CS5330 Pattern Recognition and Computer Vision

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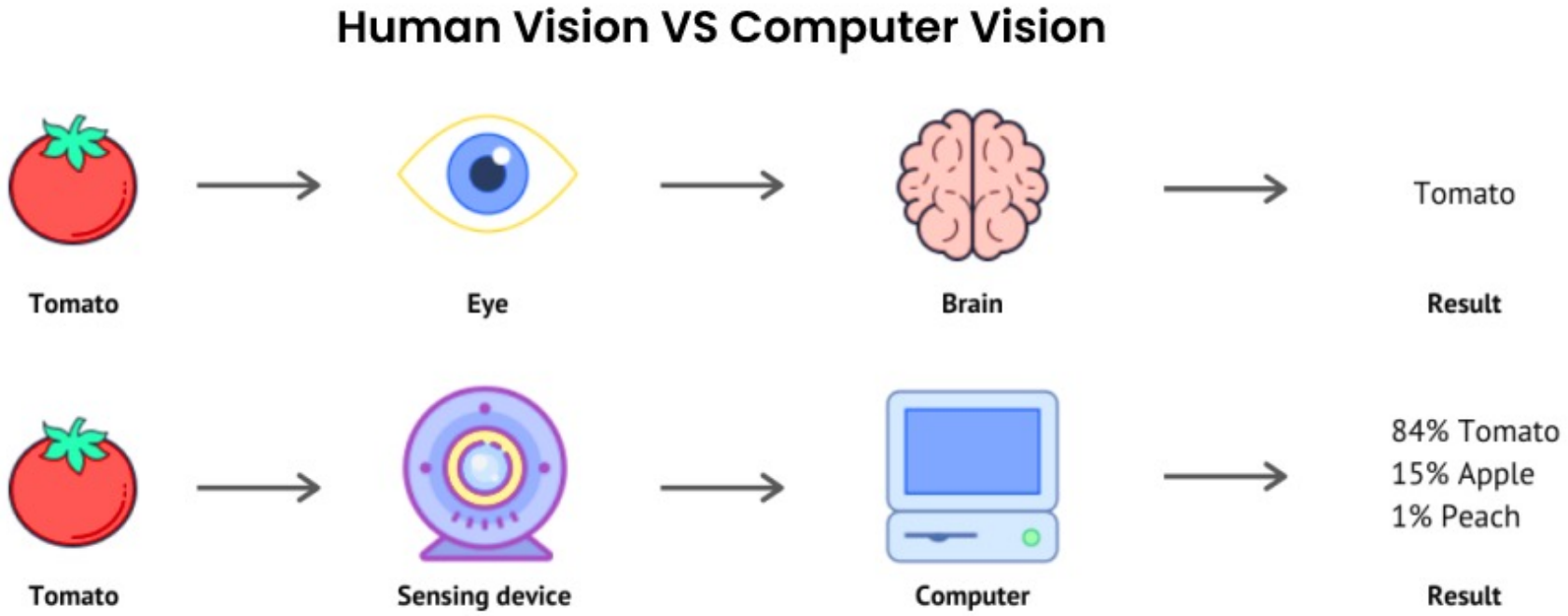
What is Computer Vision (CV)?

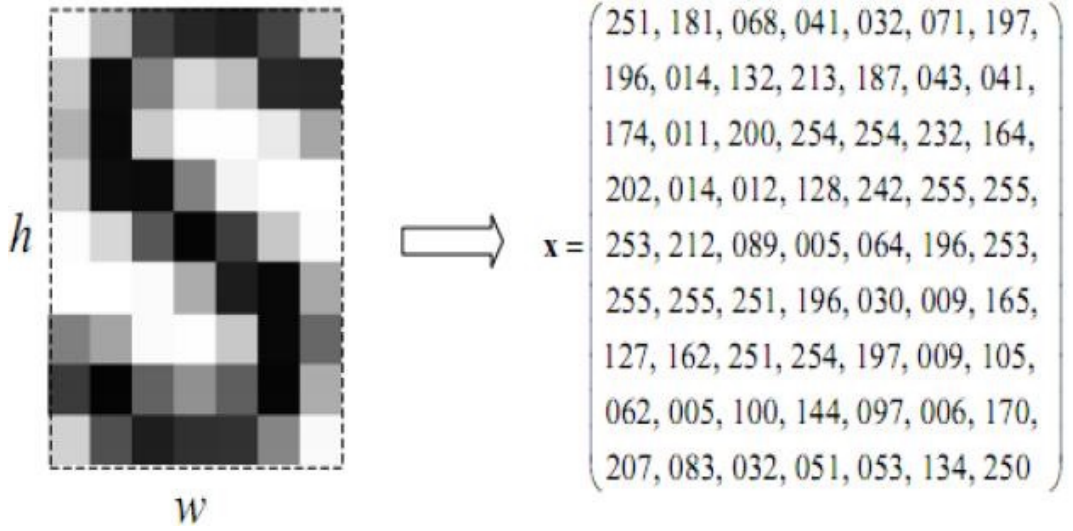
- Computer vision is - *a field of "artificial intelligence" (AI) enabling computers to derive information* from images, videos and other inputs.




traffic light
traffic light
traffic light
traffic light
traffic light
bus
truck
car
car
car
truck
truck
person
handbag
person
person
person
person
person

