Introduction to Information Systems

– Understanding the digital world

15 The Future of Information System and Overall Review

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Today's schedule

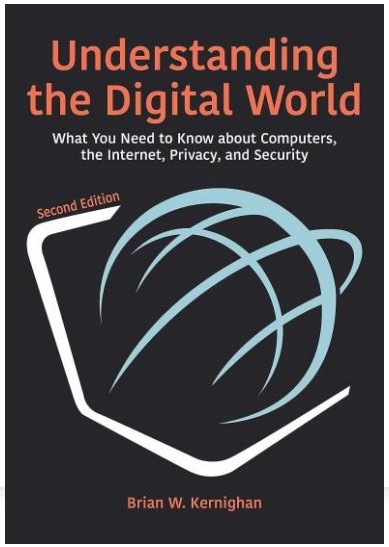
- Overall review (20')
- Future information system (15')
- Introduction of our research (15')
- Self assessment (30')
- Class survey (10')

Overall review - Syllabus

Summary: Provide an **overview** of information systems including hardware and software **fundamentals**, **coding**, effective and secure use of the Internet and other **communication** tools, **Artificial Intelligence** (AI), as well as the **ethical** use of computers in business and society through **hands-on activities** and **assignments**.

Goal: Learn **basic concepts and knowledge** to **understand** digital computers and communications including hardware, software, Internet, World-Wide Web (WWW), AI, software license, information security and others, as well as coding and web page creation.

Overall review - Contents



1 What is in a Computer, 2 Bit, Bytes and Representation of Information,
3 Inside the CPU, 4 Programming, 5 Algorithms, Programming and Programming Languages,
6 Programming with Python and Scratch, 7 Operating System and Software Systems,
8 Javascript and HTML, 9 Communication and Networks, 10 The Internet, 11 Data and Information,
12 Privacy and Security, 13 The World-Wide Web (WWW), HTML, and Wiki,
14 Artificial Intelligence (AI) and the Future of Computing,
15 The Future of Information System and Overall Review

