

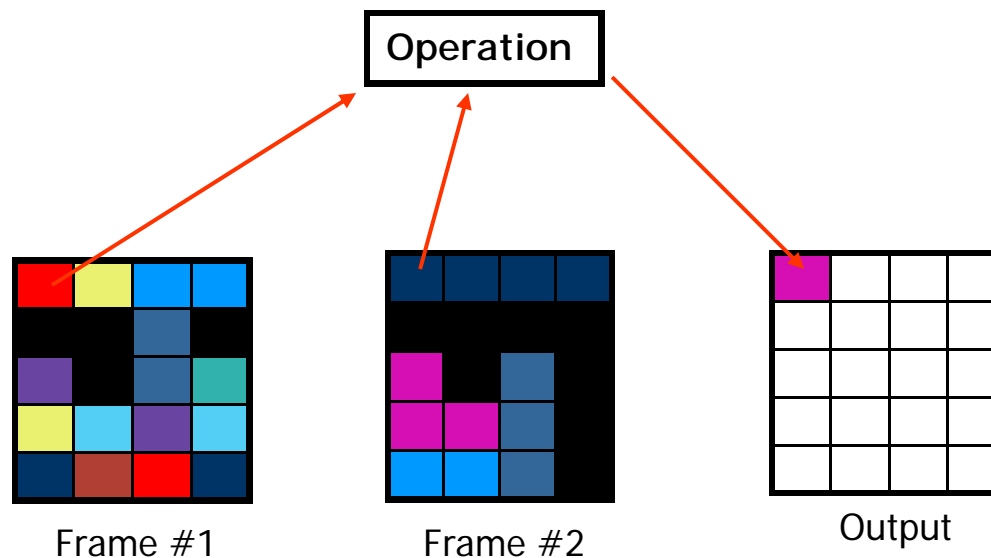
CHAPTER 5

FRAME PROCESSES

Generate a pixel value based on an operation involving two or more different images.

Frame Processes

- Generate a pixel value based on an operation involving two or more different images.
- Each pixel value will be located at the same position in the input image.



Addition

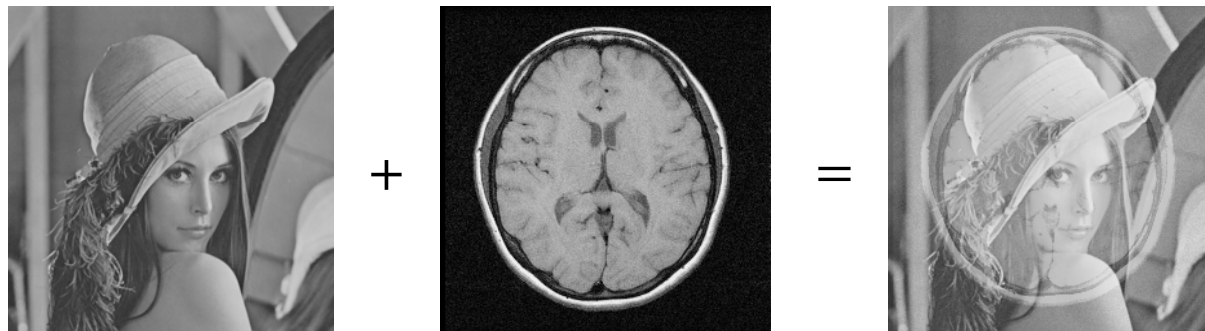
- Simple ADD operation would cause overflow and wrap around.

$$g[m,n] = f_1[m,n] + f_2[m,n]$$

- To prevent overflow, use some fraction α :

$$g[m,n] = \alpha f_1[m,n] + (1 - \alpha) f_2[m,n]$$

- The fraction α allows one image to dominate the other by a certain amount.



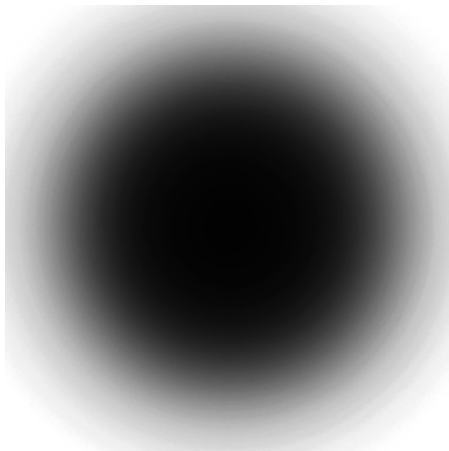
Addition



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Subtraction

- Determine differences between two images
- Used for motion detection and background subtraction
- Applications include
 - Object tracking
 - Medical imaging
 - Law enforcement and military applications



