

# 19CSE367 Digital Image Processing

SARATH TV

# Why so much fuss about DIP??

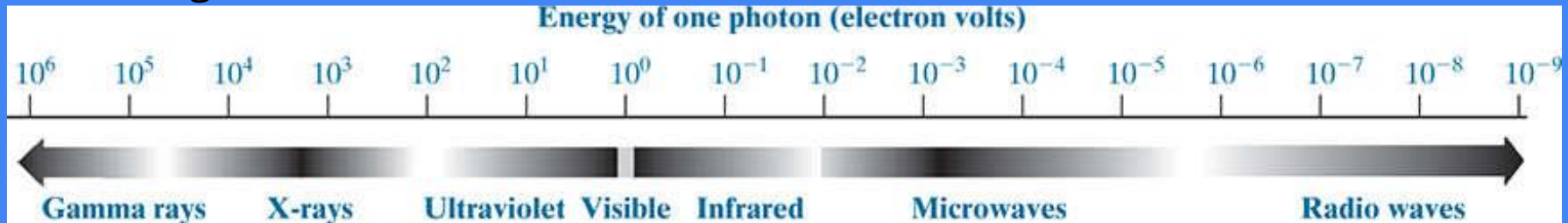
- Improve pictorial information for human interpretation.
- Processing of image data for tasks(storage, transmission and extraction).

# What is DIP?

But what is an Image??

- Two dimensional function  $f(x,y)$
- $x,y$  plane /spatial coordinates
- Value/Amplitude of  $f$  @  $x,y$  is the intensity or gray level of that image at those points.
- Digital image-  $x,y$  and intensity values of  $f$  are finite and discrete values.
- DI has a finite number of elements ,each has a particular value and location – **picture elements ,image elements ,pel** and **pixels**(the most widely used term)
- Processing digital images by means of a digital computer.

- Human perception-Vision sense.
- Only a part of the electromagnetic spectrum is visible for humans.
- Imaging machines – gamma to radio waves -- Entire EM spectrum(almost).
- Confusion with other related areas– image analysis, computer vision.
  - No general agreement on this ☹
- One way, but its limits the applications- both input and output of a process are images.



# Three Types of computerized processes

High

- “making” sense –image analysis, performing cognitive functions normally associated with human vision.

