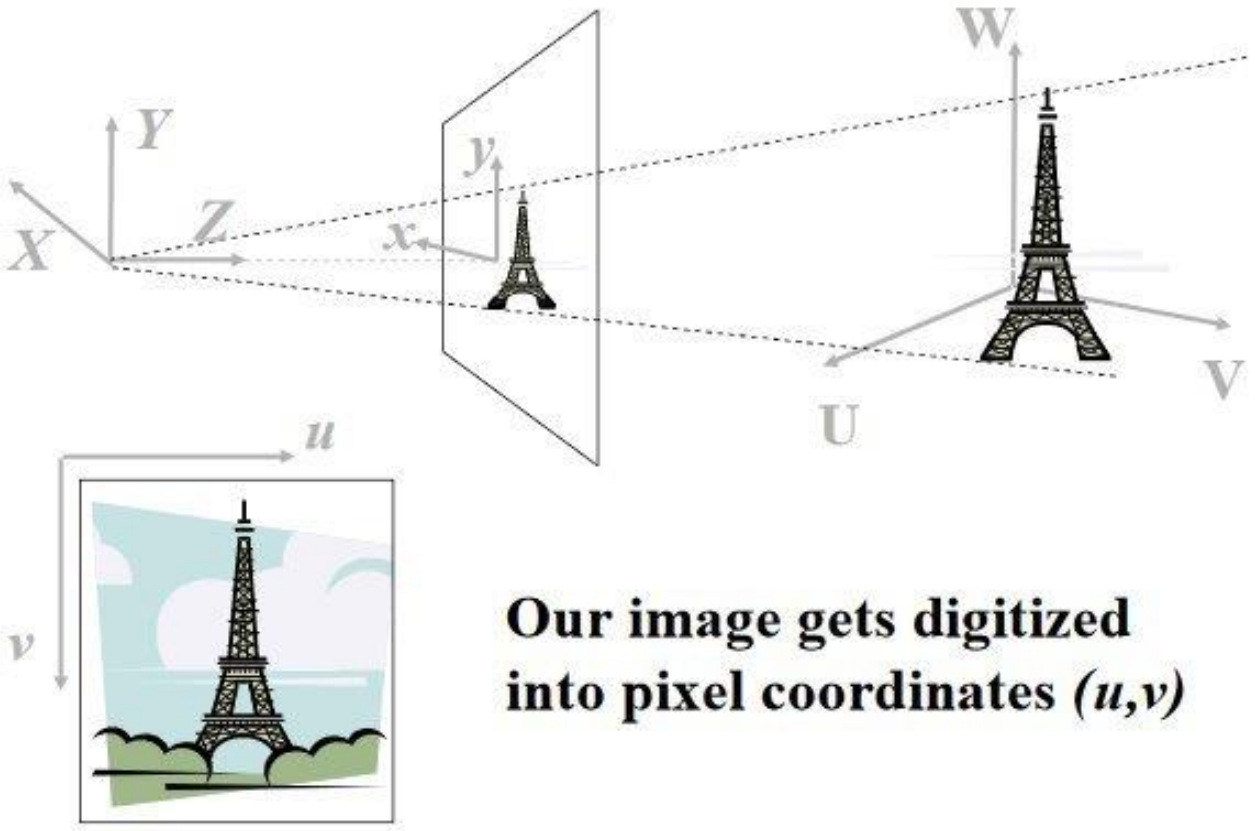
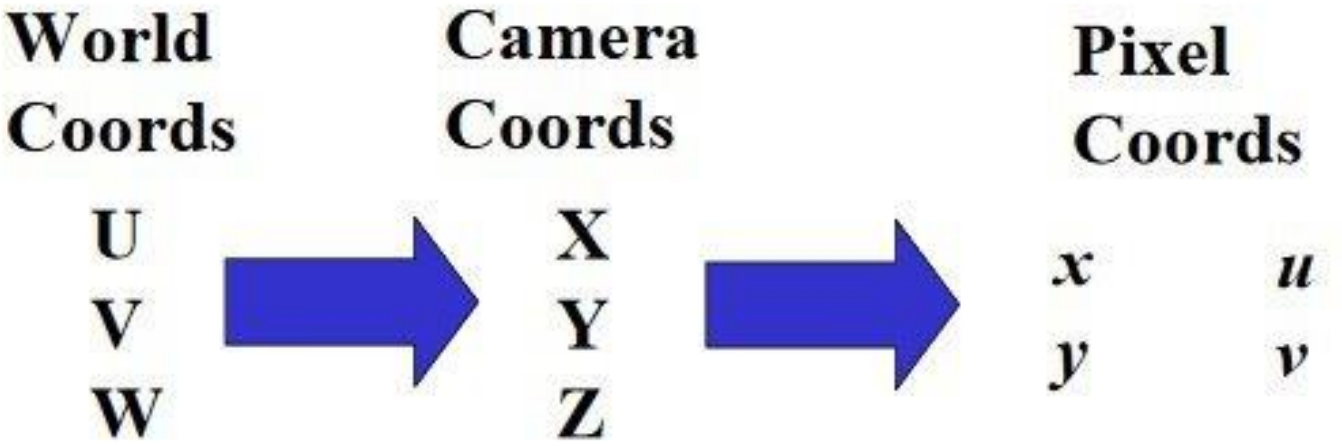