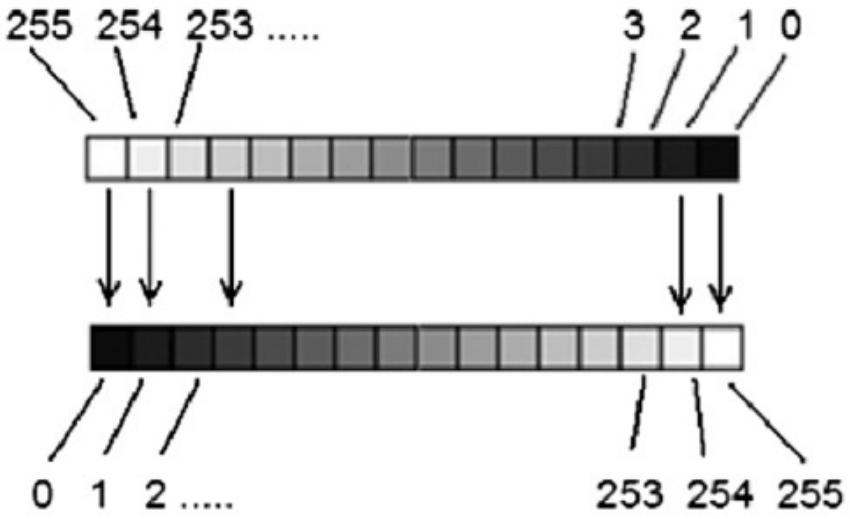
What is an Image?

- A **digital image** is an image composed of picture elements, also known as *pixels*, each with *finite*, *discrete quantities* of numeric representation for its intensity or gray level that is an output from its two-dimensional functions fed as input by its spatial coordinates denoted with *x*, *y* on the x-axis and y-axis, respectively.

