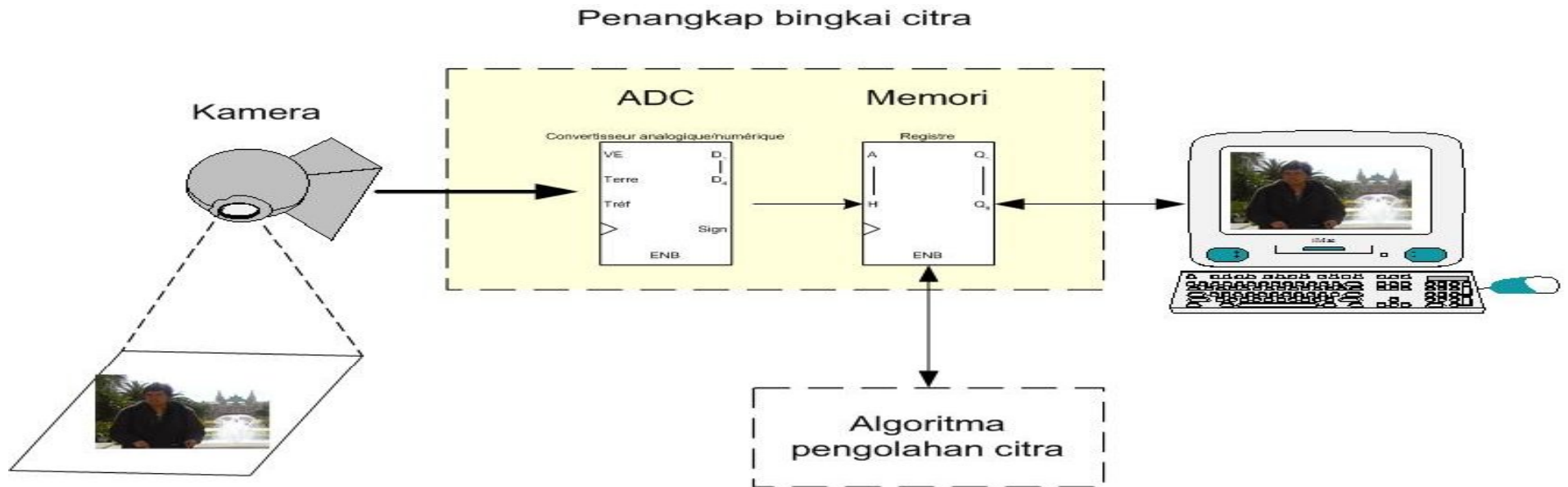


KONSEP KAMERA DIGITAL

ERI PRASETYO

Perangkat keras sistem Visual



Sensor Citra , untuk menangkap pantulan objek

Jenisnya : CCD(charge coupled device) dan CMOS (complementary metal-oxide semiconductor)

ADC , mengkonversi sinyal analog menjadi sinyal digital

Memori , untuk menyimpan data hasil konversi

ADC dan memori dikemas dalam satu kesatuan yang disebut dengan penangkap bingkai citra (image frame grabber)

Digital Camera Introduction

- Captures images
- Stores images in digital format
 - No film
 - Multiple images stored in camera
 - Number depends on amount of memory and bits used per image
- Downloads images to PC
- Only recently possible
 - Systems-on-a-chip
 - Multiple processors and memories on one IC
 - High-capacity flash memory
- Very simple description used for example
 - Many more features with real digital camera
 - Variable size images, image deletion, digital stretching, zooming in and out, etc.

Designer's Perspective

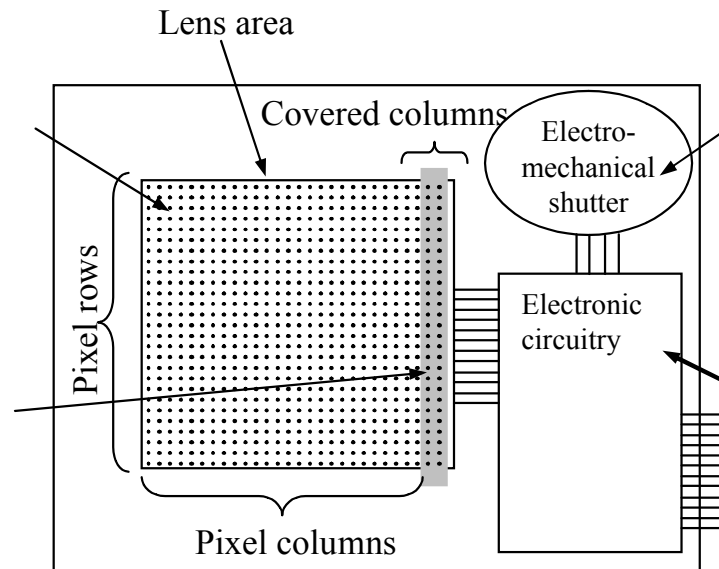
- Two key tasks
 - Processing images and storing in memory
 - When shutter pressed:
 - Image captured
 - Converted to digital form by charge-coupled device (CCD)
 - Compressed and archived in internal memory
 - Uploading images to PC
 - Digital camera attached to PC
 - Special software commands camera to transmit archived images serially

Charge-Coupled Device (CCD)

- Special sensor that captures an image
- Light-sensitive silicon solid-state device composed

When exposed to light, each cell becomes electrically charged. This charge can then be converted to a 8-bit value where 0 represents no exposure while 255 represents very intense exposure of that cell to light.

Some of the columns are covered with a black strip of paint. The light-intensity of these pixels is used for zero-bias adjustments of all the cells.



The electromechanical shutter is activated to expose the cells to light for a brief moment.

The electronic circuitry, when commanded, discharges the cells, activates the electromechanical shutter, and then reads the 8-bit charge value of each cell. These values can be clocked out of the CCD by external logic through a standard parallel bus interface.

APS Vs. CCD

- CCD
 - requires specialized expensive processes; not easily integrable with CMOS
 - has high Quantum Efficiency, high fill factor and low noise
 - lacks random access and fast readouts
 - needs multiple voltages on chip for efficient charge transfer
- APS
 - is lower voltage and lower-power
 - achieves random access and faster readout
 - can yield low noise with peripheral circuitry
 - compatible with CMOS process