Image Geometry



Image; What we see and what computers see!

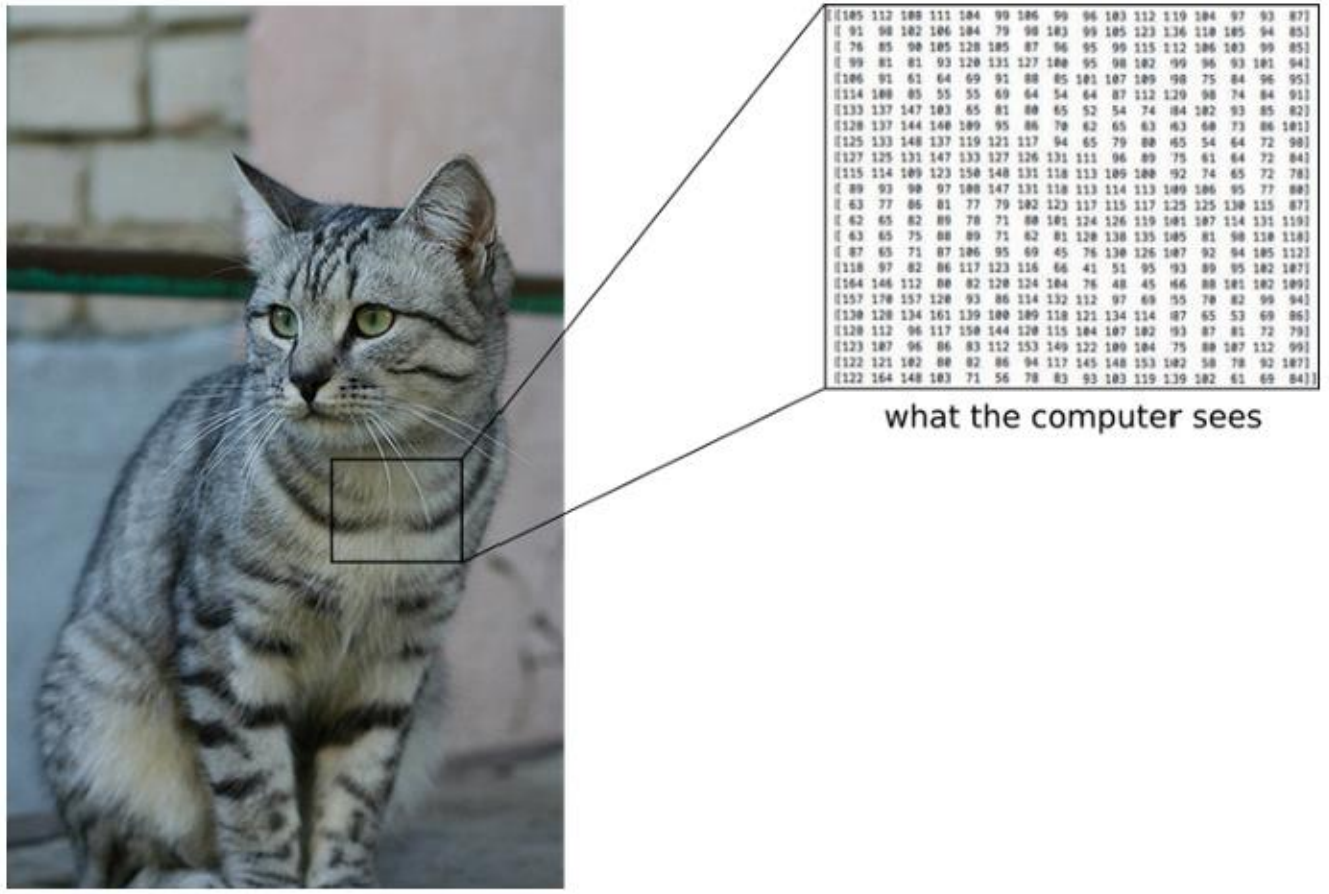
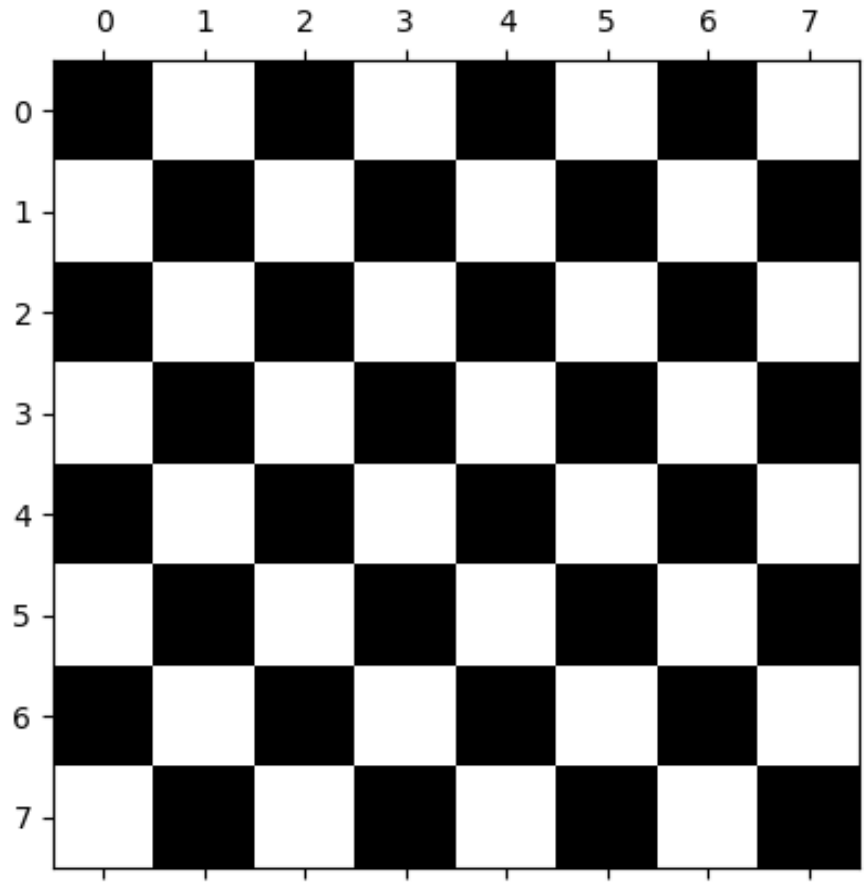


