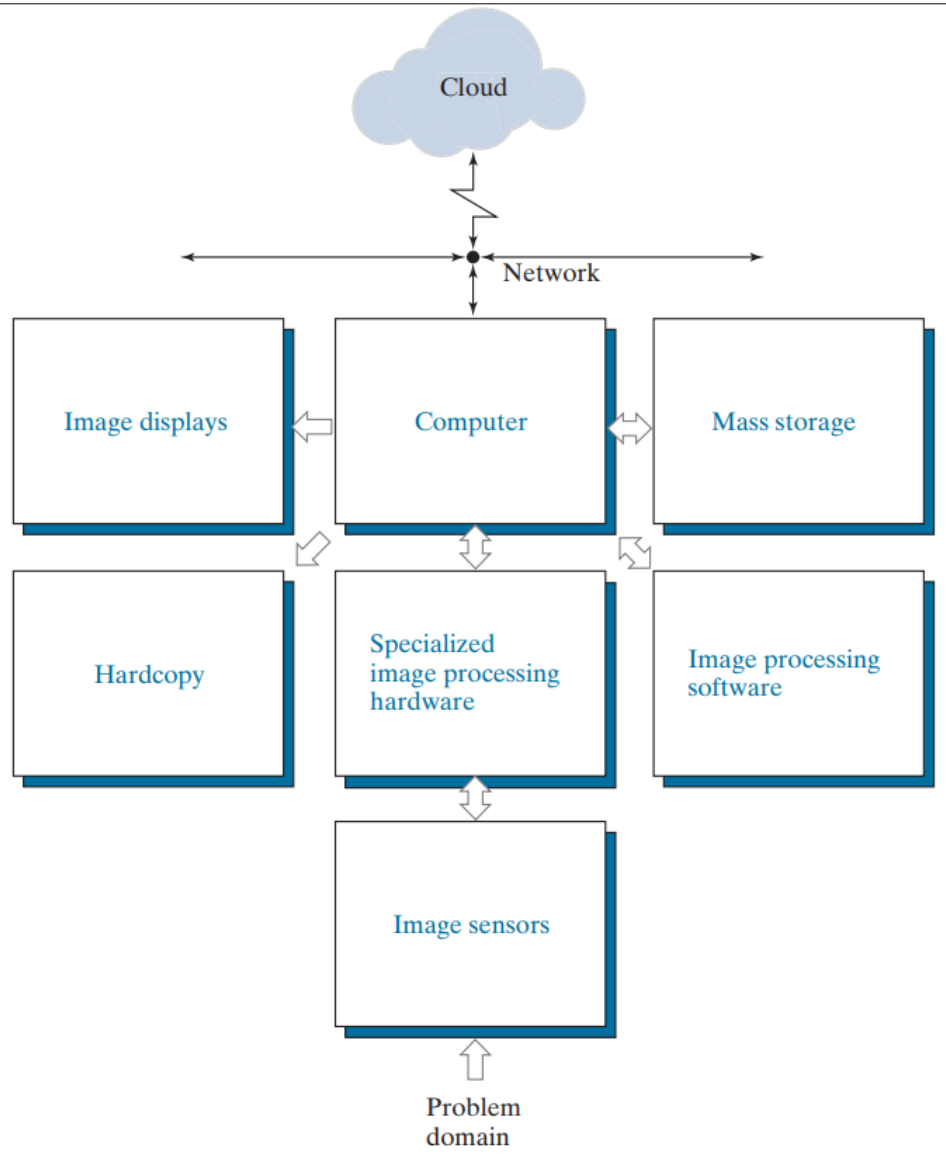
Objectives

- To understand the Components of a DIP system

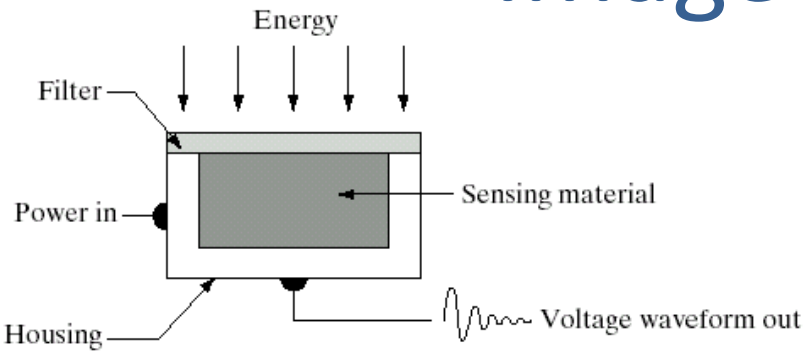


Components of an Image Processing System

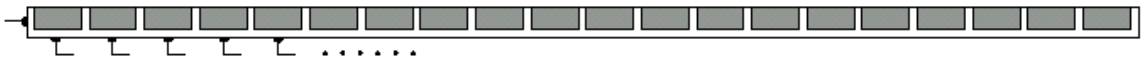
Image Sensors

- For sensing, 2 elements are required to acquire digital images
- Firstly, a physical device sensitive to the energy radiated by the object to be imaged
- Secondly, a digitizer to convert the output of the physical sensing device into digital form