(a) Original scene



(b) Same scene later

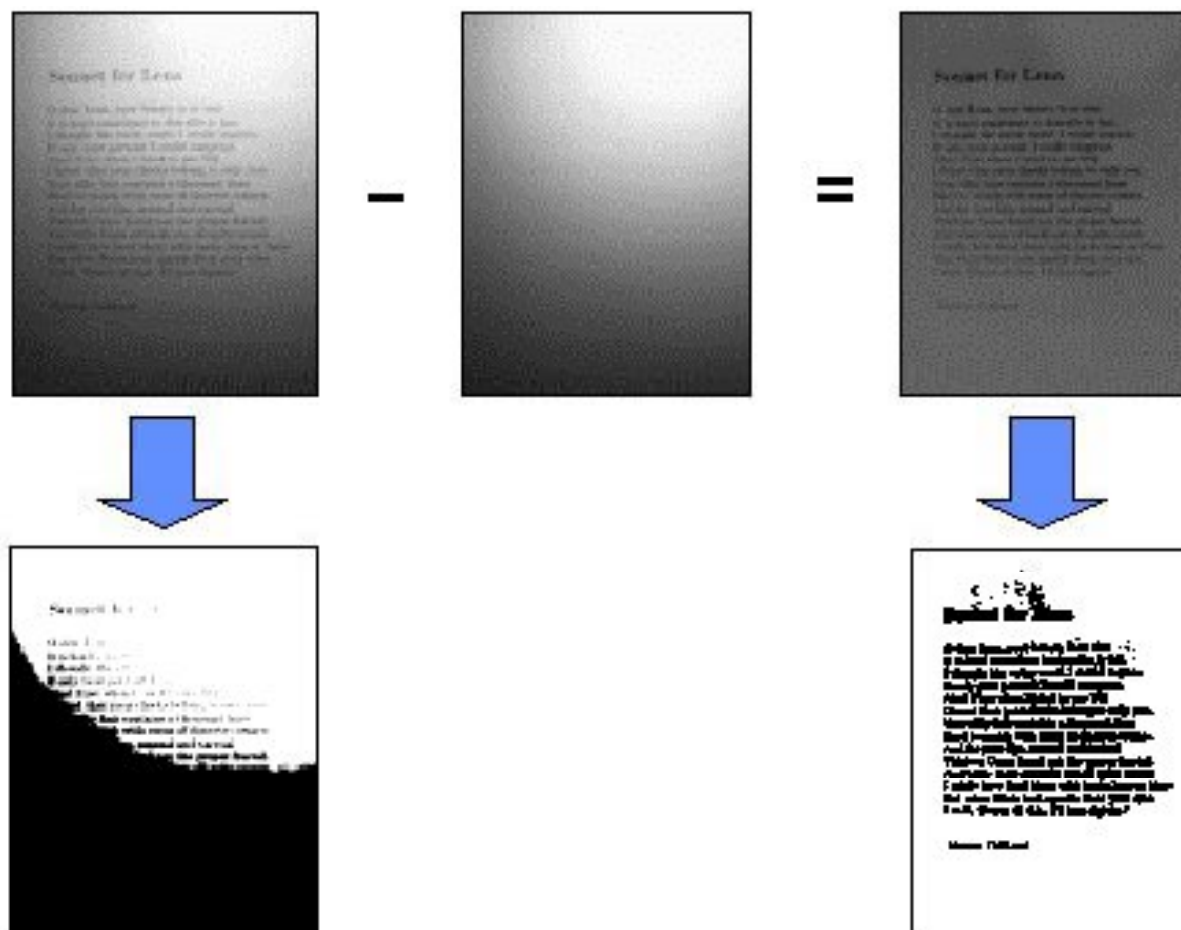


(c) Subtraction of scene (a) from scene (b)



(d) Subtracted image with threshold of 100

Subtraction



배기 연산 전

배기 연산 후

Logic Operations

- AND and OR are used:
 - To combine information in two images
 - For image masking operation
 - For extracting region of interest
- NOT operation creates a negative of the original image



Original image



Image after NOT operation

Masking Using Logic Operations

- AND operation



(a) Original image

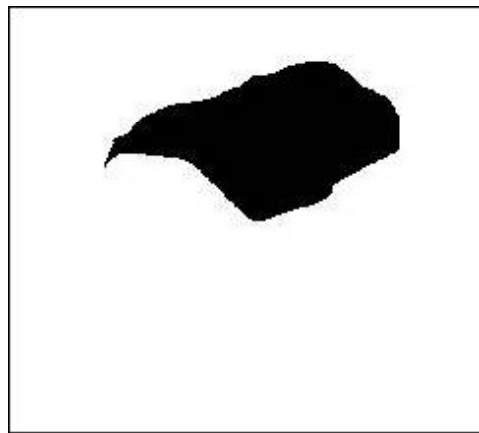


(b) Image mask

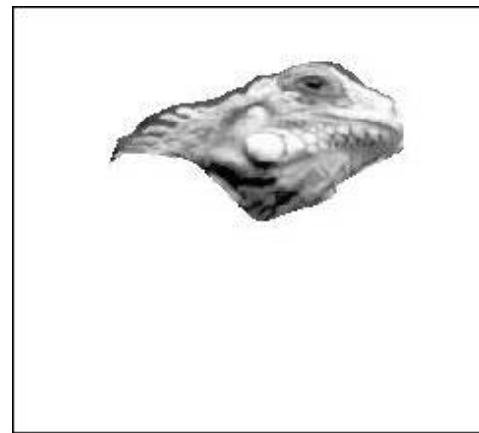


(c) ANDing (a) and (b)

