

CS 4602

Introduction to Machine Learning

NTHU / Autumn 2023-2024

Instructor: Po-Chih Kuo (郭柏志)



Human-Centered Machine Intelligence Lab
<https://pochihkuo.github.io/>

Logistics

- **Instructor:** Po-Chih Kuo (郭柏志)

- Email: kuopc@cs.nthu.edu.tw
- Office: Delta 630
- Office hours: Wednesdays 11:00-12:00



- **TA:**

- TA hours: Thursday 17:00-18:00, EECS 639
- Make a reservation via google doc by Thursday 10am

Our TA Team



林家合



陳怡汝



林晁璿



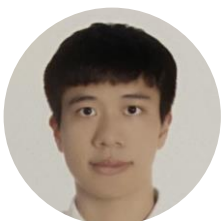
曾微絲



張亞錫



黃謹緯



黃允暘



李佳芸



蘇芮筠



林育韻



吳聲宏



呂佳恩



Communication

- We will use **eeclash** for all communications: announcements and questions related to lectures, labs, and projects.
 - You should be added to the eeclash automatically
- Teams will be used for remote lectures if necessary.



Prerequisites

- This course covers a lot of ground
 - Calculus
 - Probability/Statistics
 - **Programming: Python**



Rules

- Mainly physical lecture
- English is the official language (some mandarin)
- Food allowed? Maybe.
- Turn your phone to silent mode
- You are allowed to leave anytime (Chat with your friends outside)
- No roll call but there might be bonus for attendance
- Ask and answer questions! (Mandarin is acceptable)
- **Cheating or plagiarism on exams/labs will result in zero score**



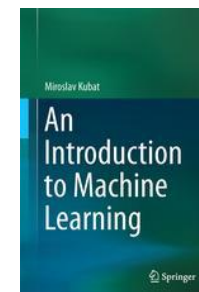
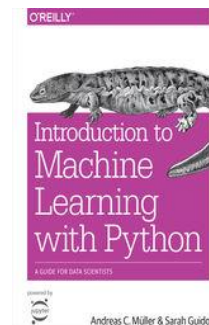
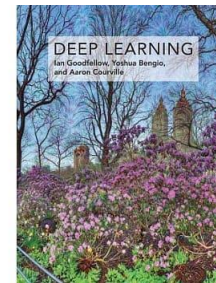
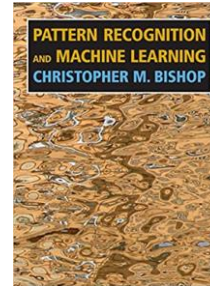
Textbook

- There is no required textbook for this class
- You should be able to learn everything from the lecture slides and homework
- Lecture slides will be uploaded to eeclash before the class



References

- “Pattern Recognition and Machine Learning”
- Christopher Bishop
- ISBN: 978-0387310732
- “Deep Learning”
- Ian Goodfellow, Yoshua Bengio, and Aaron Courville
- ISBN: 978-0262035613
- “Introduction to Machine Learning with Python”
- Andreas C. Müller, Sarah Guido
- ISBN: 978-1449369415
- “An Introduction to Machine Learning”
- Miroslav Kubat
- ISBN: 978-3319200101
- (Electronic version is available from the library)



Goals

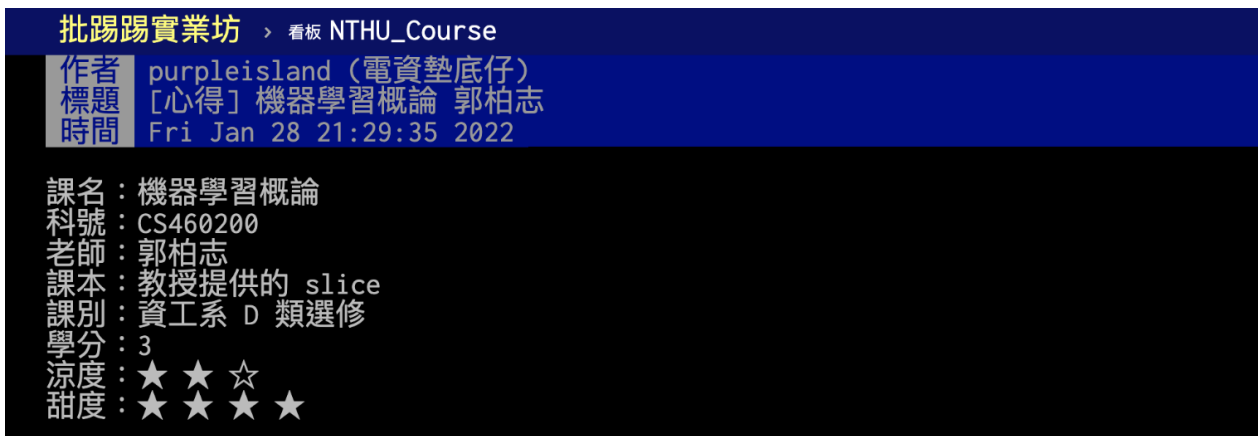
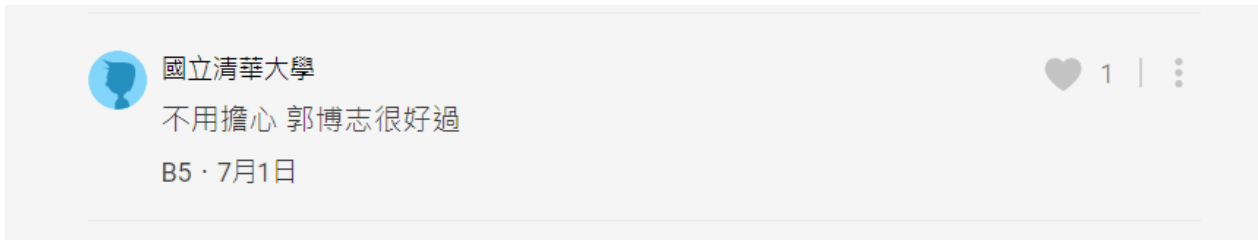
- To understand the basic principles of machine learning
- To become familiar with widely used machine learning algorithms
- To learn how to use machine learning algorithms to solve real problems
- To properly evaluate the model performance
- Little math or proof of theory