What's in a computer

CPU, RAM, Disk (HDD/SSD), bus, Motherborad, USB, etc

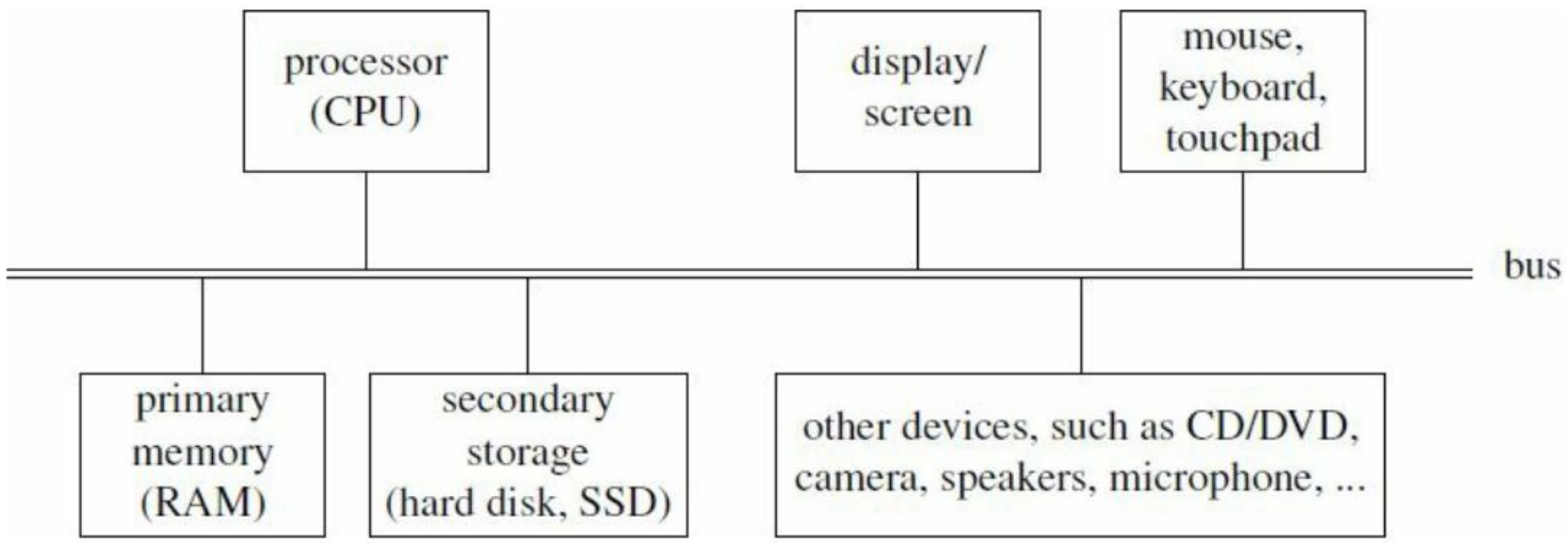
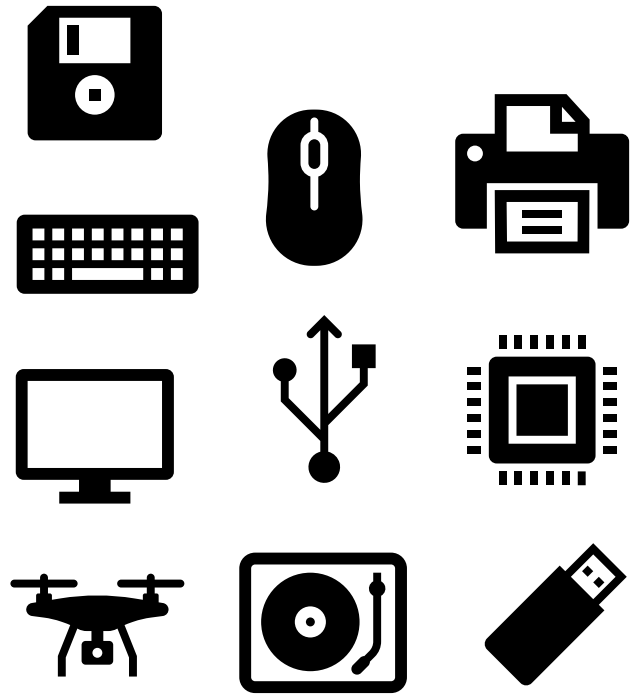
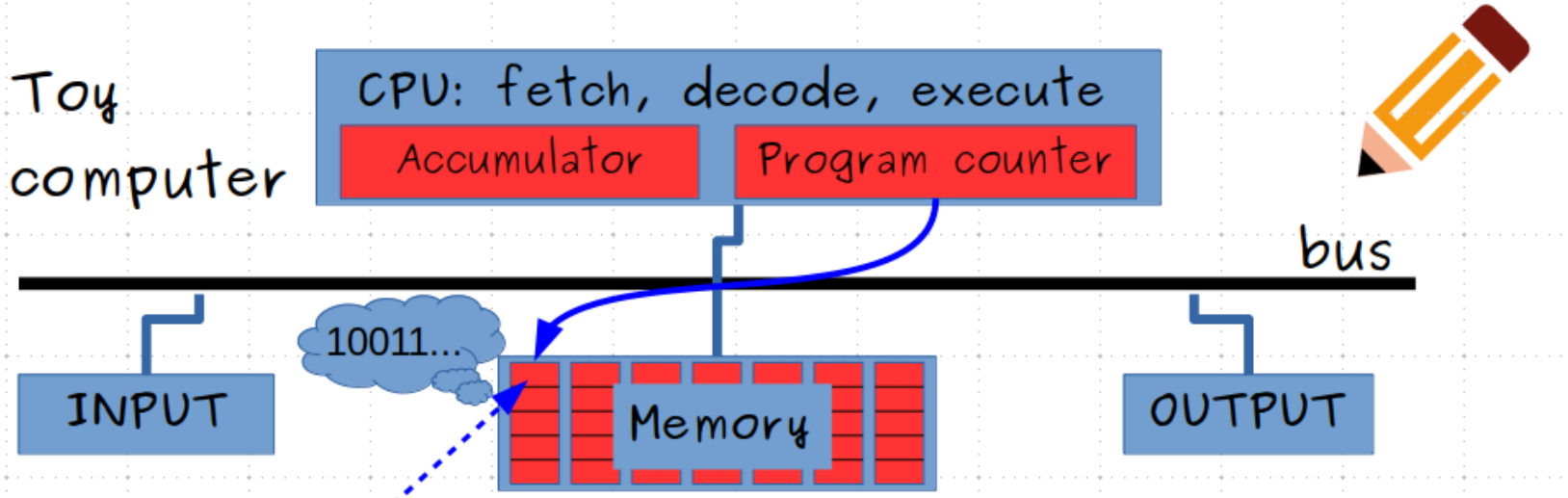


Figure 1.1: Architectural diagram of a simple idealized computer.