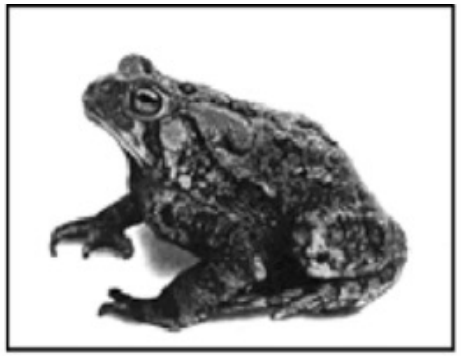


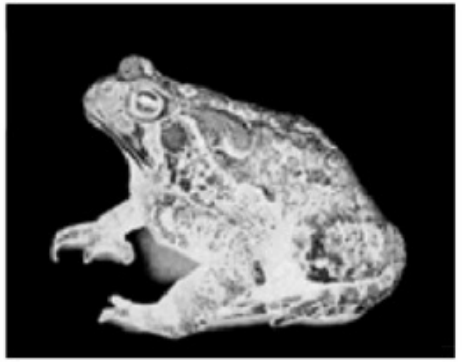
Old CV – Math Based Image Processing

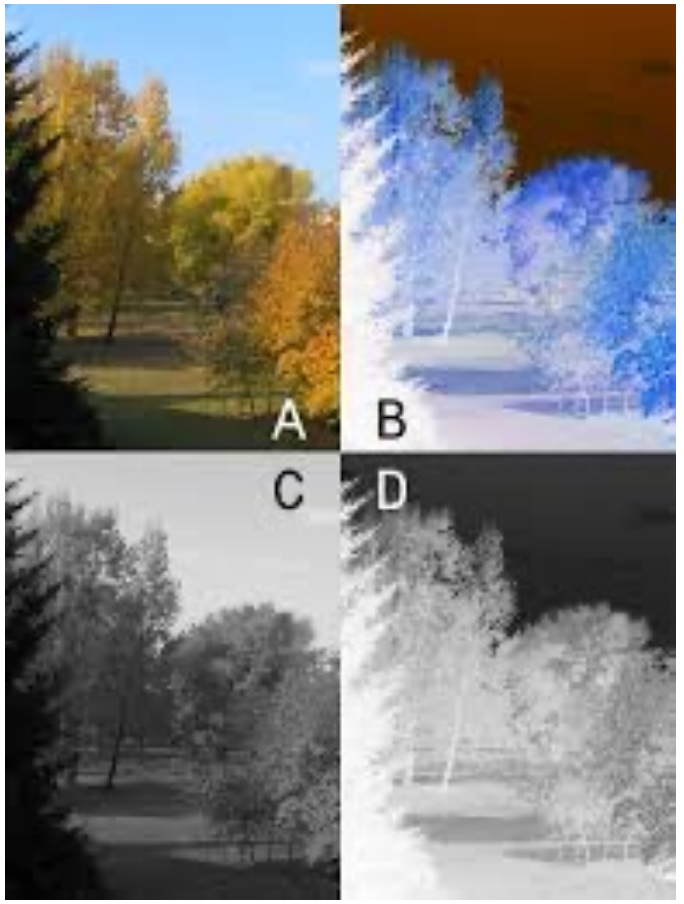
- Math based image manipulation



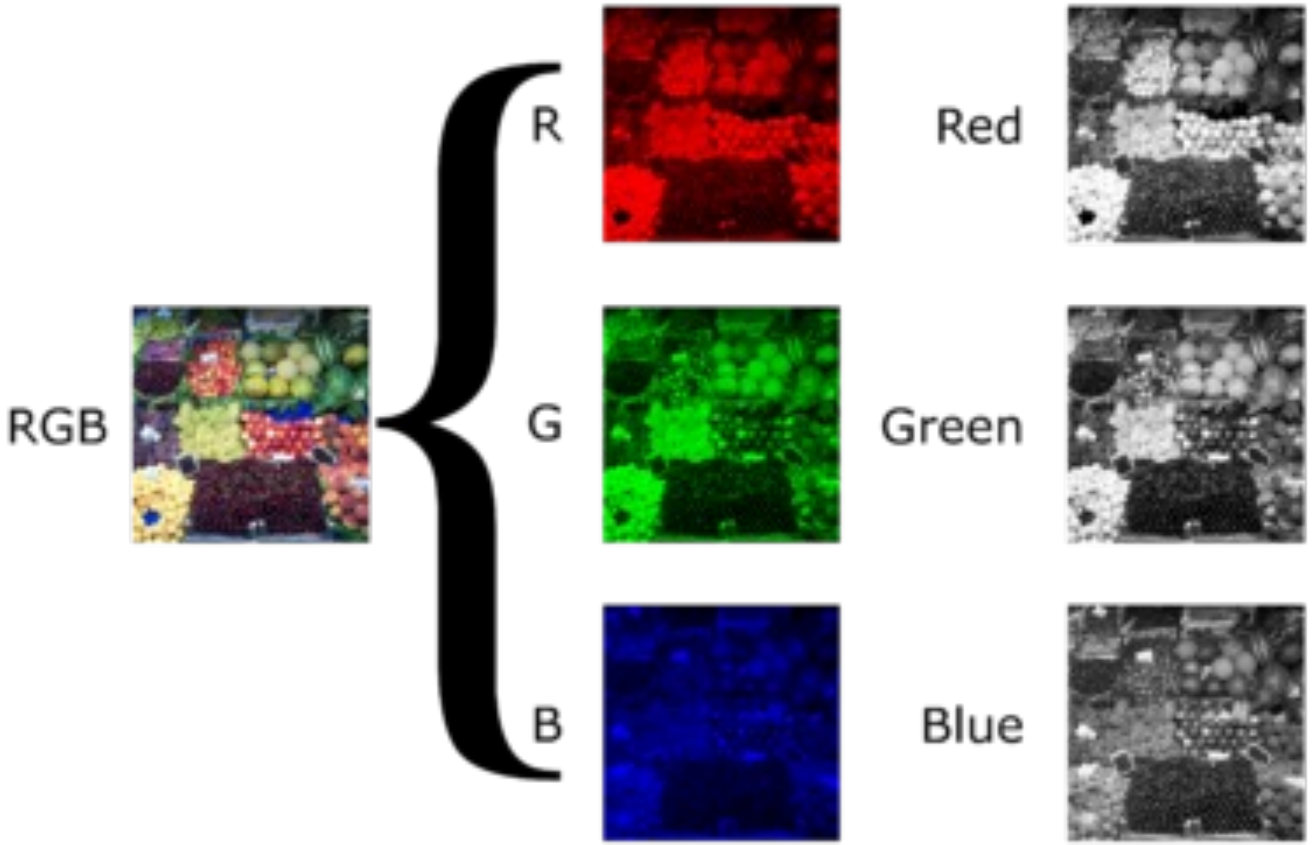
B' (Negative picture) = (255 – B)