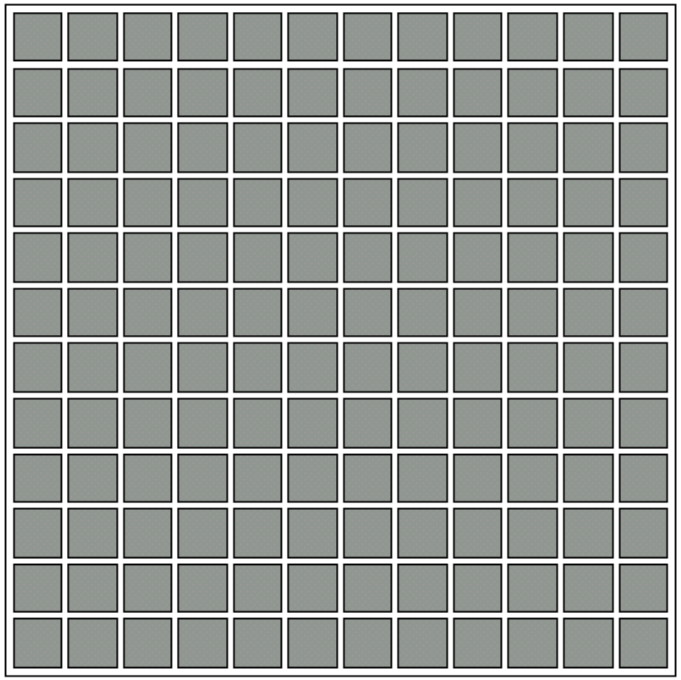
Image Sensors



Single sensor



Line sensor



Array sensor

(Images from Rafael C. Gonzalez and Richard Wood, Digital Image Processing, 2nd Edition.

Single Sensor

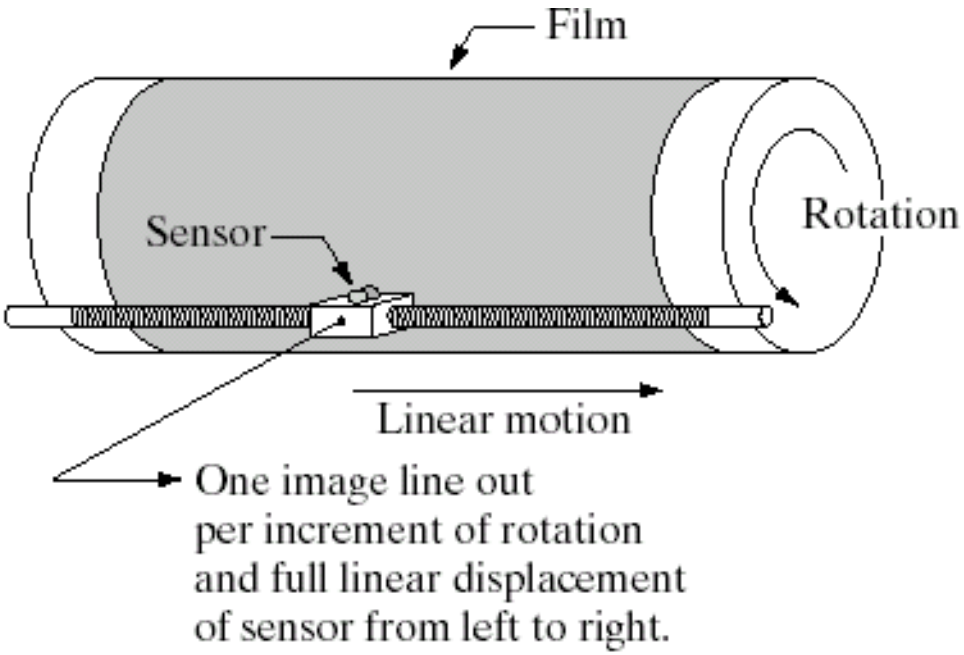


FIGURE 2.13 Combining a single sensor with motion to generate a 2-D image.

(Images from Rafael C. Gonzalez and Richard Wood, Digital Image Processing, 2nd Edition.

