

Course Title : Machine Learning and Lab
[Syllabus]

2022-1st Semester

Course	Category	Major selection (major selection)	Instructor	Department or Division	Department of Statistics
	Number(section)	47771(01)		Name	
	Title	Machine Learning and Lab		Phone	
	Credit(Hours)	3 Credit(4 Hours)		E-mail	
	Type	Lecture+Experiment/Practice		Homepage	
	Time(Room)	Tue 06,07,08/33-710, Thu 01/33-710		Office Hours	
	school year	3/4 year	Assistant	name & phone	

Grading	Evaluation Method	absolute evaluation			
	<input type="checkbox"/> Attendance (10%)	<input type="checkbox"/> Portfolio (0%)	<input type="checkbox"/> Participation (10%)		
	<input type="checkbox"/> Assignment (20%)	<input type="checkbox"/> Quiz (0%)	<input type="checkbox"/> Midterm Report (0%)	<input type="checkbox"/> Midterm Exam (30%)	
	<input type="checkbox"/> Final Report (0%)	<input type="checkbox"/> Final Exam (30%)	<input type="checkbox"/> Other (0%)		

Type	Lecture and Practice , PBL , Foreign Language
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Teaching Method	Lecture , Practice
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Plagiarism Policy	It is considered plagiarism to draw any idea or any language from someone else without adequately crediting that source in your work. It doesn't matter whether the source is a published author, another student, a Web site without clear authorship, a Web site that sells academic papers, or any other person: Taking credit for anyone else's work is stealing, and it is unacceptable in all academic situations, whether you do it intentionally or by accident.
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Any student with a disability is welcome to contact the instructor to get academic accommodations, and may be in touch with the Student Accessibility Services by calling 02-6490-6273 to discuss the process for requesting accommodations.

Course Objectives

- This class is a foreign language class conducted in English.
(This course will be presented in English)
- o Understanding the principles of various machine learning methods
(Understanding the mechanisms of various machine learning methods)
- o Understanding the evaluation of machine learning methods
(Understanding assessment of the performances of machine learning methods)
- o Applying appropriate machine learning methods to real data
(Building sound skills in machine learning)

Course Description

In this course, based on R or Python, there are many learning problems. The methodology used is introduced here. The main topics are decision trees and nerves. Various supervised learning techniques and evaluation methods such as networks, association rules, clusters, There are self-learning techniques such as the dimension reduction method.

Textbooks and Reference Materials

An Introduction to Statistical Learning: with applications in R
G. James, D. Witten, T. Hastie, and R. Tibshirani,
Springer.

Specialty competency

Representative competency

Statistical Modeling	Primary
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Mathematical Methods	
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Statistical Data Processing	
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Statistical Data Analysis

Secondary

Specialty competency	Representative competency
Problem Solving	Secondary
Collaboration	
Global Competence	
Ethics in Statistical Practice and Communication	

[Weekly Lesson Plan]

Week	Contents	Teaching Method	Teaching Materials	Requirements, Assignments, etc.
One	1. Overview of Machine Learning: 1-1. What is machine learning, 1-2. What is model evaluation is it 1. Introduction to Statistical Learning 1-1. What is Statistical Learning, 1-2. Assessing Model Accuracy		Introduction to Statistical Learning Ch. 1 & 2.	
2	2. Linear Model I 2-1. Simple star regression model, 2-2. Multiple Linear Regression Model I 2. Linear Regression Part I 2-1. Simple Linear regression, 2-2. Multiple Linear Regression		Introduction to Statistical Learning Ch. 3	
3	3. Linear Model II 3-1. Multiple Linear Regression Model II, 3-2. Extension of the linear model 3. Linear Regression II 3-1. Multiple Linear Regression Part 2, 3-2. Other Considerations in the Regression Models		Introduction to Statistical Learning Ch. 3 continued	
4	4. Categorization I 4-1. Introduction to Categorization, 4-2. logistic regression model 4. Classification 4-1. An Overview of Classification, 4-2. Logistic Regression		Introduction to Statistical Learning Ch. 4	
5	5. Categorization II 5-1. Generative Model, 5-2. of various categorization methods. compare 5. Classification II 5-1. Generative Models 5-2. A Comparison of Classification Method		Introduction to Statistical Learning Ch. 4 continued	
6	6. Resampling 6-1. Cross-Validation, 6-2. bootstrap 6. Resampling Methods 6-1. Cross-Validation, 6-2. Bootstrap		Introduction to Statistical Learning Ch. 5	
7	7. Linear Model Selection and Normalization I 7-1. Subset Selection Method, 7-2. shrinkage model 7. Linear Model Selection and Regularization 7-1. Subset Selection, 7-2. Shrinkage Methods		Introduction to Statistical Learning Ch. 6	
8	Midterm exam Midterm			
9	9. Linear Model Selection and Normalization II 9-1. Dimensional Reduction, 9-2. High dimensionality and multicollinearity 9. Linear Model Selection and Regularization 9-1. Dimension Reduction Methods, 9-2. Considerations in High Dimensions		Introduction to Statistical Learning Ch. 6 Continued	
	10. Tree Model I 10-1. Introduction to Nonlinear Methods, 10-2.		Introduction to	

10	<p>Introduction to the tree method</p> <p>10. Tree Methods I</p> <p>10-1. An Overview of Non-linear Methods, 10-2. An Overview of Tree Methods</p>		<p>Statistical LearningCh. 7 & 8</p>	
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11	<p>11. Tree II 11-1. Bagging method, 11-2. Random Forest, 11-3. booth chat</p> <p>11. Tree Methods II 11-1. Bagging, 11-2. Random Forests, 11-3. Boosting</p>		Introduction to Statistical Learning Ch. 8 continued	
12	Supplementary Week			
13	<p>13. Support Vector Machine 13-1. Margin and support vectors, 13-2. support vector machine</p> <p>13. Support Vector Machine 13-1. Margins, Classifiers, Support vectors, and Support Vector Classifiers, 13-2. Support Vector Machines</p>		Introduction to Statistical Learning Ch. 9	
14	<p>14. Unsupervised Learning 14-1. Principal Component Analysis, 14-2. Clustering Analysis</p> <p>14. Unsupervised Learning 14-1. Principal Component Analysis, 14-2. Clustering Methods</p>		Introduction to Statistical Learning Ch. 10.	
15	<p>15. Neural Networks 15-1. Introduction of Neural Networks, 15-2. of neural networks learning</p> <p>15. Neural Networks 15-1. An Overview of Neural Networks, 15-2. Neural Network Learning</p>		Lecture Slides	
16	<p>Finals Final Exam</p>			