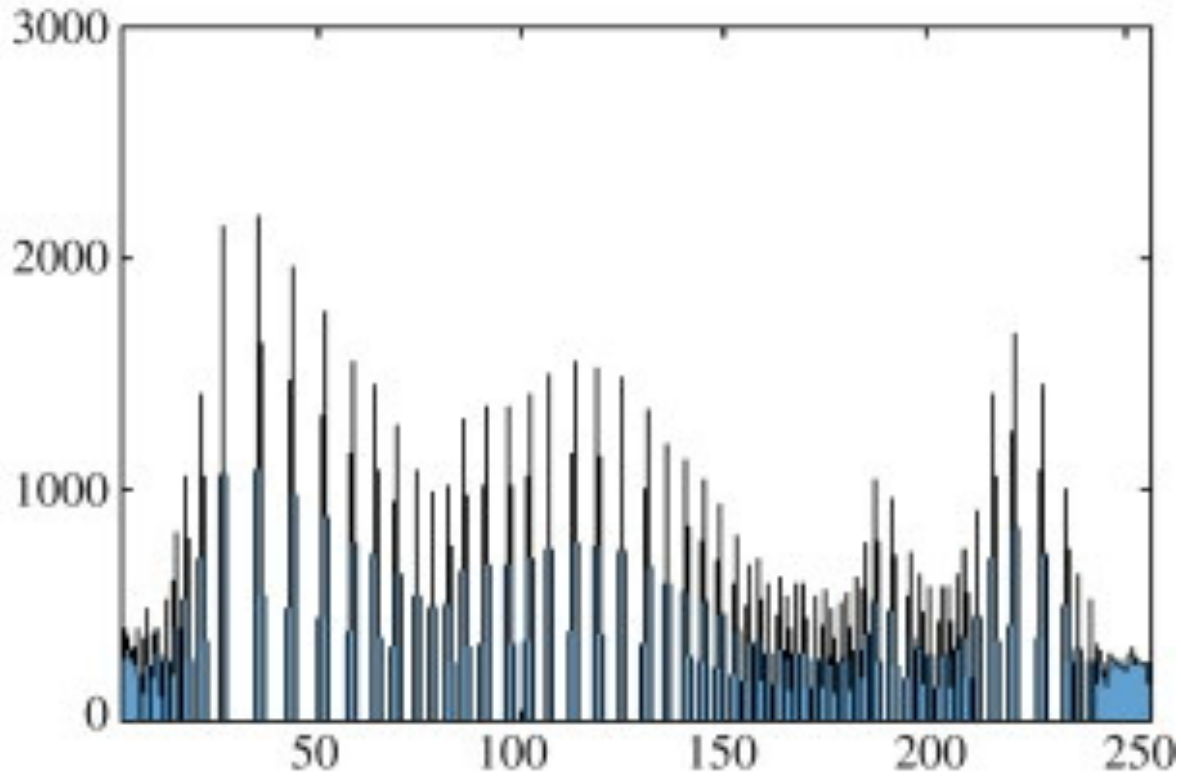


Grey Scale

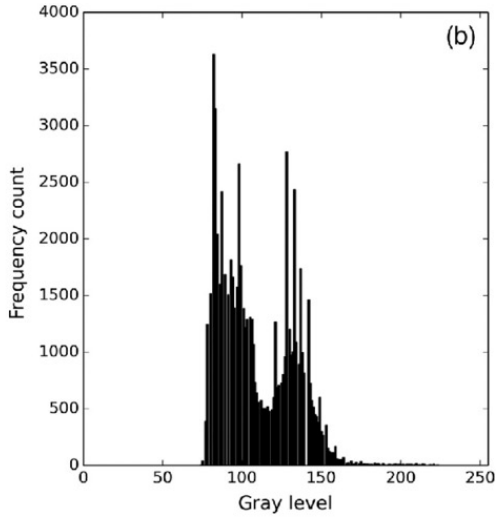


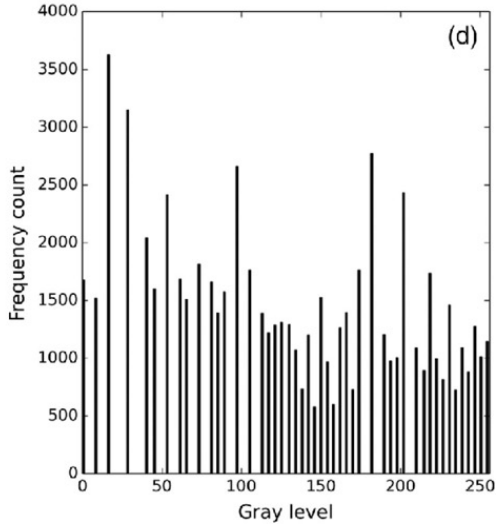
Histograms


M SURFACES TO
GEOMETRY AND SYM
Simplified Transisti
PARALLEL DISTRIBUTED PROCESSING
PARALLEL DISTRIBUTED PROCESSING
AN INTRODUCTION TO