- OR operation

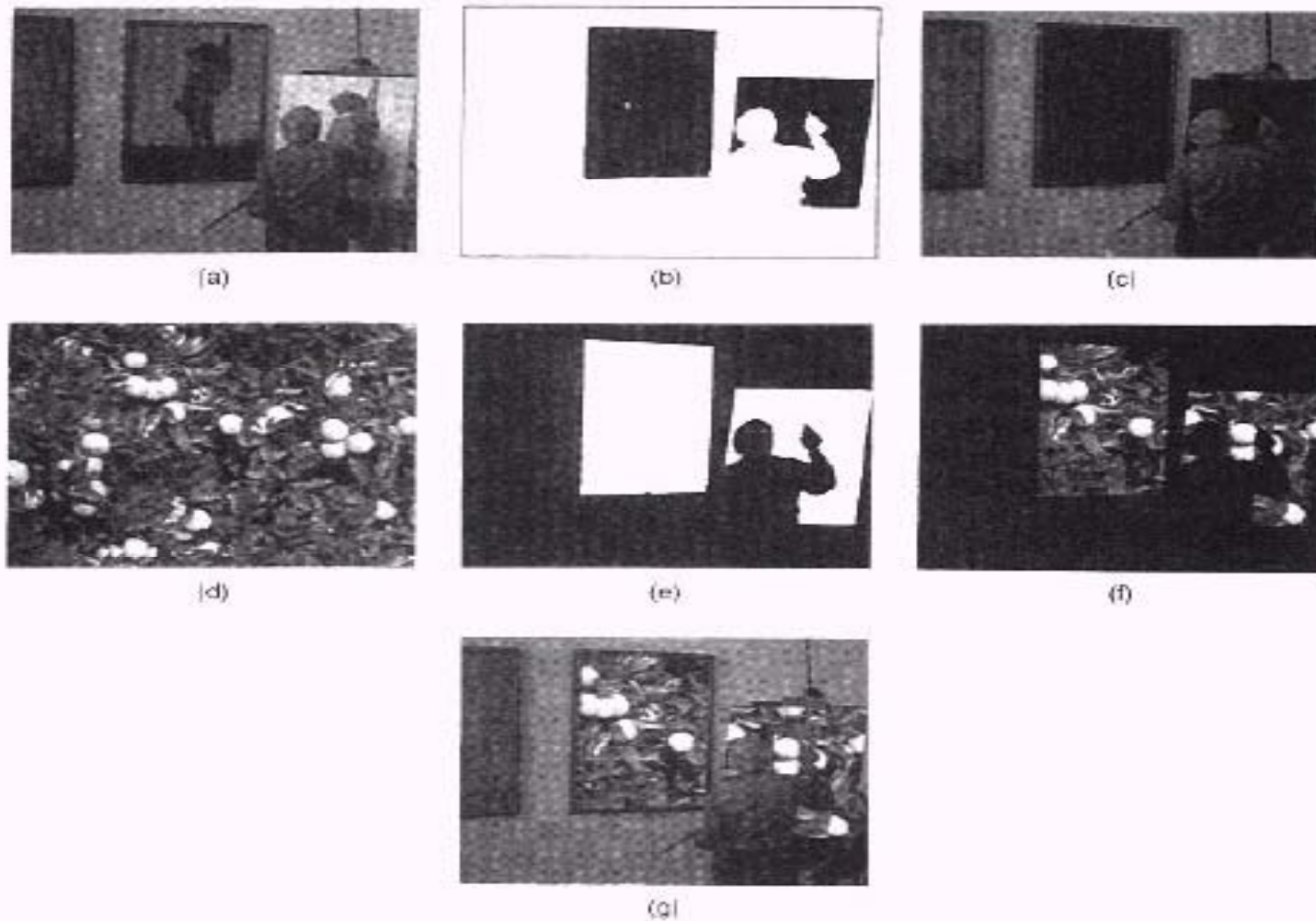


(d) Image mask



(e) ORing (a) and (d)

Masking Using Logic Operations



(a) painter image, (b) paint mask, (c) ANDed with mask, (d) Orange image, (e) mask, (f) ANDed with mask, (g) Ored with (f)

Average

- Sums two pixel values and divides the sum by two.
- Used to filter out noise from image transmissions.
(Effective only if the noise in each image is uncorrelated.)



(a)



(b)



(c)

(a) First noisy frame, (b) second noisy frame, (c) averaged frame.