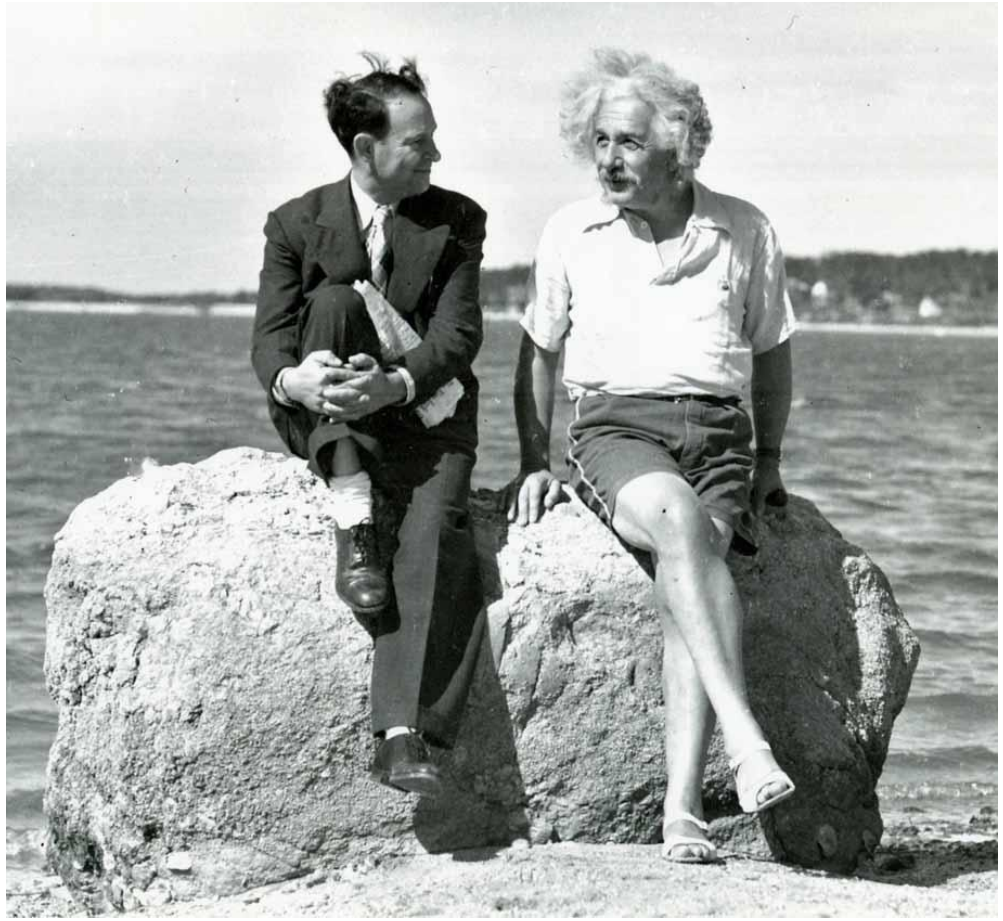
Image from: https://bam098.medium.com/image-classification-c8bcb1d7811e

