Pattern Recognition

Chapter 0: Course Introduction

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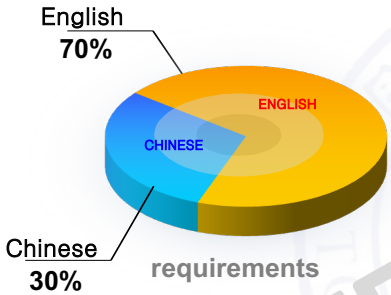
Course Description

- Bilingual course



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- Course Goals
  - A. Basic knowledge and theory of statistical pattern recognition
  - B. Basic algorithm of Pattern Recognition
  - C. Computing skills of pattern recognition
- Course Requirement

Prerequisites		
Probability theory	Calculus	Linear algebra

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Course Description

- **Course**
  - This course focuses on the basic concepts and methodologies and the core theories of pattern recognition.

Bayes classification

Probability density functions

Linear & nonlinear classifiers

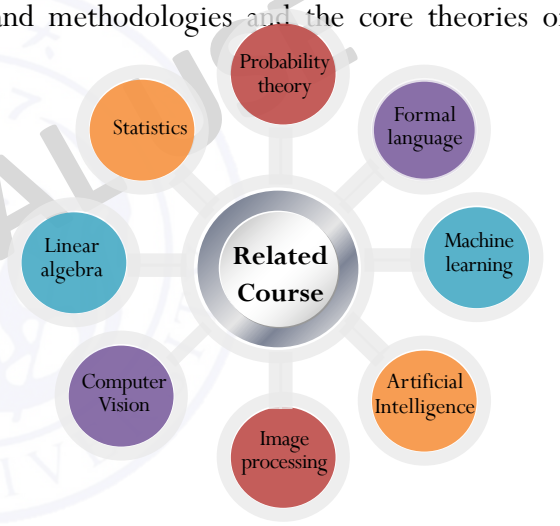
Classifiers design

Feature extraction

Unsupervised learning

Neural Networks

- **Related course**



Course Introduction

- **Course Info.**
  - Credit Units： 2
  - Lecture Hours： 34
  - Time: Thur. 13:30-15:05(Cl.5~6)
  - Location: G407
  - Teacher
    - E-mail: chunmei.liu@tongji.edu.cn
    - EIE Bldg. 505
    - Q&A:
      - Thur. 12:00-13:30 offline
      - Every day online

- **Contact**
  - **QQ: 582344330**

  - http://canvas.tongji.edu.cn

Course Arrangement

Content	Lecture Hours
Introduction to Pattern Recognition	3
Classifiers Based on Bayesian Decision Theory	4
Probability density estimation methods	4
Linear Classification	4
Non-linear Classification	4
Feature Extraction and Feature Selection	4
Unsupervised learning and clustering	4
Neural networks for pattern recognition	4
Pattern Recognition Application	1

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Pattern Recognition 2024-2025(1)

Date Thursday 13:30–15:05(Cl.5~6)	Week	Outline
9/5/24	1	Ch.0 Preface & Ch.1 Introduction to Pattern Recognition
9/12/24	2	Ch.1 Introduction to Pattern Recognition & Ch.2 Classifiers Based on Bayesian Decision Theory
9/19/24	3	Ch.2 Classifiers Based on Bayesian Decision Theory
9/26/24	4	Ch.2 Classifiers Based on Bayesian Decision Theory & Ch.3 Parameter Estimation
10/3/24	5	National Day Holidays
10/10/24	6	Ch.3 Parameter Estimation & Non-Parametric Estimation
10/17/24	7	Ch.4 Linear Classification
10/24/24	8	Ch.4 Linear Classification
10/31/24	9	Ch.5 Non-linear Classification
11/7/24	10	Ch.5 Non-linear Classification
11/14/24	11	Ch.6 Feature Extraction and Feature Selection
11/21/24	12	Ch.6 Feature Extraction and Feature Selection
11/28/24	13	Ch.7 Unsupervised learning and clustering

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Pattern Recognition 2024-2025(1)

Date Thursday 13:30–15:05(Cl.5~6)	Week	Title
12/5/24	14	Ch.7 Unsupervised learning and clustering
12/12/24	15	Ch.8 Neural networks for pattern recognition
12/19/24	16	Ch.8 Neural networks for pattern recognition
12/26/24	17	**Final Exam**

Assessment:

- Class Attendance & Class Exercises: 25%(10+15)
- Coursework: 15%
  - —Chinese report on one English article issued lately
  - —Send your Report & Original English paper to http://canvas.tongji.edu.cn before Nov.30.
- Final Exam: 60%

Course Introduction

Optional Coursework:

- Application limit: 15 students
- Coursework: +0~15%
  - —Program relative to our course
  - —Lecture Talk: 10 min.
  - —Time: Nov.28(13th week)～ Dec.26(16th week)
  - —Submission: send your materials(ppt, code) to http://canvas.tongji.edu.cn before Dec.3.
  - —Requirement: **no plagiarism in any form**
- Extra Score: 0~15

Course Textbooks

- Slides & Course Materials

  http://canvas.tongji.edu.cn

  preCh1

  Ch1_Introduction.pdf

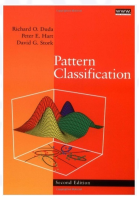
- Reference book

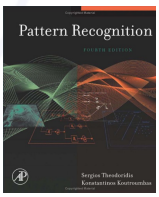
[1] ***Pattern Classification***
R. Duda, P. Hart, D. Stork, 2nd edition, 2000;

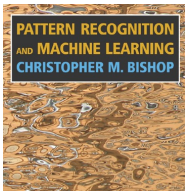
[2] ***模式识别***
张学工 , 汪小我 ,第4版,清华大学出版社 , 2021;

[3] ***Pattern Recognition***
Sergios Theodoridis, Konstantinos Koutroumbas, Academic Press, 4th edition, 2009;

[4] ***Pattern Recognition and Machine Learning***
Christopher Bishop, Springer, 2006;







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Pattern Recognition Publications

- Journals
  - IEEE Trans. on Pattern Analysis and Machine Intelligence (TPAMI)
    - #1 in both electrical engineering and artificial intelligence
    - #3 in all of computer science
  - Internal Journal of Computer Vision (IJCV)
  - IEEE Trans. on Image Processing
  - …

- Conferences
  - International Conference on Computer Vision (ICCV), once every two years
  - Conf. of Computer Vision and Pattern Recognition (CVPR), once a year
  - Europe Conference on Computer Vision (ECCV), once every two years
  - International Conference on Pattern Recognition (ICPR), once every two years
  - …

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Chapter 0