3000
2000
1000
0
50
100
150
200
250

Histogram Equalization





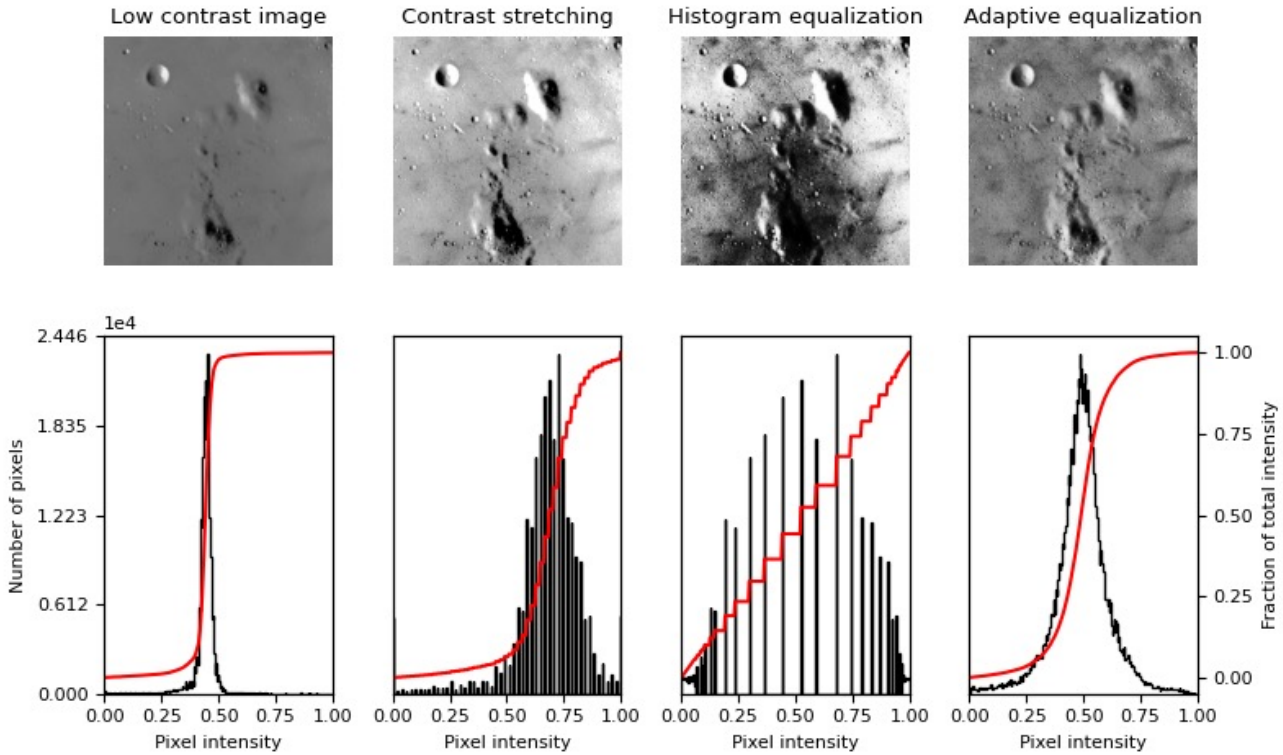
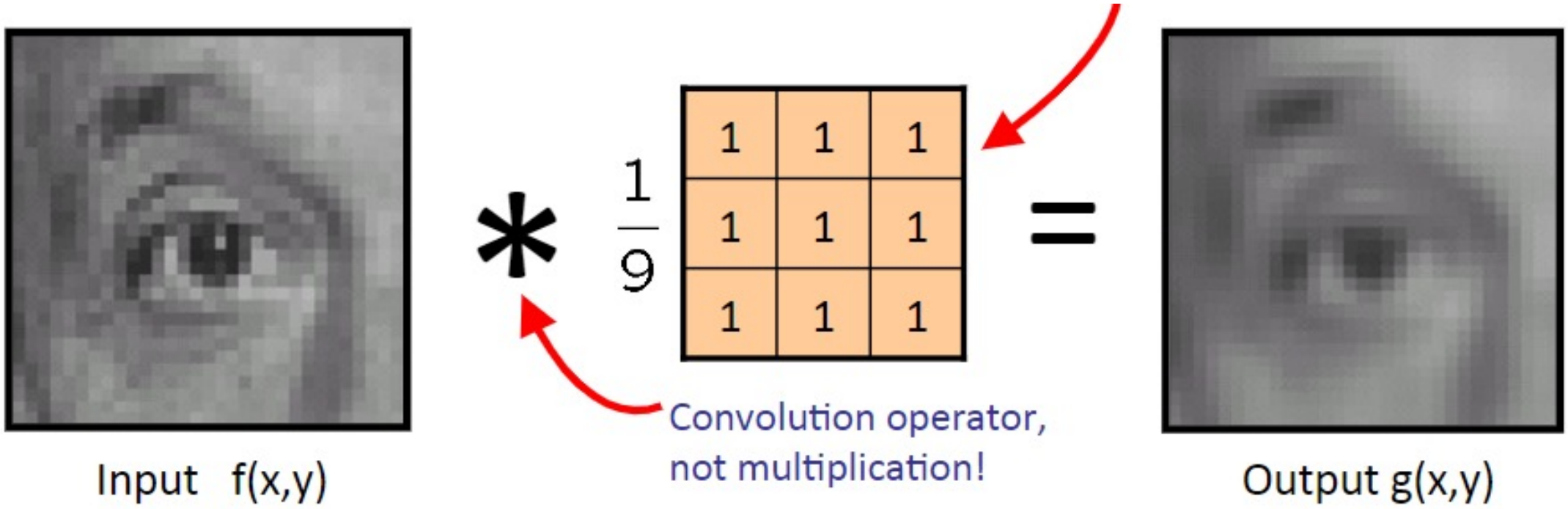
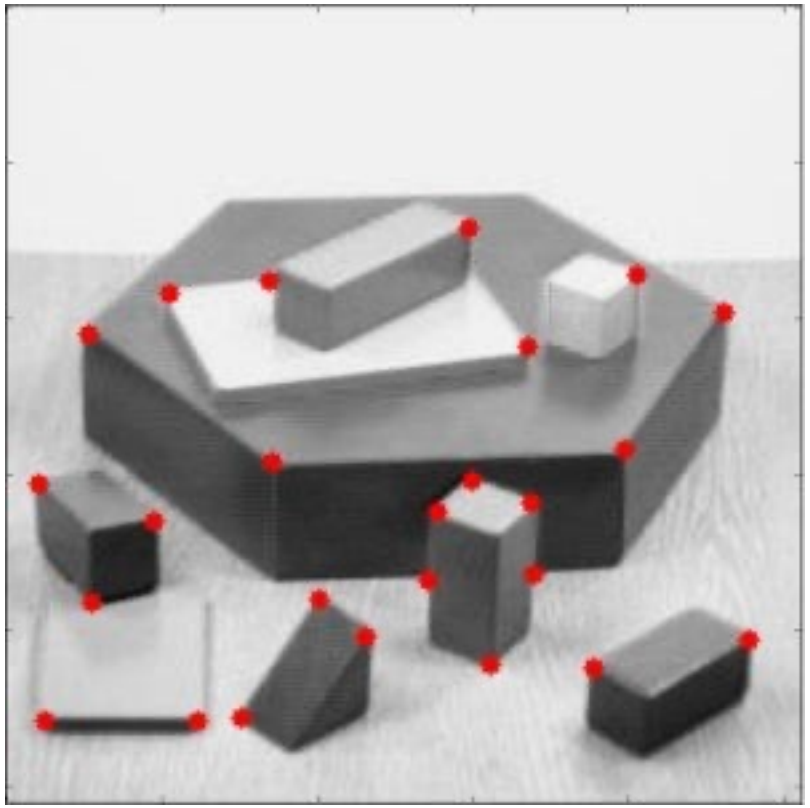