Evaluation

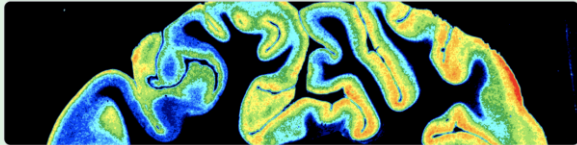
- Exams: 30%
- Assignments: 40%
- Term project: 30%

To note that, those are the maximum points you will get for each category. For example, you will receive 40 at the end for the homework part although you get a total of 42 from 5 assignments



Evaluation (Cont.)

- 4 Exams: 30%
 - In classroom
 - Answer by your smartphone or laptop



CS 460200 Introduction to Machine Learning

Quiz #1


* Required

Q1. Which step might save the time for training? *

- ☐ Increase batch size
- ☐ Increase learning rate
- ☐ Increase the input dimension
- ☐ increase the layers



Evaluation (Cont.)

- 4 labs: 40%
 - Due two weeks after the announcement
 - Google Colab is recommended. 
 - The scores will be given based on your model's performance on testing data, which are held in our hands (35%).
 - Hand in a brief report (5%)
 - Avoid plagiarism

Evaluation (Cont.)

- Term project: 30%
 - More than 10 projects are given by us
 - You can propose your own project by 9/30
 - 3-6 members per team
 - Rank your preferences by 10/7
 - **Teammates are assigned by us**
 - Each team will have a mentor
 - Missions for every teammate may be different
 - PM, UX, RD, QA...
 - Grading for each of you is based on your contribution
 - Meet with your team/mentor every week/two weeks
 - Hand in meeting minutes (with photos) every two weeks



Evaluation (Cont.)

- Create a repo (e.g., on Github) for your team
- Submit your proposal during mid-term
 - Give a brief presentation **in English** on your project
 - 3 mins for each team by video.
 - Introduce your topics and team members.
- Final presentation (**in English**, 5 mins presentation + 3 min QA) at the end of the semester
- Hand in a report (2-8 pages) in the format of an IEEE paper, including Introduction, Methods, Results, and Conclusions
- **Avoid plagiarism**
- Push your code.
- Evaluated by TAs, mentors, and instructors (Maybe committee outside NTHU)





Syllabus

- Introduction and Basic Concepts
- Regression **Error-Based Learning**
- Bayesian Classifiers **Probability-Based Learning**
- Decision Trees **Information-Based Learning**
- KNN **Similarity-Based Learning**
- Linear Classifier
- Neural Networks
- Deep learning
- Reinforcement Learning
- Model Selection and Evaluation
- Clustering **Unsupervised Learning**
- Dimensionality reduction






September 2023

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25		27		29	30

Holidays and Observances: 4: Labor Day

Wiki Calendar






October 2023

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1	2	3	4	5	6	7
8	9		11		13	14
15	16		18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Holidays and Observances: 9: Columbus Day, 31: Halloween

Wiki Calendar

November 2023

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1		3	4
5	6	7	8		10	11
12	13	14	15		17	18
19	20		22		24	25
26	27	28	29	30		

Holidays and Observances: 7: Election Day, 10: Veterans Day day off, 11: Veterans Day, 23: Thanksgiving Day, 24: Black Friday

Wiki Calendar







Introduction and Basic Concepts
Regression

Bayesian Classifiers
Decision Trees
Linear Classifier

Neural Networks
Deep learning

Reinforcement learning

December 2023

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1	2
3	4	5	6	7	8	9
10	11		13		15	16
17	18		20		22	23
24	25		27		29	30
31						

Holidays and Observances: 24: Christmas Eve, 25: Christmas Day, 31: New Year's Eve

Wiki Calendar

Model Selection & Evaluation

Clustering

Dim. Reduction



Online



Exam



Assignment



Holiday



Upload proposal presentation



Project presentation



Extra selection

電子表單簽核系統

首頁
Home

加簽批次簽核作業
Extra Selection Application
Batch Review

個人待簽核表單
Personal Pending List

授權待簽核表單
Authorization Pending List

代理他人簽核表單
Agent Pending List

已送未收表單
Sent But Not Received List

申請表選擇
Application Forms

申請紀錄查詢
Application Records

本職 資訊工程學系 助理教授 切換

首頁 / 一般承辦人 / 加簽批次簽核作業

加簽批次簽核作業

112 學年上學期

勾選 Select	科號 Course No.	設定人數上 限 Quota	已核可人 數 Approved	待簽核件 數 Applicants	科目名稱 Course Title	上課時 間 Time	
列出資料 LIST	11210CS 591000	10	0	4	書報討論 Seminar	W5W6	郭1
列出資料 LIST	11210CS 555300	70	0	12	數位醫療資料科學 Data Science for Digital Health	F2F3F4	
列出資料 LIST	11210CS 460200	173	0	125	機器學習概論 Introduction to Machine Learning	T3T4R3	

批次同意 APPROVE

批次不同意 DISAPPROVE

搜尋 Search ...

待簽核 Undecided

No more approval after 11:59am



Quiz time!



Questions?

When you get your first job
with all the knowledge you
got from your CS degree