Toy Machine & instructions

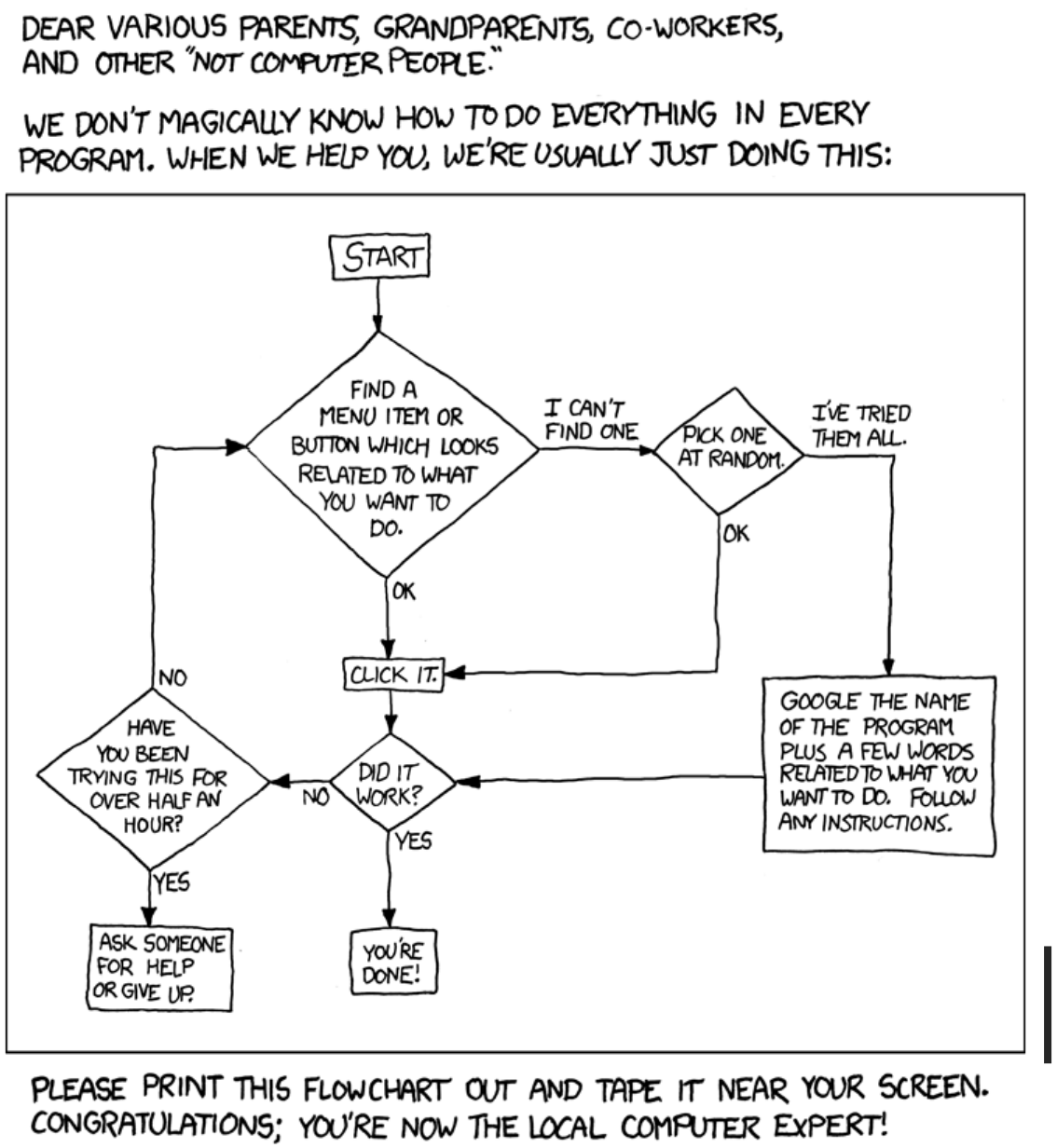


The programming language we are learning is called the assembly, which is almost the same as the machine language.

