Enrollment in April 2022

Graduate School of Environmental and Life
Science, Okayama University Master's Course

For International Students

Entrance Examination Question Booklet

(2021.12)

Specialized Subject

Division of Social Engineering and Environmental Management

Department of Rural Environment Management

Notes

1. Do not open this booklet until the start of the examination is announced.

2. You are given one booklet and three answer sheets and two draft sheets.

3. Write your examinee number in the designated box on the top of each answer sheet.

4. Answers should be written in the space designated on the answer sheet for each question.

5. Answer all three questions of this booklet.

6. At the end of the examination, submit all answer sheets as instructed by the invigilator.

7. Take this booklet and draft sheets with you after the examination.

The question starts on the next page.

Question 1

After reading the paragraphs below, answer the following three questions.

Source: Kutílek, M. and Nielsen, D. R. (*eds*.). 1994, *Soil Hydrology*, CATENA VERLAG.

* wadi(s): the bed or valley of a stream in regions of southwestern Asia and northern Africa that
is usually dry except during the rainy season and that often forms an oasis.

(1) Regarding to the underlined sentence (a), explain how are non continuous rainfall and snow transformed into a continuous flow of water to the roots of plants.

(2) Regarding to the underlined sentence (b), explain how our planet avoids this.

(3) Imagine the earth without water and describe problems in relation to solute movement.

Question 2

Answer the following two questions.

Table 1 ranks occupations according to their probability of computerisation (from least-to-most computerisable) estimated by an advanced data analysis method.

Source: Frey, C.B. and Osborne, M.A. 2017, The future of employment: How susceptible are jobs to computerisation?, *Technological Forecasting & Social Change*, 114, 254-280.

(1) What characteristics can make the computerisation easy or difficult? Describe those characteristics with reference to Table 1. Then discuss the negative and positive aspects of computerisation in occupations.

Figure 1 (a) shows the relationship between performance of machine learning (ML) algorithm and the amount of data. ML has become an important technology in our daily life and used for face recognition systems, Amazon recommendation engine, machine (language) translation, route search on Google map. In principle, while traditional ML deals with only simple tasks, advanced ML can solve very complex tasks such as self-driving car.
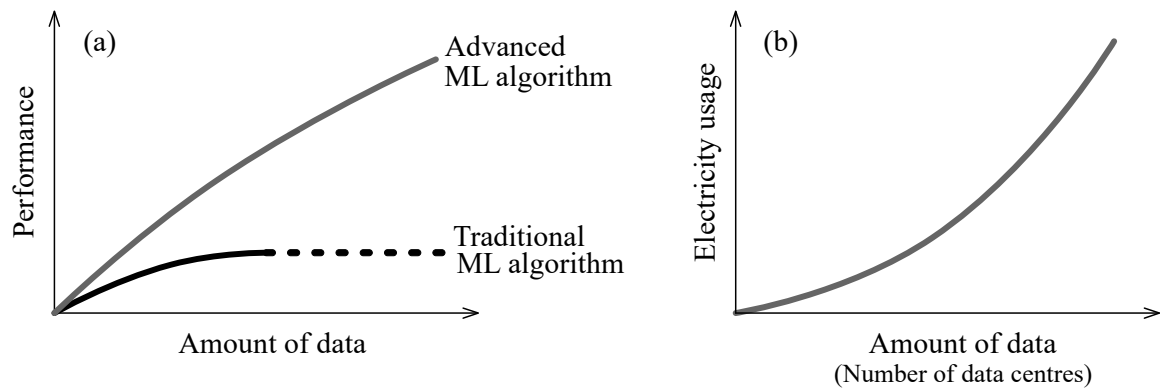

Figure 1 Conceptual illustration of ML development:
(a) Performance of ML vs. amount of data; (b) Electricity usage vs. amount of data.

(2) What can be the key issue in application of ML to more complex problems in our society? Discuss it with reference to Figure 1.

Question 3

Describe the social background, importance, and necessities of your research plan during the master's course.

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