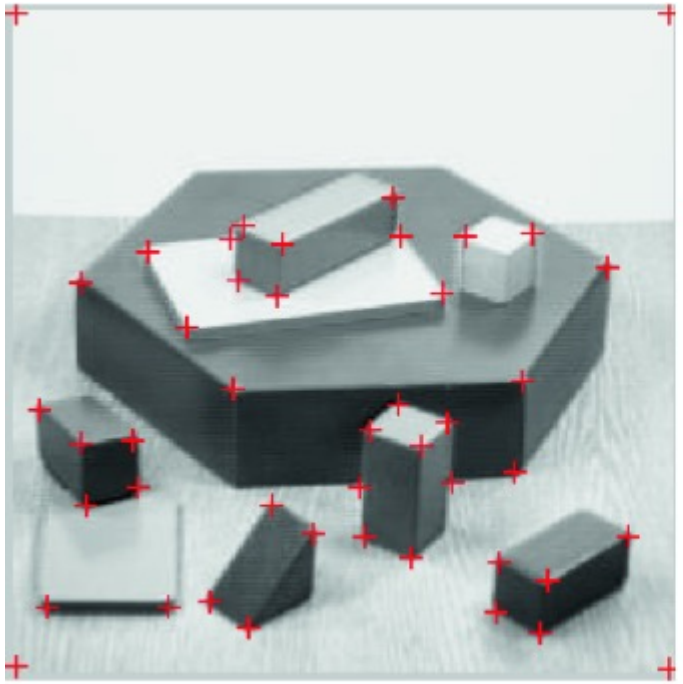
Image Filtering



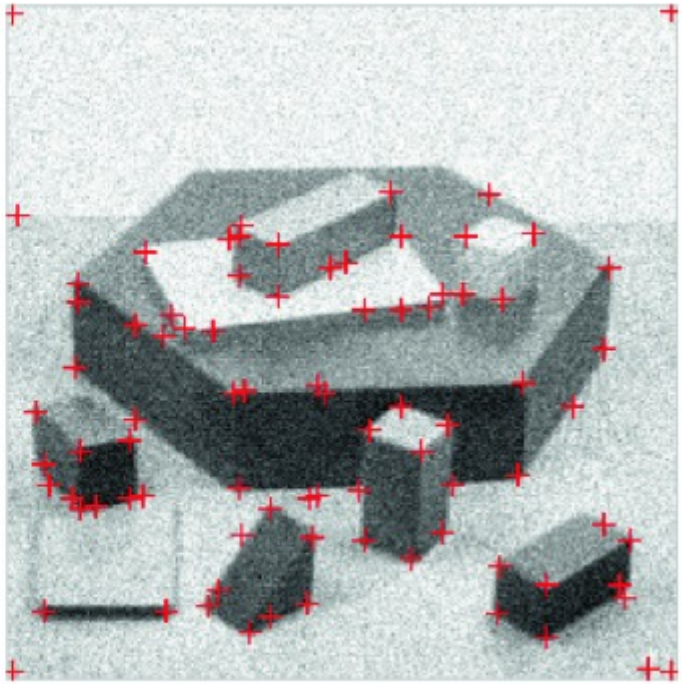
Edge Detection

Corner Detection





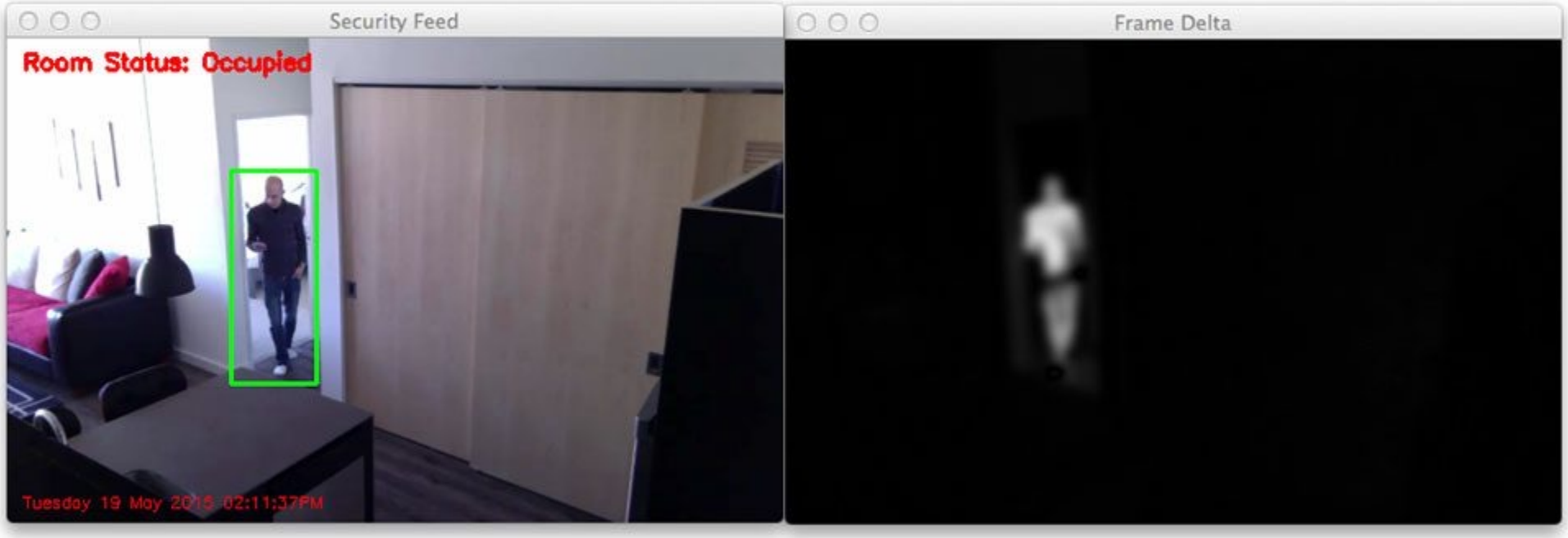
(a) No noise



