

04.

영상 처리 및 컴퓨터비전 개요

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학습 내용

- Computer Vision 개요
- Image Processing 개요

Computer Vision 개요

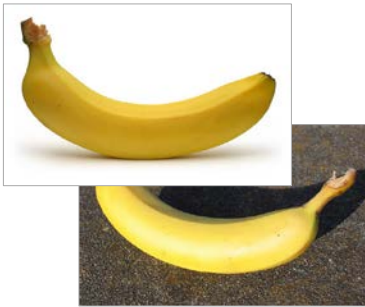
- computer imaging where the application *does not involve* a human being in the visual loop
 - The images are examined and acted upon by a computer
 - The final application requires a computer to use the visual information *directly*

Fields of Computer Vision

- factory automation system
 - Quality control,
 - Inspection
- automatic identification (biometrics system)
 - DNA analysis,
 - fingerprints identification,
 - retinal identification
- medical diagnostic system
- intelligent transport system
- etc

pattern recognition

Input object(pattern)를 주어진 algorithm에 의해 category나 class로 classification하는 과정



무슨 과일인가?

Pattern Recognition

PATTERN RECOGNITION

Pattern Recognition

무슨 글자인가?

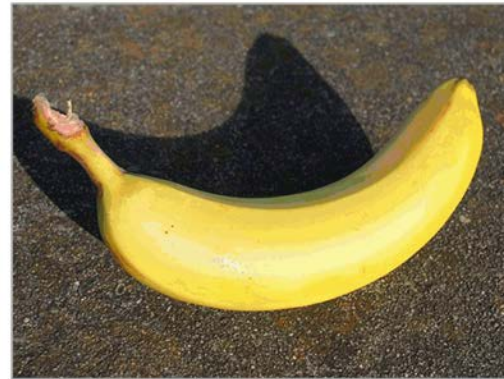
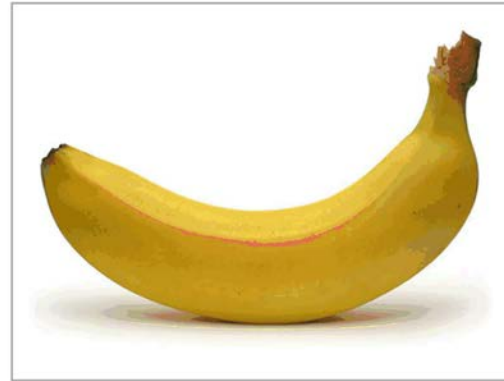
(키, 몸무게, SGOT, SGPT, 혈당,
높은 혈압, 낮은 혈압)

=

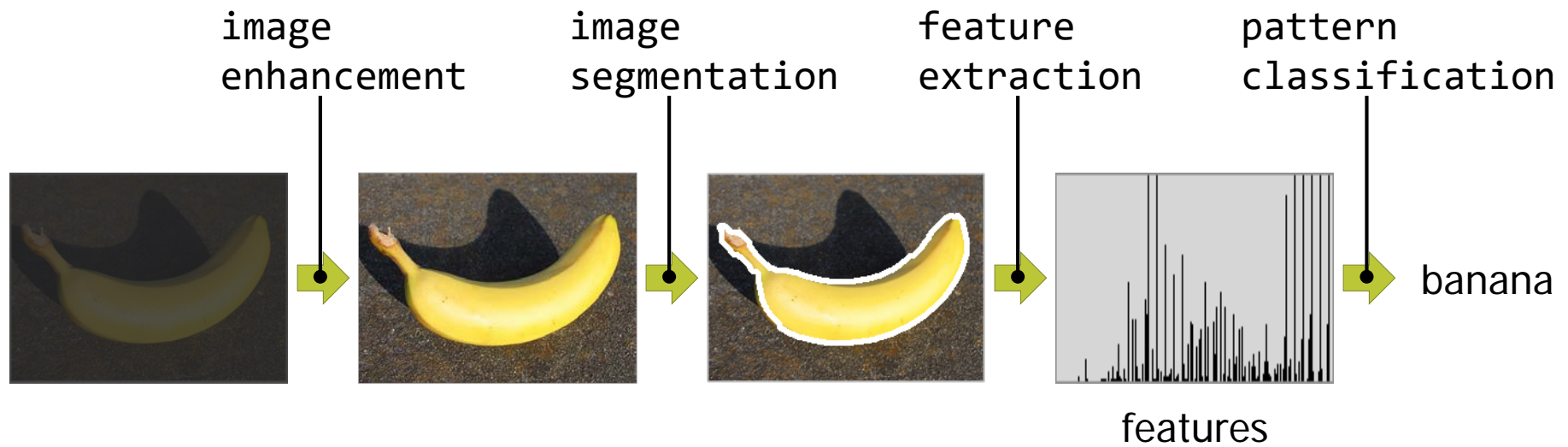
(169, 71, 18, 26, 94, 130, 80)