Mid

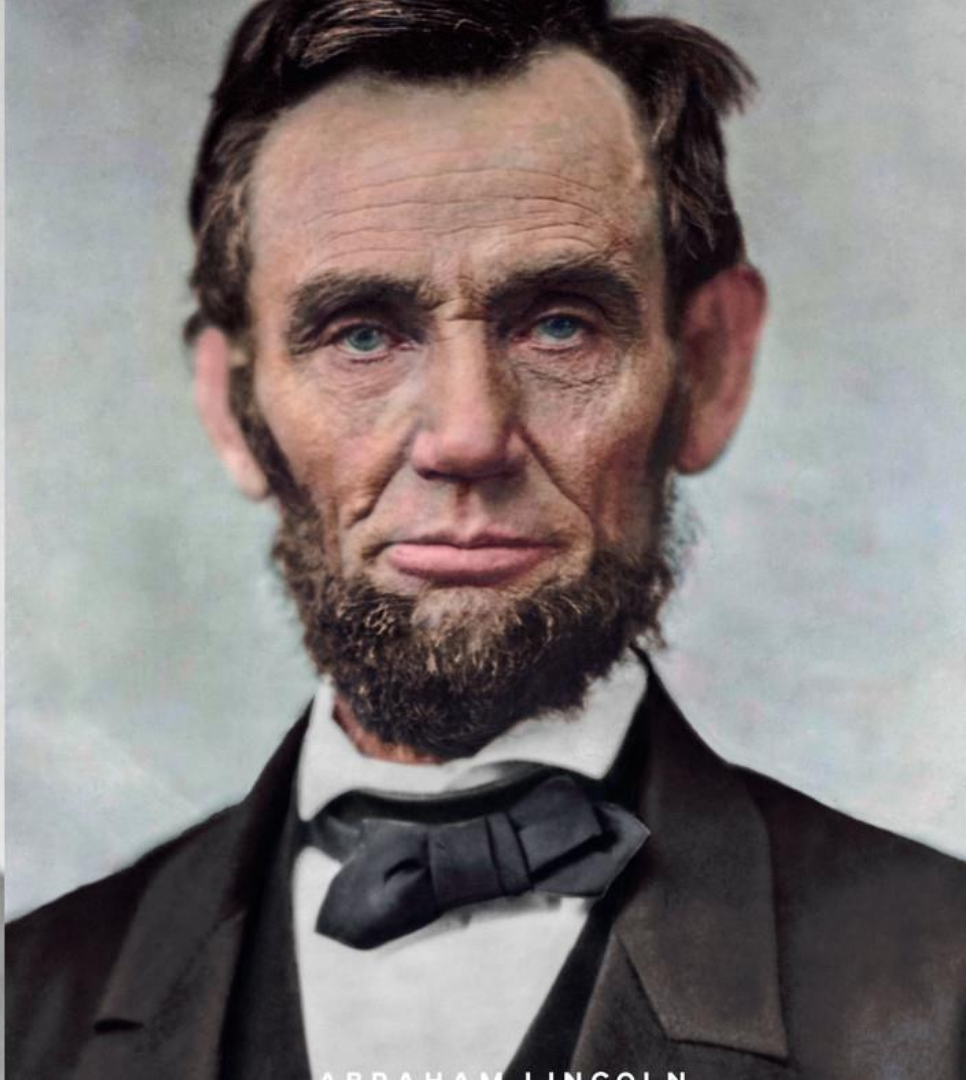
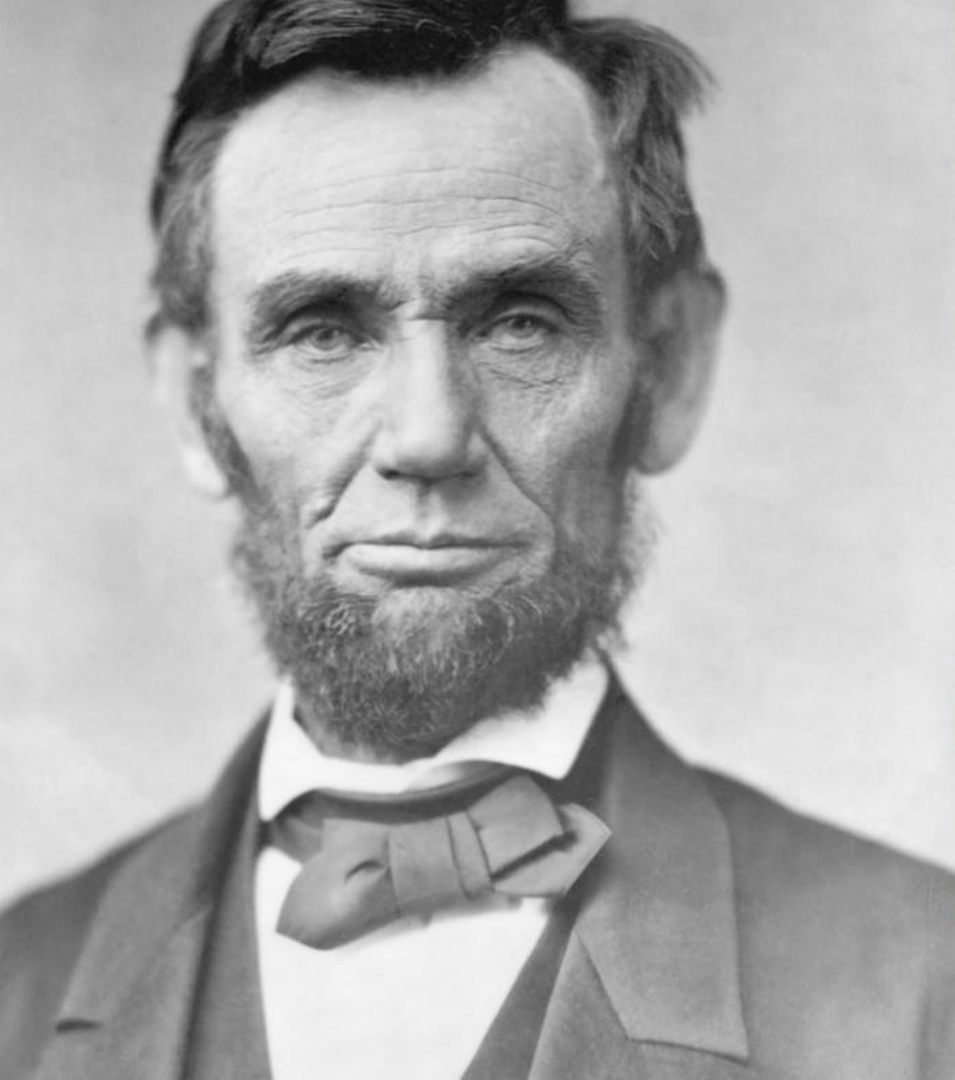
- Tasks like segmentation, reduce features to a suitable form for computer processing, recognition of objects.
- Input are images, but output are attributes extracted from these images