Black and White Image



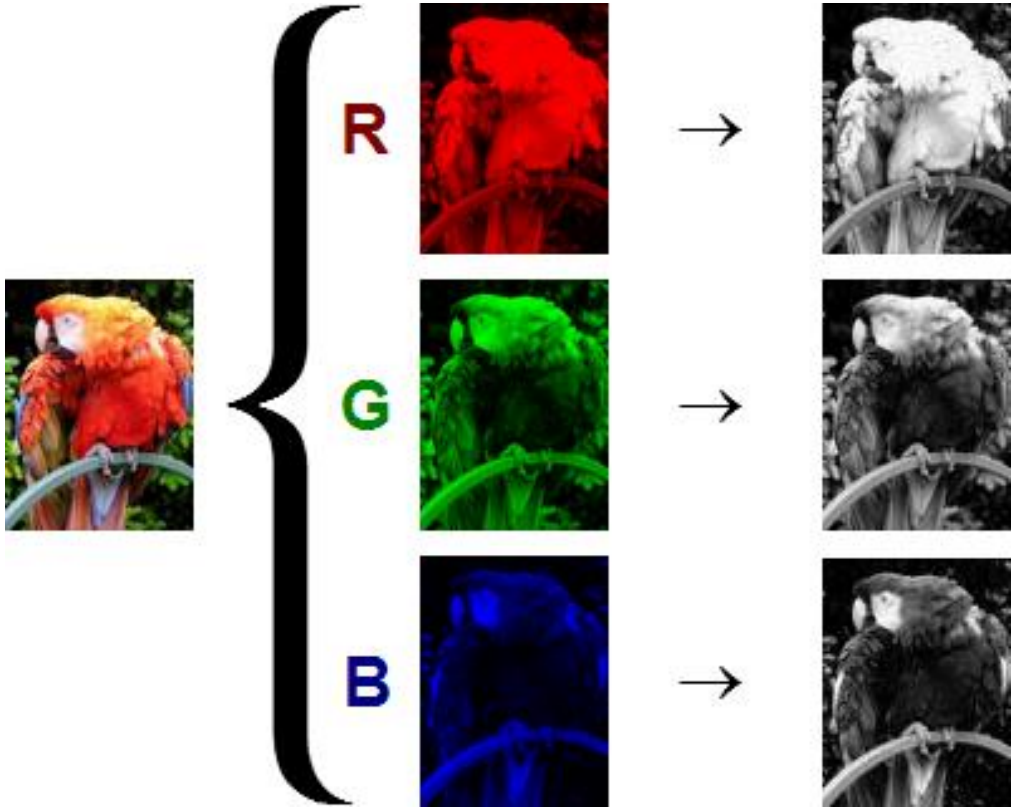
Pixel Values: 0 or 1

Grayscale Image



Pixel Values: 0 -255

RGB Image



Pixel Values: 0 -255

Pixel Values: 0 -255

Pixel Values: 0 -255

Image Operation: Thresholding

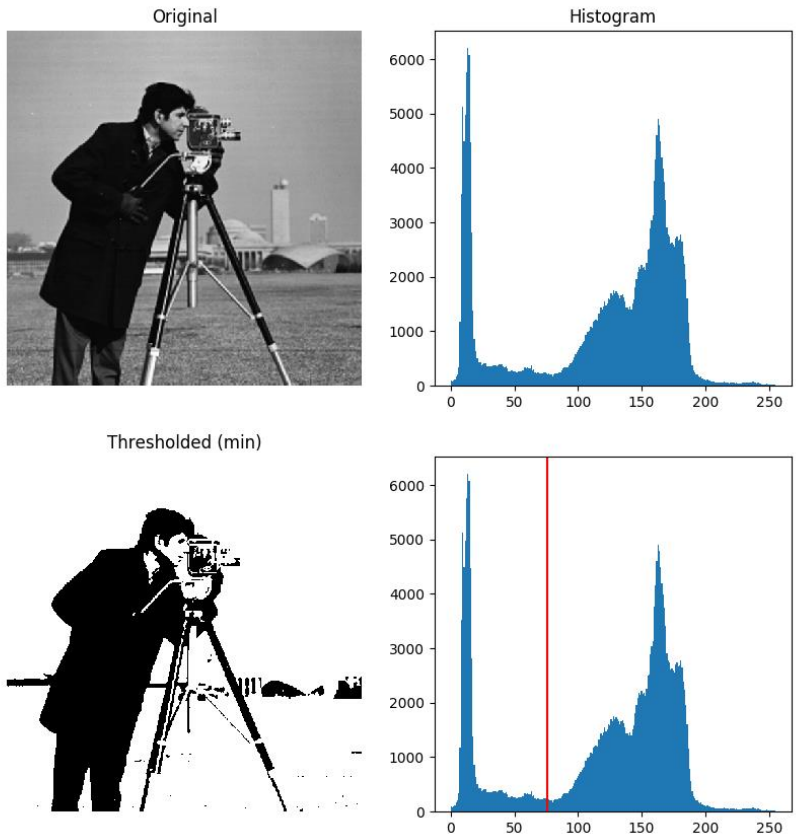


Image from: https://scikit-image.org

