Lecture 1-1：Course introduction

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Course piazza link：piazza.com/shanghaitech.edu.cn/spring2022/cs270b

Outline

- Course introduction
- Teaching Schedule
- Evaluation

Frequent question: relationship between Digital Image Processing and Computer Vision

Input \ Output	Image	Knowledge
Image	Digital Image Processing	Computer Vision
Knowledge	Computer Graphic	Artificial Intelligence

Stage of DIP

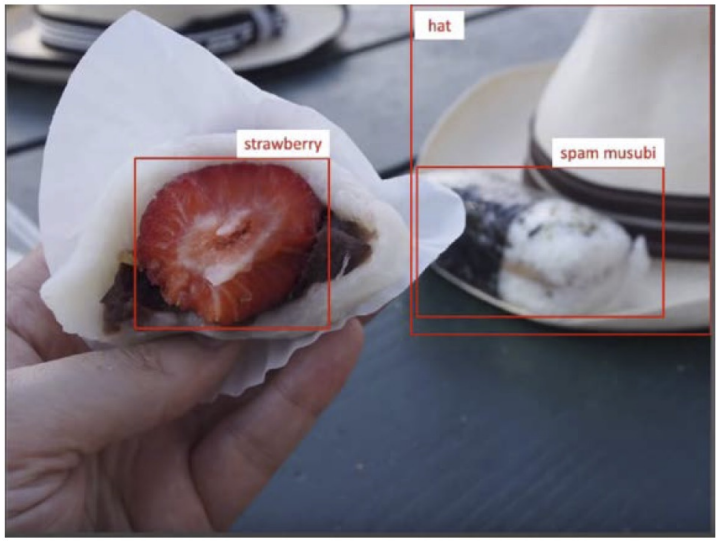
Low level process	Mid level process	High level process
INPUT: Image **OUTPUT:** Image **EXAMPLE:** Denoise Contrast enhancement Image sharpening	**INPUT:** Image **OUTPUT:** Attributes **EXAMPLE:** Segmentation Edge detection Recognition	**INPUT:** Attributes **OUTPUT:** Understanding **EXAMPLE:** Image analysis Image understanding

There are no clear-cut boundaries
from image processing to computer vision

Low level

Mid level

High level



Fundamental Steps in DIP

- Image acquisition
- Image enhancement
- Image restoration
- Image reconstruction
- Image compression
- Image segmentation
- Image representation and description
- Object recognition

Teaching schedule (not fixed)

Week 1: Introduction, image denoising.

Week 2: Image super-resolution.

Week 3: Image deblurring.

Week 4: Image reconstruction.

Week 5: Image segmentation.

Week 6: Image matting and Inpainting.

Week 7: Image style transfer.

Week 8: Image registration.

Evaluation

- **Homework assignment (20%*2=40%):** 2 times of homework for, the objective is to familiarize students with the material and exercise the processing skill that learned in the class.
- **Project (60%):** we highly recommend you to work on your own research topic, and if your research direction is not related to our course (it should be, otherwise why you choose this course) we will also provide few topics for you to select. These topics will be released in the mid-semester (the 7^{th} week), The 9^{th}-11^{th} week will be left for project, and the 12^{th} week will be left for the presentation of the projects.
- **Possible bonus (10%)**: Extension reading and thinking on any topic. Please prepare 30 min of PPT slice and talk in class. Please send me your plan in advance.

Take home message

- 1. In course CS270B-Advanced Digital Image Processing，we are going to deeply discuss several low level image processing problems. There is no perfectly matching reference books, so we will share with you all the papers we talked about in the lecture. Of course your extension reading and thinking is very welcome to be shared with all of us.
- 2. From my point of interest, we will probably talk more about image restoration and reconstruction topics. Other possible emphasized topics are also welcome to be proposed from all of you.
- 3. The simplest way to follow up this course is to complete your homework before each due date.