label	instruction	description
	get	get a number from keyboard into accumulator
L	print	print contents of accumulator
	load Val	load accumulator with Val (Val unchanged)
	store M	store contents of accumulator into memory location called M
	add Val	add Val to contents of accumulator (Val unchanged)
	sub Val	subtract Val from contents of accumulator (Val unchanged)
	goto L	go to instruction labeled L
	ifpos L	go to instruction labeled L if accumulator is >= zero
	ifzero L	go to instruction labeled L if accumulator is zero
	stop	stop running
M	Num	before program runs, set this memory location (called M) to Num

Three fundamental structures of ALL programs (algorithms).

1. Sequential
2. Conditional
3. Iterative (-> loop)



Game developing with Scratch

1. Create an account on Scratch (see https://www.youtube.com/watch?v=se8di8cBj70).
2. Watch a tutorial https://www.youtube.com/watch?v=1jHvXakt1qw.
3. With your account, create a game introduced in the above tutorial.
4. Create your original game and try to make it as fun as possible (in your opinion).
5. E-mail me the link of your game to liangzhao@acm.org before 9am, Nov. 6th. I will check how fun it is and grade it (based on my impression).

What does an OS do?

- CPU (task management)
- Disk (HDD, SSD, etc) and file
- RAM (memory)
- Devices (monitor, keyboard, mice, printer, etc)

```
<!DOCTYPE html>
<html>
  <head><title>Javascript Ex2</title></head>
<body>
  <script>
    var name = prompt("What is your name?");
    var sentence = "Hello, " + name + ".";
    document.write(sentence);
  </script>
</body>
</html>
```

Hello, Z.

Edit and save the above source to ex2.html and use a browser to open it.
Or use https://www.w3schools.com/js/tryit.asp?filename=tryjs_myfirst

Introduction to telecommunication

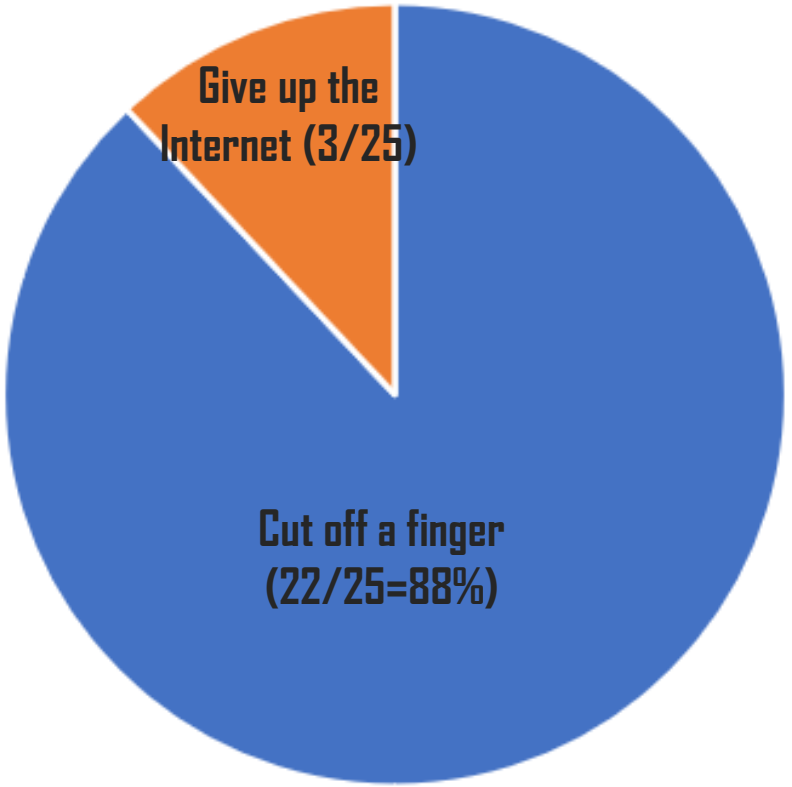
- Tin can telephone (3')
- Morse code: https://www.youtube.com/watch?v=iy8BaMs_JuI (4')
- Codes for text message (e.g. ASCII), for emoji (e.g. UTF-8), for video message (e.g. H264)

You must use a Windows or Mac computer.