Image Operation: Thresholding

Class Activity: What about an application(s)?

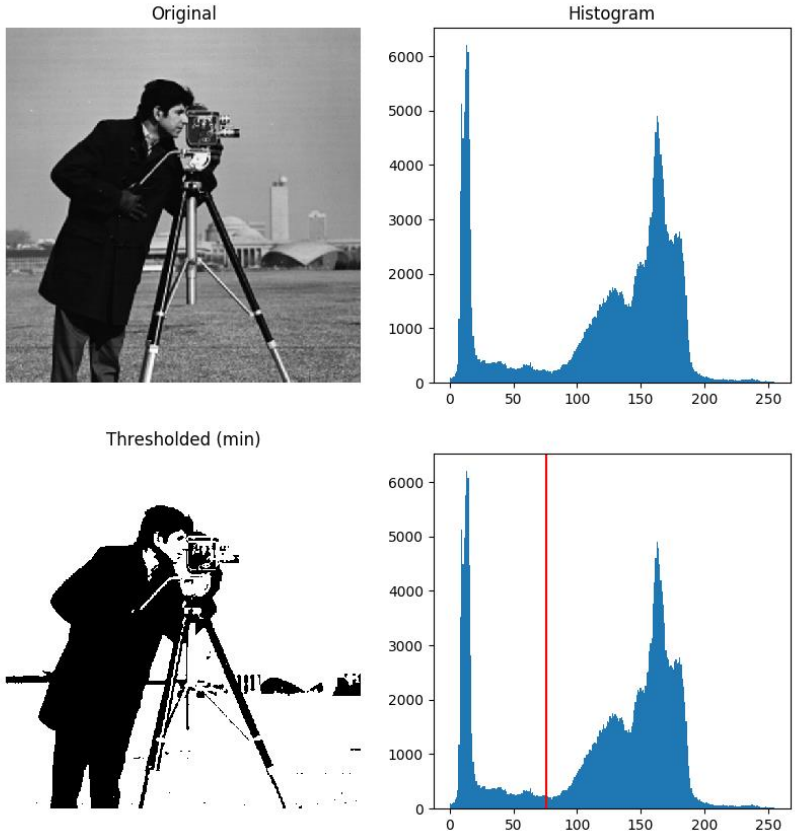


Image from: https://scikit-image.org

Image Operation: Addition

Image Operation: Subtraction

Image Operation: Flip

Image Operation: Resizing

Image Operation: Rotating

Thank you!

Questions!