정상인가?

example



pattern recognition 절차

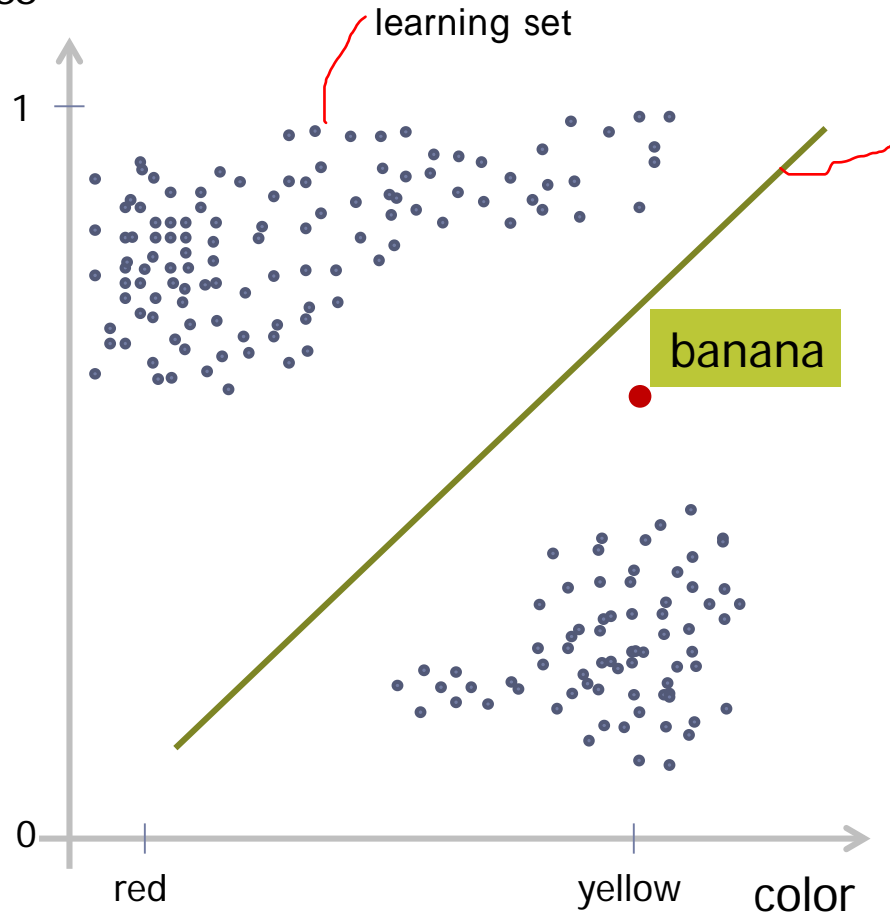
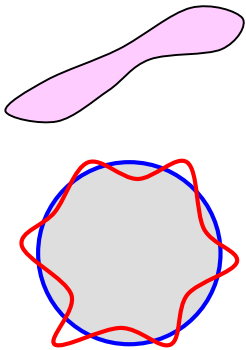


feature

thinness
ratio

$$T = 4\pi \left(\frac{A}{P^2} \right)$$

$$4\pi \left(\frac{\pi r^2}{(2\pi r)^2} \right) = 1$$



(classification)

Image Processing 개요

- 인간이 사용하기 편하도록 컴퓨터를 사용하여 기존 영상을 개선하거나 수정하는 학문 분야
(Images are to be examined and acted upon by people)
- Fields of image processing
 - *Image restoration*
 - *image enhancement*
 - *image compression*

image restoration

process of taking an image with some known, or estimated degradation, and restoring it to its original appearance