1. Open a command line (Search cmd. Mac: Finder -> Go -> Utilities -> Terminal)
2. ipconfig (Mac: ifconfig)
3. ping aw.gsais.kyoto-u.ac.jp (Win)
   ping –c 4 aw.gsais.kyoto-u.ac.jp (Mac)
4. nslookup g.gg
5. Whois: https://www.whatismyip.com/ip-whois-lookup/

Classwork and mini test #10

Finger or Internet



Result of the ILA class in Dec. 2023

Creating web pages with Wiki

- Wiki: language and system to create web contents with syntax simpler than HTML
- Feature: usually open for multi-users' writing (unlike the closed FB, Line, etc)
- Example: Wikipedia (see more detail on https://en.wikipedia.org/wiki/Wiki)
- Classwork: Access the next site and create your web contents with the Wiki system.

http://aw.gsais.kyoto-u.ac.jp/z/wiki/

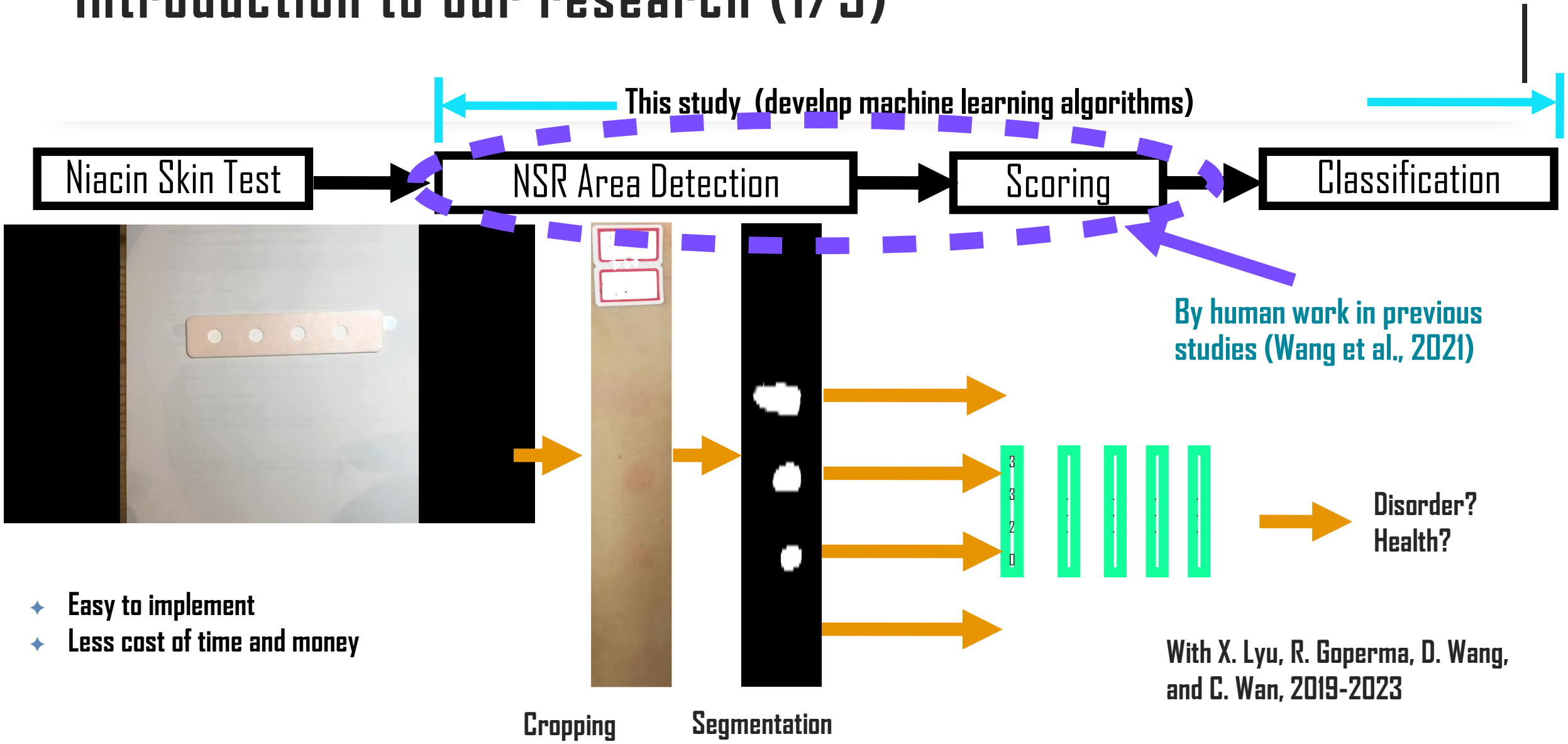
On the future of computing
- Students' experience on using AI in study

