Machine Learning, Fall 2021

Time: MWF 12:30pm-1:20pm

Location: Sarkeys Energy Center N0202

Instructor: Chao Lan (clan@ou.edu)

TA: Tim Gehrsitz (twgehrsitz@ou.edu)

Office Hours

– M&W 1:30pm-3pm, Dr. Lan, DEH 341 or https://oklahoma.zoom.us/j/97332886862

– Tu&Th 12pm-12:45pm, Tim, in-person by appointment or https://oklahoma.zoom.us/j/9959599595?
(code: MDdyeDN1VGllc1pGOXJoNzlJNkt1dz09)

* *If you plan to attend office hours in person, please wear a mask and practice social distancing.*

* *If you plan to attend office hours online, please try to notify the instructor or TA beforehand.*

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1. Course Description

This course introduces the fundamentals of machine learning. It will cover

(1) Learn regression models, including (but not limited to) least square, ridge, Lasso, MLE/MAP, Bayesian linear regression, kernel regression, principal component analysis

(2) Learn classification models, including (but not limited to) logistic regression, naive Bayes, nearest neighbor, decision tree, random forest, support vector machine, neural network

(3) Clustering, including (but not limited to) K-means

(4) Ensemble models, including (but not limited to) bagging, boosting, adaboost

(5) Advanced topics if time permits

2. Reference

T. Hastie, R. Tibshirani and J. Friedman. The Elements of Statistical Learning. Springer, 2009.

C. Bishop. Pattern Recognition and Machine Learning. Springer, 2006.

L. Wasserman. All of Statistics. Springer, 2004.

S. Boyd and L.Vandenberghe. Convex Optimization. Cambridge University Press, 2004.

3. Grading Policy

– 60% for written and Python programming assignments

– 20% for one written exam (not final week)

– 20% for one final project report (using Latex) and oral presentation

4. Late Assignment Submission Policy

– 1 week after due: score = score * 0.8

– 2 weeks after due: score = score * 0.6

– more than 2 weeks after due: score = 0

5. Student Collaboration Policy

– Students cannot collaborate on the exam or final project.

– Students can collaborate on assignments but need to clarify the collaborator in submission and be ready to independently defend their own submitted solutions upon the request of the instructor.

6. Expected Background

Basic knowledge on probability, linear algebra (or advanced calculus such as derivative) are needed to understand most lectures and complete tasks in assignments and exam. Sufficient programming skills in Python are needed to implement machine learning algorithms from scratch.

7. Attendance Policy

Attendance is not required. Lecture notes will be posted on Canvas, though they do not cover all discussions and in-class exercises.

8. Mask Expectation

Students are encouraged to continue wearing masks in class and practicing social distancing.