Line Sensor

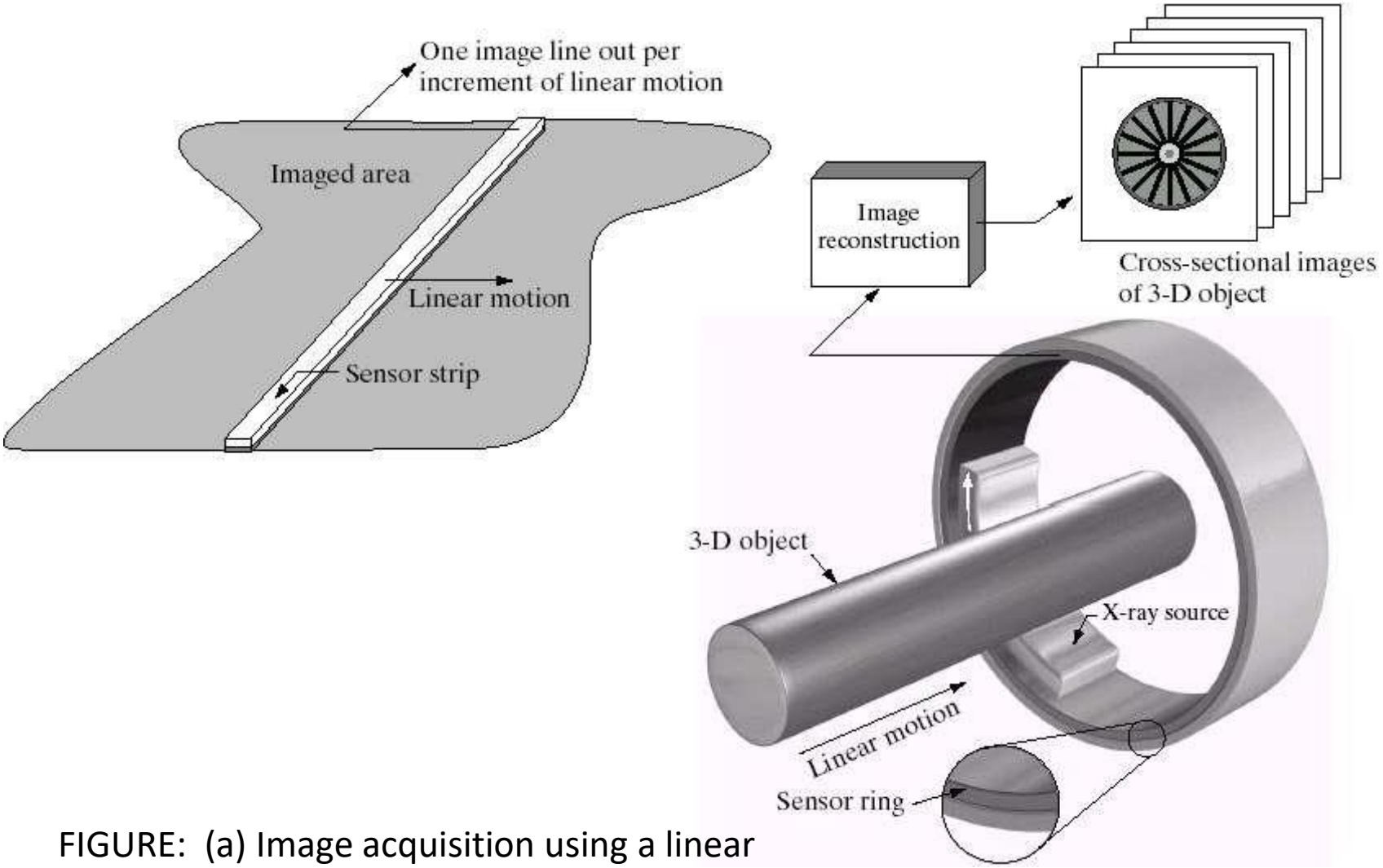


FIGURE: (a) Image acquisition using a linear sensor strip. (b) Image acquisition using a circular sensor strip

(Images from Rafael C. Gonzalez and Richard Wood, Digital Image Processing, 2nd Edition.

Image Processing Hardware

Specialized image processing hardware:

- Consists of a digitizer plus hardware
- It performs operations of an ALU in parallel on entire image
- Ex, an averaging operation on the image as it is digitized
  - To reduce noise

Computer

Computer:

- From a PC to a supercomputer
- In dedicated applications, sometimes custom computers are used to achieve high performance

Software

Software:

- Specialized modules that perform specific tasks
- A package having capability for the user to write code
- Sophisticated software packages for interface and commands

Mass storage

Mass storage:

- It is a must in image processing applications
- An 8-bit image of 1024 X 1024 if not compressed is of size 1 Mb
- With millions of images, providing adequate storage capability can be a challenge

Image display

Image display:

- Color TV Monitors
- Monitors are driven by the outputs of image and graphics display cards

Components of Image Processing System

Hardcopy devices:

- For recording images
- Examples:
  - laser printers
  - film cameras
  - heat sensitive devices
  - inkjet units etc.

Fig. taken from hp.com
(HP ENVY Photo 7820 All-in-One Printer)

Components of Image Processing System

Networking:

- A default function in any computer system in use today
- Dedicated network removes the difficulty of bandwidth limitation
- Optical fiber & other broadband technologies has made transmission of images over internet more efficient

Ex. Computer Network