- Lemonie's team (15 minutes)
- Hayao (10 minutes)
- Akiko (10 minutes)

A video on future information system

https://www.youtube.com/watch?v=5TNAz1HYg18 (13')

Introduction to our research (1/3)

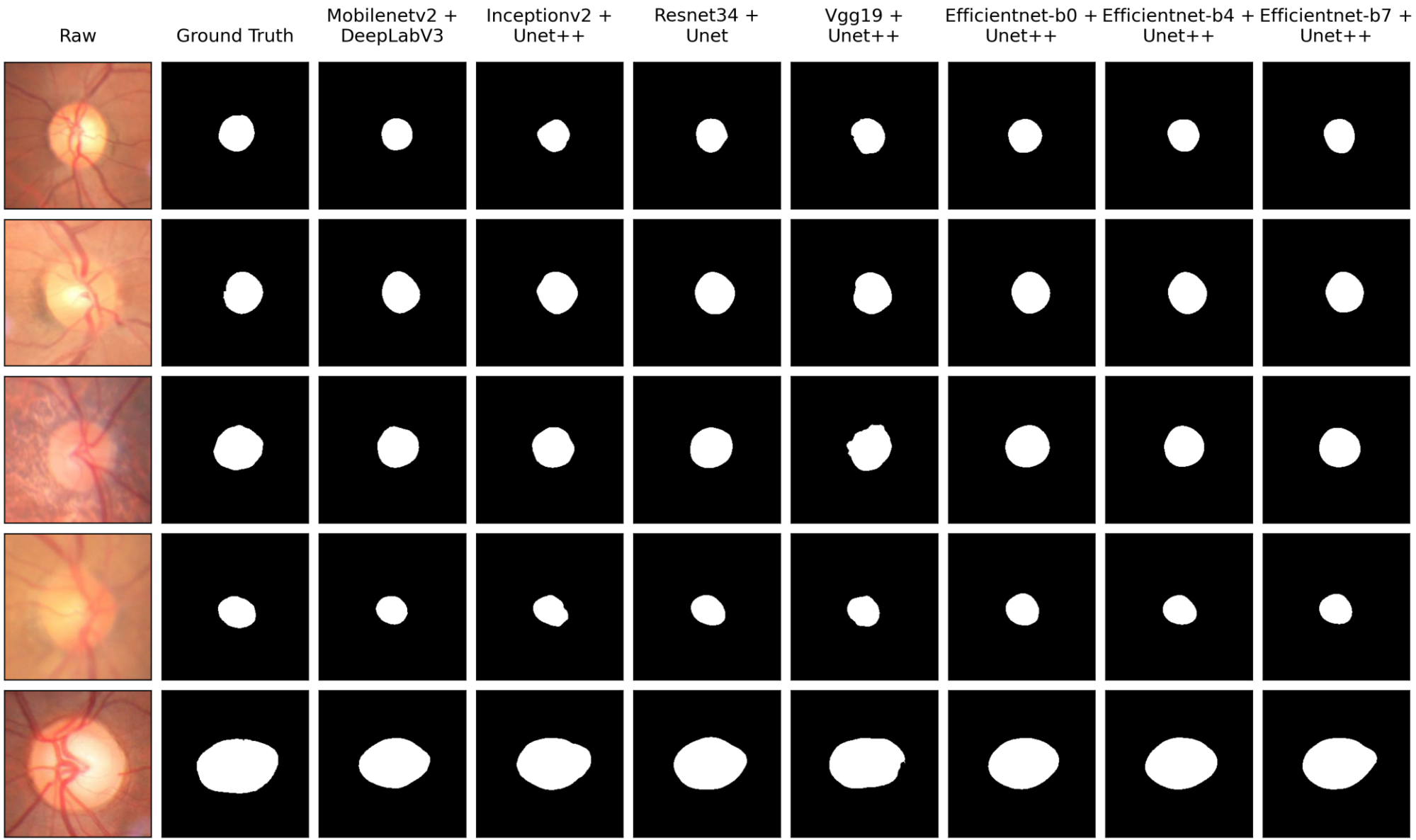


- Easy to implement
- Less cost of time and money

With X. Lyu, R. Goperma, D. Wang, and C. Wan, 2019-2023

Introduction to our research (2/3)

