5/12 画像信号処理特論

Schedule

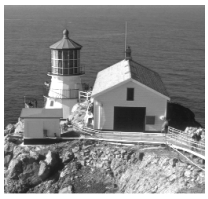
- 5/12 “Hello World!” of image processing
- 5/19 Image filtering
- 5/26 Binarization
- 6/2 (Prof. Tehrani)
- 6/9 (Prof. Tehrani)
- 6/16 (Prof. Tehrani)
- 6/23 Histogram ← 1st report deadline
- 6/30 Discrete Cosine Transform
- 7/7 JPEG
- 7/14 (Prof. Fujii)
- 7/21 (Prof. Fujii) ← 2nd report deadline

Reports

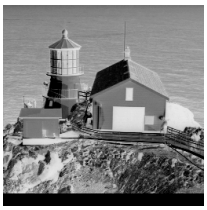
- Format
  - Name and student ID on the 1st page
  - A4 papers, both side printed
  - Stapled at the upper left corner
  - Up to 6 pages for each report
- Contents
  - Images produced by your own programs
  - Whatever your learned from the exercises
  - Source codes are unnecessary

Today’s goal

- “Hello world” of image processing



Input

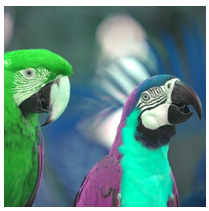


output

Today’s goal

- “Hello world” of image processing

Input



output

Image format

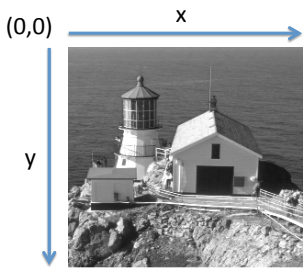
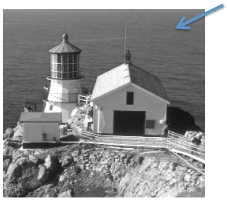


Image format



Pixel = picture element

Holding a grey level

(an integer in 0~255)

0: black, 255: white

8 bits for each pixel

Image format

Pixel = picture element

Holding three (RGB) color channels, each of which takes an integer in 0~255.

24 bits for each pixel

myImageData class

- Create an instance
  myImageData *img = new myImageData();
- Initialize
  img->init(640, 480, 1); // 640x480, grey scale
  img->init(640, 480, 3); // 640x480, RGB color
- Delete the instance
  delete img;

myImageData class

- Read an image from a file
  img->read("inputfile.pgm");
- Write an image to a file
  img->save("outputfile");
- Get image properties
  int W = img->getWidth();
  int H = img->getHeight();
  int CH = img->getCH();

myImageData class

- Get a pixel value
  double v = img->get(x,y); // for grey scale images
  double v = img->get(x,y,1); // for RGB color images
- Set a pixel value
  img->set(x,y,value); // for grey scale images
  img->set(x,y,2,value); // for RGB color images

Exercises

- Go to the webpage of this course
  - http://www.fujii.nuee.nagoya-u.ac.jp/~takahasi/Lectures/ImageProcessing/index.html
  - username: student password: ip2015
- Download
  - Image data
  - Irfanview (an image viewer)
  - Header file (myImageIO.h)
  - Sample source file (sample1.cpp)

Exercises

- Build and execute “sample1”
- Implement
  - luminance inversion of a gray scale image
  - Color channel swapping of a color image
  - Any other process you like