Low

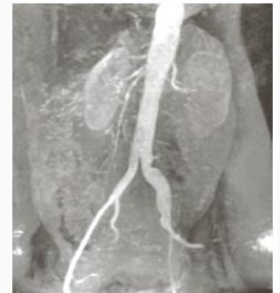
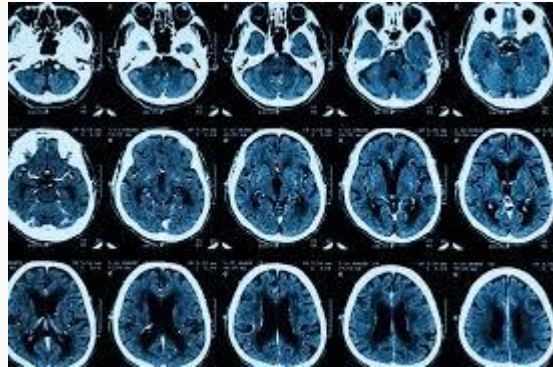
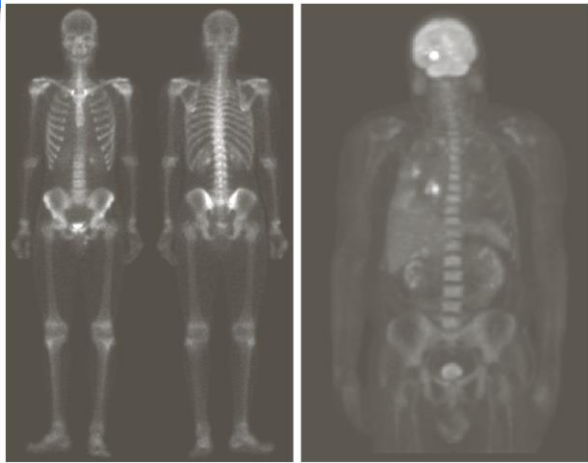
- Primitive operations-image preprocessing. Reduce noise, contrast enhancement and image sharpening.
- Input and output are images.

# Verticals in DIP

- Image sharpening and restoration
- Medical Field
  - Gamma-ray imaging
  - PET scan
  - X-Ray Imaging
  - Medical CT scan
  - UV imaging
- Robot vision
- Pattern recognition
- Filters on Editing Apps and Social Media