With R. Goperma & R. Basnet



Introduction to our research (3/3)

With R. Basnet & R. Goperma

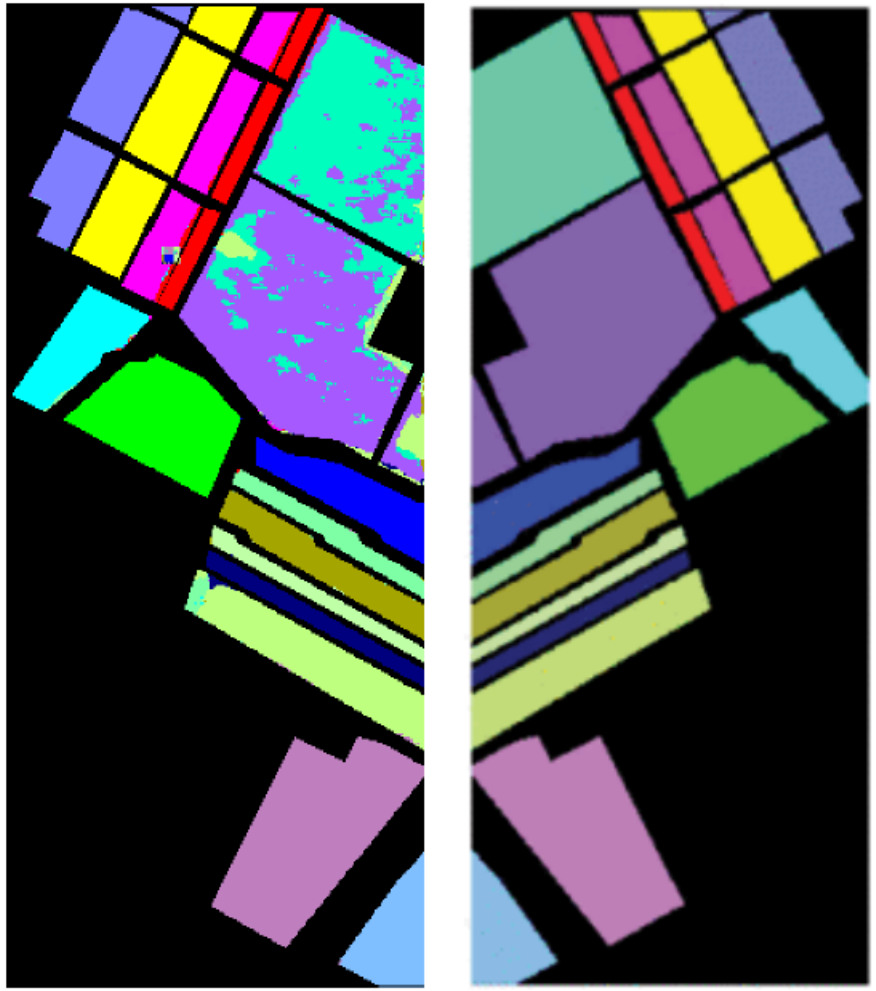


Figure 7:Predicted Image and Ground Truth of Salinas

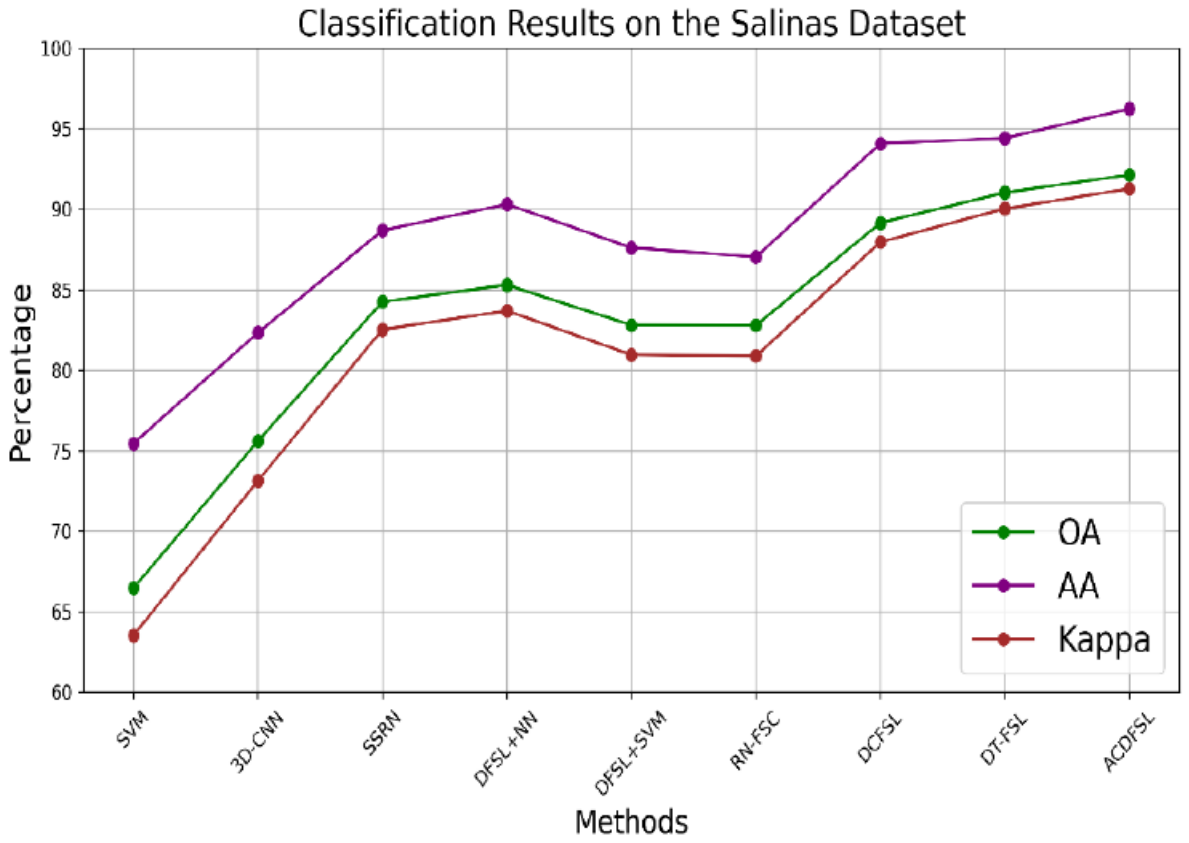


Figure 8:Comparative Classification results in Salinas

What's New

https://aw.gsais.kyoto-u.ac.jp/

- Jan 29, 2024, The First Joint Mini Workshop on Chemical Graph Learning
- Jan 8, 2024, Page on the Nonlinear Representative Theory has been created.
- Dec 8, 2023, Liang Zhao, Can AI be creative? (in Japanese) ふれデミックカフェ@KRP AIは創造もできるか．[Slides]

Research

Mainly from the aspect of information, we do interdisciplinary studies for future wise AI and life, wisdom, human society. The topics include methodologies such as network and optimization, machine learning, deep learning, etc, and their connection to learning theory, wisdom, life, and human society. We propose the **Information Wisdom theory** (especially, **Wisdom = Learning + Random Selection**), and use them to study the limitation, future, expectation and danger of AI, as well as the nature of life, creativity, future life/world.

Features

- **Interdisciplinary research**: We focus on information related research but it actually related to all disciplines. See research.
- **Diversity**: We have students, visitors and collaborations from various fields and countries. See members.
- **Academic freedom**: Under the supervision students can do original research as far as it is related to informatics. See members.
- **Leadership training**: We have a lot of experience in leadership training (リーディング大学院思修館，京大ELP，Asia Future Leaders Scholarship Program etc).
- **Integrated dormitory**: is available for all students with minimum expense and maximum communication opportunity. See the explanation.
- **Diverse career path**: See members.

Self Assessment (30′)

I would be glad to read your feedback and try to improve this lecture. The feedback does not affect the grade, of course.

Class survey (10′)

Doshisha University's web page -> Enter user ID and password on DUET -> Select “Class Evaluation Survey”

Notice: Your answers will not affect the grades and the lecturer cannot identify an individual student from the survey.