(b) δ =0.01

Image Morphing

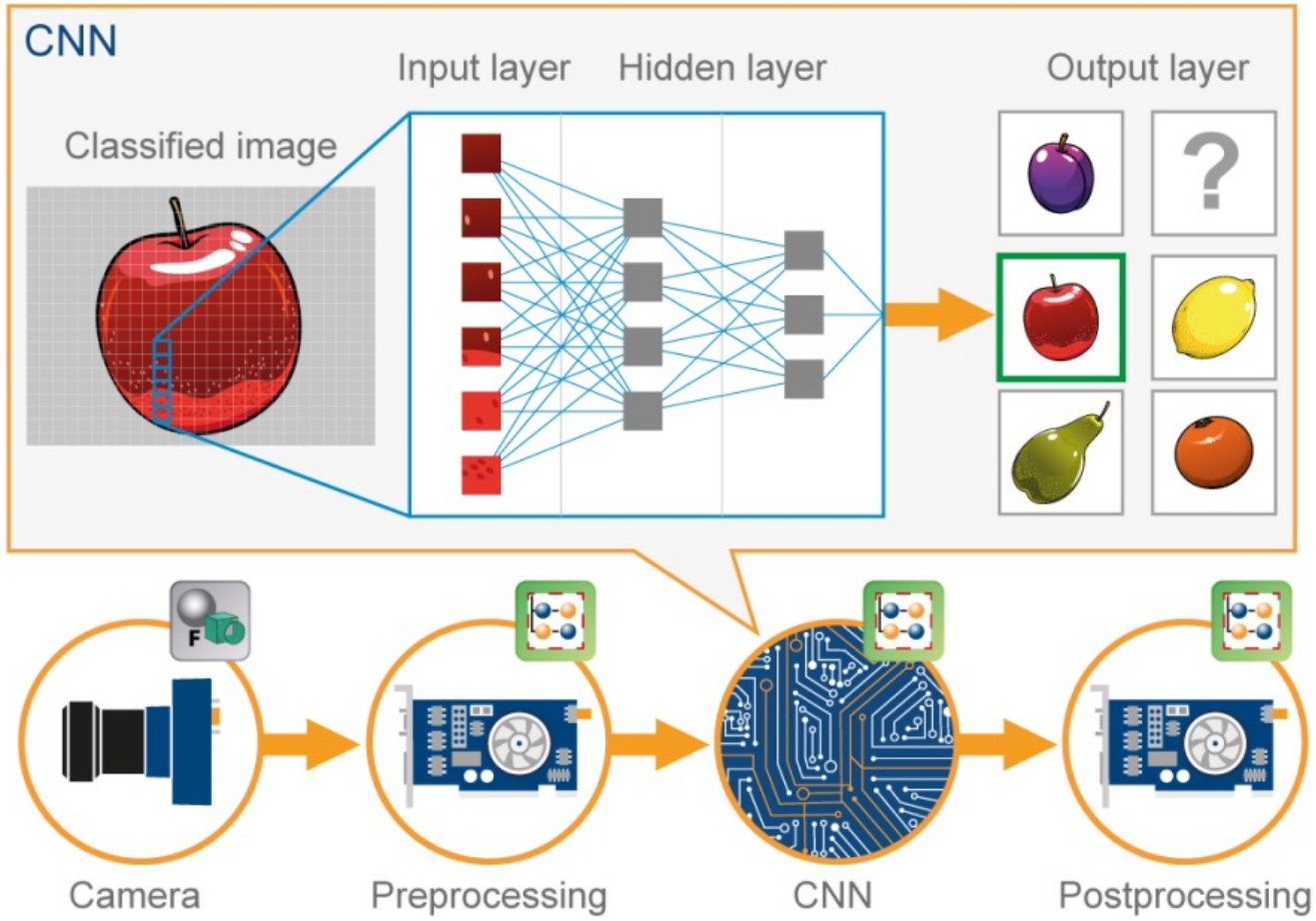
Video - Movement Detection



New Age CV – Deep Learning

- Object Detection

Image Classification



Face Recognition