# Medical field

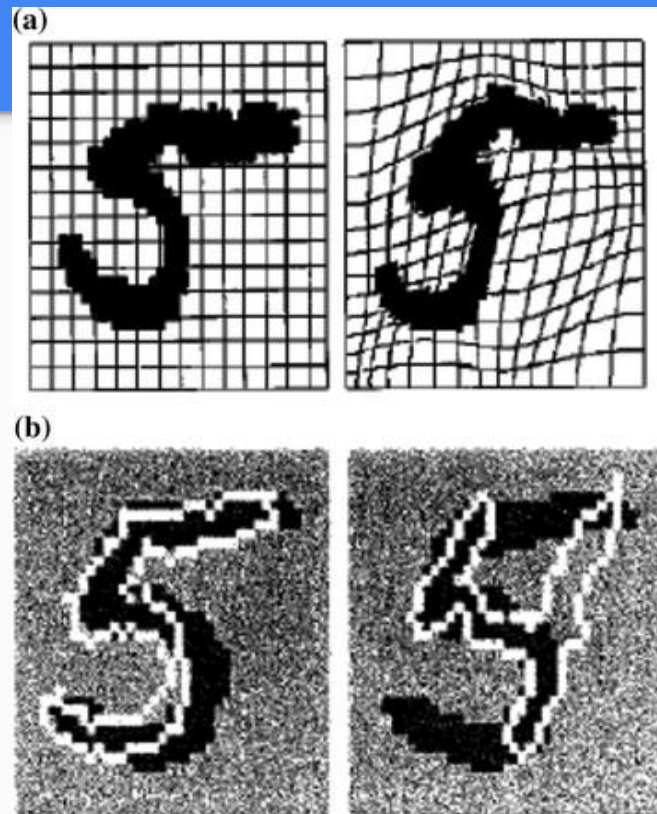




# Robot Vision



# Pattern



# Social Media



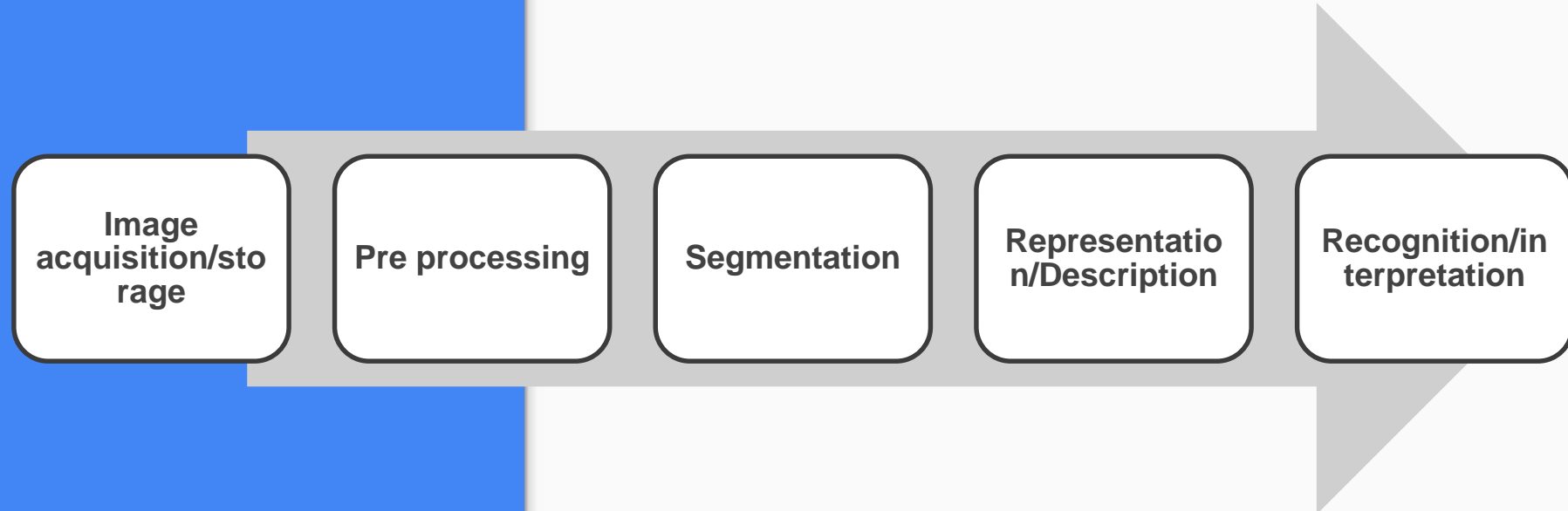
Original Image



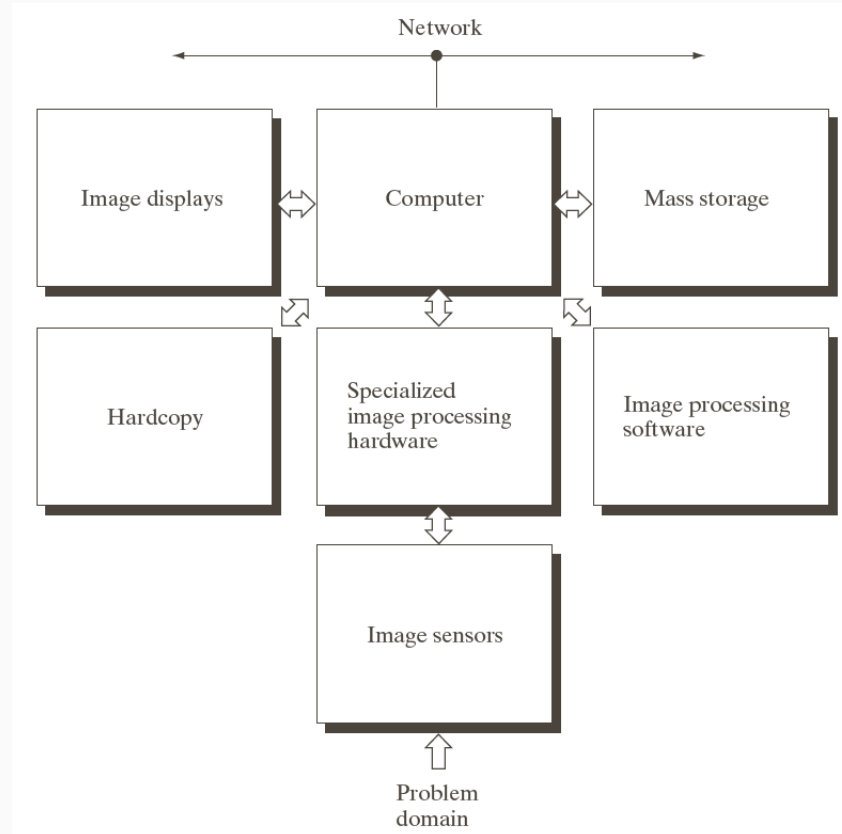
Filtered Image

- Acquisition and storage
- Load into memory and save to disk
- Manipulation, enhancement, and restoration
- Segmentation
- Information extraction/representation

# Steps in Digital Image Processing



# Components of DIP system



THANK YOU!