Middle East Technical University
Department of Computer Engineering

CENG 499 Introduction to Machine Learning
Fall 2020-2021 Syllabus

Instructor:
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Lecture Hours:
Wednesday 15:40 - 16:30
Thursday 15:40 - 17:30

Office Hours:
By appointment

Forum:
ODTUCLASS Discussion

Course Objectives: At the end of the course, student will be able to,

- formulate machine learning problems and propose viable solutions to these,
- manipulate data to extract features and information necessary for solutions,
- design and evaluate machine learning systems,
- use tools created for data mining and machine learning,
- understand and apply different machine learning algorithms to appropriate problems.

Textbooks and Course Materials:

- Machine Learning, Tom Mitchell, 1997
- Introduction to Machine Learning, Ethem Alpaydın, 2004
- Lecture notes
- Lecture slides
- Pattern Classification. Second edition R.O. Duda, P.E. Hart, D.G. Stork. John Wiley and Sons, 2000.

Course Outline (tentative):

- Introduction to Machine Learning
- Fundamentals of Learning
- Structural Risk Minimization
- Multiclass Classification (One vs One / One vs All)
- Perceptron Algorithm
- Artificial Neural Networks
- Parameter Tuning, Cross Validation
- Linear Regression, Logistic Regression
- K-Nearest Neighbour Algorithm
- Performance Metrics
- K-Means Clustering
- Hierarchical Divisive / Agglomerative Clustering
- Mining Association Rules
- Decision Tree Learning
- Support Vector Machines
- Kernel Based Learning
- Active Learning
- Bayesian Learning
- Naive Bayes
- Bayesian Networks
- Stochastic Processes
- Hidden Markov Models
- Reinforcement Learning

Grading (tentative):

- Assignments (THE) 40%
- Quiz & Attendance 15%
- Midterm 20%
- Final 25%

Assignments:

There will be 4 take home exams as programming assignments. You will have 6 days in total for late submission throughout the term for assignments. You can use at most 3 late days per homework. The late submission penalty will be calculated using $5n^2$, that is, 1 day late submission will cost you 5 points, 2 days will cost you 20 points and 3 days will cost you 45 points. No late submission is accepted after reaching 3 late days for any homework or a total of 6 late days.

Code of Honor:

Any work you submit must be your own. Any action against code of honor will result in an investigation by the department honor committee. You will not be given a further warning.