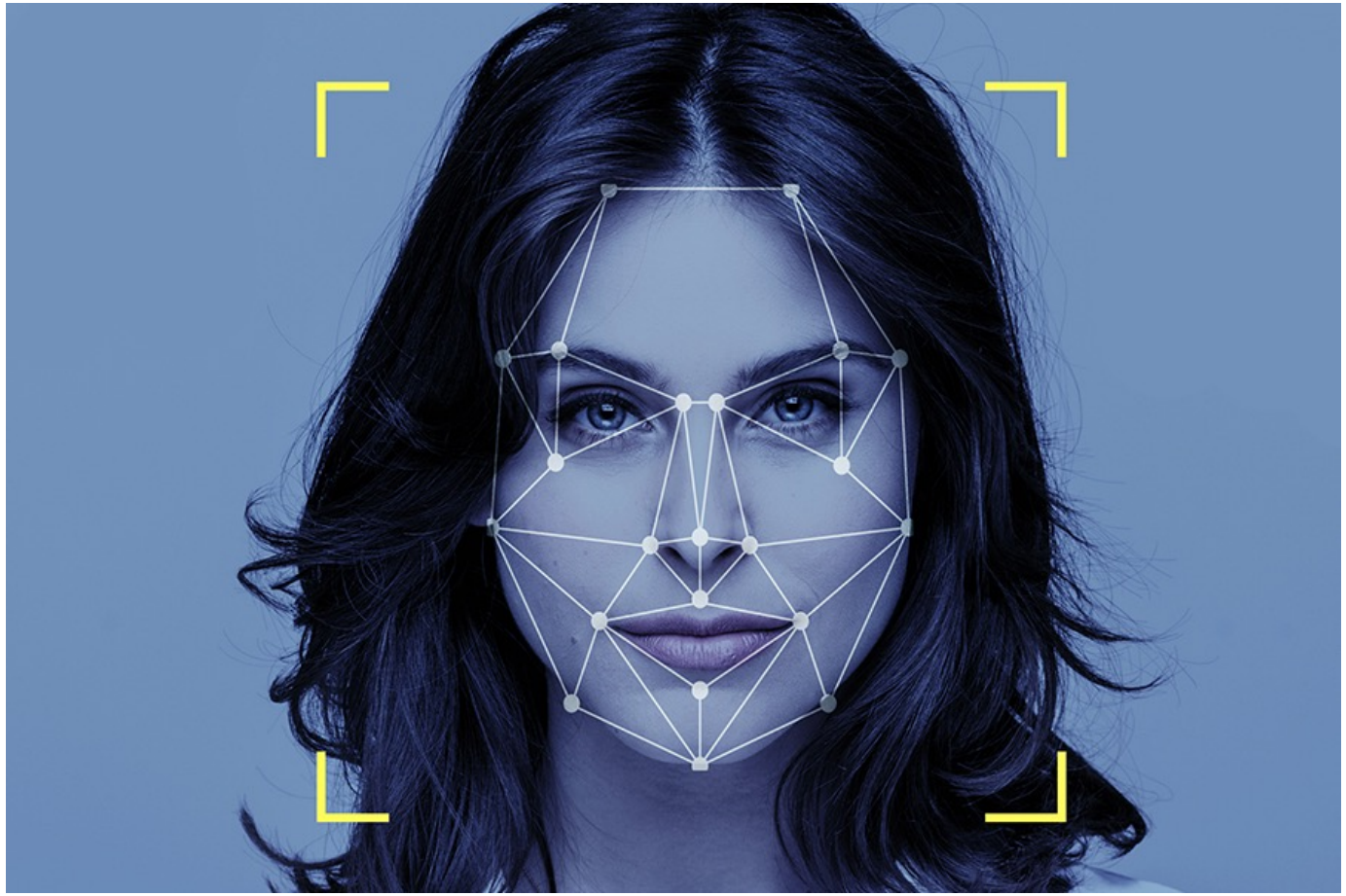


Image Segmentation

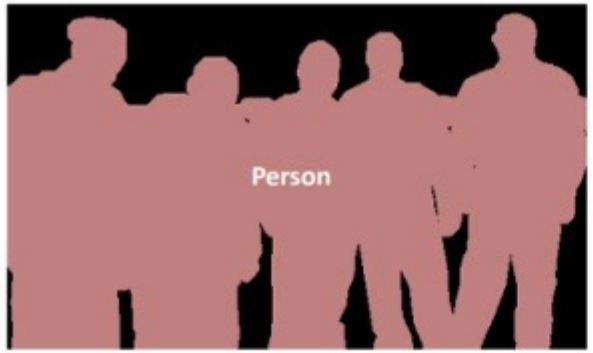


Image 1

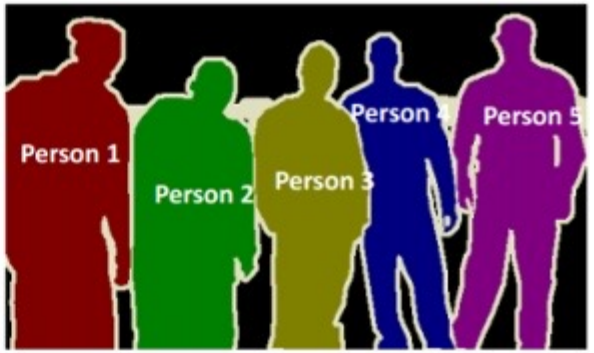


Image 2

Input

Ground truth

Prediction

Generative AI