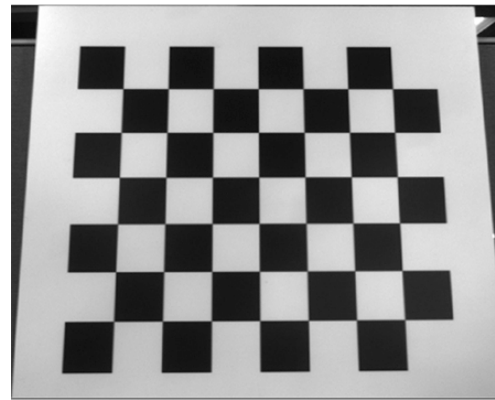
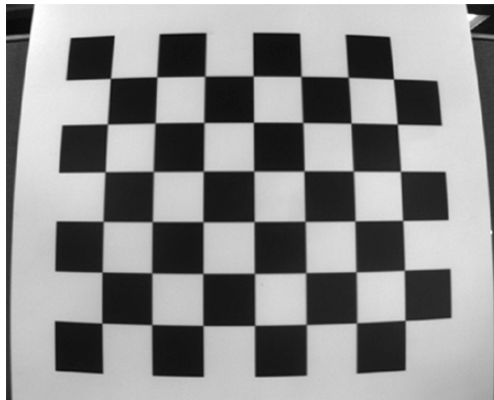
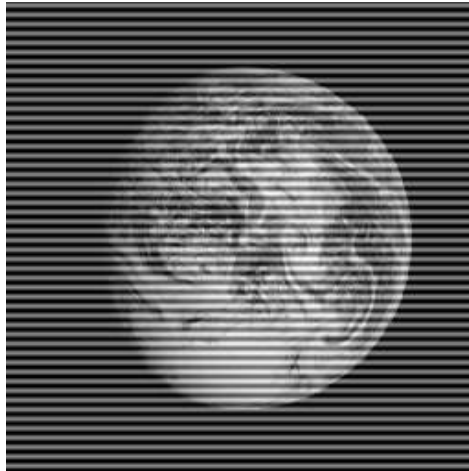


image enhancement

To improve an image visually by using knowledge of the human visual system's response

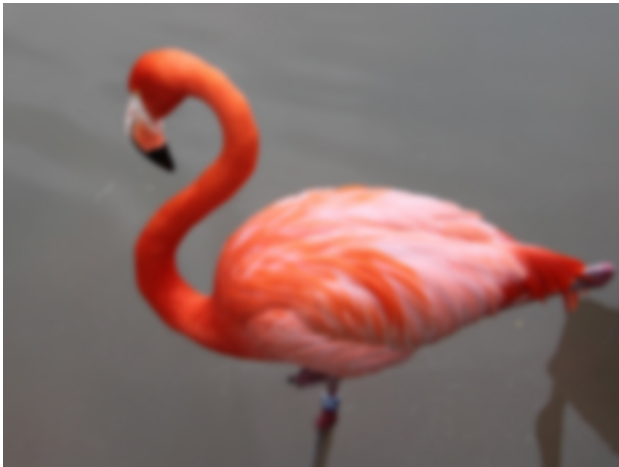
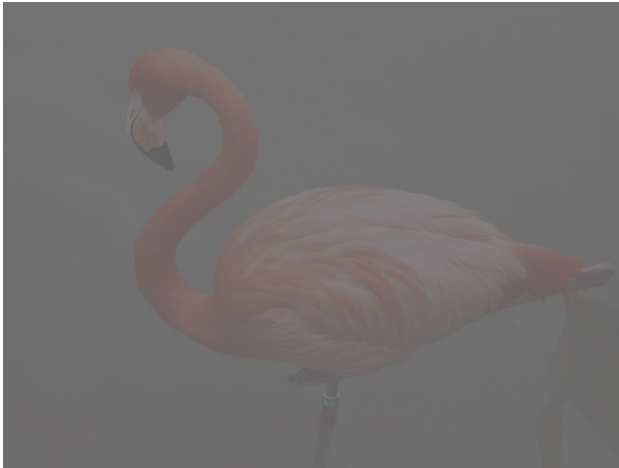


image compression

To reduce the typically massive amount of data needed to represent an image

$$640 \times 480 \times 3 = 900 \text{ Kbytes}$$



200 Kbytes (22%)



45 Kbytes (5%)



30 Kbytes (3%)



- Computer Imaging

- Acquisition and processing of visual information by computer
- Computer vision, Image processing → image analysis

- Pattern Recognition

- Input object(pattern)를 주어진 algorithm에 따라 category나 class로 classification하는 과정
- Image enhancement → image segmentation → feature extraction → pattern classification

- Image Processing

- 인간이 사용하기 편하도록 컴퓨터를 사용하여 기존 영상을 개선하거나 수정하는 학문 분야
- image restoration, image enhancement, image compression