
课程大纲

机器学习与人工智能

Machine Learning and Artificial Intelligence

课程编号: 02839440

学 分: 2

课程类型: 必修

先修课程: 无

授课对象: 本科生

任课教师: 张颖婕

开课学期: 2021 年秋学期

任课教师简历 (500 字左右):

张颖婕, 北京大学光华管理学院市场营销系助理教授。于 2018 年在美国卡内基梅隆大学 (Carnegie Mellon University) 获得博士学位 (信息管理与系统)。毕业后曾就职于美国德州大学达拉斯分校 (The University of Texas at Dallas)。研究集中于运用跨学科方法论 (如计量模型、机器学习算法、实地实验设计等) 研究智能城市建设、共享经济、社交媒体、消费者行为等。在管理学、交通、计算机等领域的国际公认一流学术期刊以第一作者身份发表多篇论文, 包括 Information Systems Research, ACM Transactions on Intelligent Systems and Technology, Transportation Research Part C 等。在国际顶级会议上报告论文 20 余篇。屡次获得国际顶会的最佳论文奖, 并获得信息管理领域国际最佳博士论文奖 (2019 INFORMS ISS Nunamaker-Chen Dissertation Award)。在美国德州大学达拉斯分校任职期间教授研究生和 MBA 课程“应用机器学习”、“数据科学编程”等课程。

任课教师联系方式:

Email: yingjiezhang@gsm.pku.edu.cn

Office: GSM 2-445

Office hours: Wed 10-11am or by appointment

助教姓名及联系方式:

TA: 杨广鑫 2020 级市场营销系博士生

Email: ygx@stu.pku.edu.cn

辅导、答疑时间:

TA session: Saturday 10:00-11:00 or by appointment

一、课程概述

This course will focus on learning various machine learning methods, including both supervised learning and unsupervised learning algorithms. The course will provide the students with both the understanding of the general framework of each model and the implementation techniques using Python language. In addition, the

course will also cover several advanced performance evaluation-related topics and techniques (e.g., overfitting, cross-validation, and several others). Furthermore, the course will demonstrate how the machine learning techniques can be applied in several emerging application areas (including business, healthcare, and education).

二、 课程目标

By the end of this course, students will be able to

1. gain a general understanding of various AI and machine learning algorithms.
2. perform end-to-end ML analysis, from data exploration and preparation to model prediction, evaluation, and interpretation.
3. understand the strengths and limitations of different ML methods covered in the course.
4. apply proper AI/ML techniques on real-world problems.
5. be aware of the general future trend of the use of AI and ML methods.

三、 内容提要及学时分配

Week	Date	Topics	Task
1	2021.9.16	Course overview K-Nearest Neighbors	
2	2021.9.23	Regressions	
3	2021.9.30	Decision Trees	HW1 release
4	2021.10.7	Break	Proposal (Oct 10)
5	2021.10.14	Model Selection and Evaluation	HW1 due (Oct 17)
6	2021.10.21	Support Vector Machine Naïve Bayes	HW2 release
7	2021.10.28	Other Supervised Learning Models Ensemble Models	
8	2021.11.4	Unsupervised Learning Models	HW2 due (Nov 7)
9	2021.11.11	Reinforcement Learning	HW3 release
10	2021.11.18	Introduction of Deep Learning Models	
11	2021.11.25	Project Presentation	HW3 due (Nov 28)
12	2021.12.2	In-class Final Exam	

四、 教学方式

课堂讲授、计算机软件应用与案例分析相结合的方式，以讲授为主。

五、 教学过程中 IT 工具等技术手段的应用

六、 教材

七、 参考书目

- 1) Introduction to Machine Learning with Python: A Guide for Data Scientists, 1st Edition; By Sarah Guido, Andreas Müller
- 2) Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems; By Aurélien Géron

八、 教学辅助材料，如 CD、录影等

九、 课程学习要求及课堂纪律规范

- 1、 遵守学术道德规范，严禁欺骗和抄袭。
- 2、 无故缺课累计超过总学时数三分之一者，不得参加课程考试，成绩记“0”分。

Required Software: Python 3.5 or later – Additional packages you need to have for this course are numpy, sklearn, pandas, matplotlib, TensorFlow, and keras

Other Notes:

- All assignments and project reports/presentation slides must be submitted through blackboard.
- Late submissions will NOT be accepted.
- Technology issues are not a valid excuse for any late or incomplete work. You must be able to self-support hardware/software issues.
- You are responsible for any announcements made in class or through Blackboard, including changes to the schedule.
- The final exam is closed-book, closed-notes, and requires individual-effort. Unless under extreme circumstances, make-up exams will NOT be arranged.
- Missed exams earn a 0/100.
- Assignments are due at 11:59 P.M. on the due dates defined, unless otherwise specified.

Academic Integrity:

Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Academic dishonesty includes plagiarism, cheating, fabrication, and collaboration/collusion. It can include individual work or a group project.

十、 学生成绩评定办法（需详细说明评估学生学习效果的方法）

a) Individual Homework (30%)

There will be three individual assignments during the semester.

b) Group Project (20%)

The evaluation of group projects includes in-class presentation and final reports.

c) Final Exam (50%)

The final exam will be at the end of the semester. It will be close-book and close-notes and require individual efforts.