The University of Texas at Tyler
Department of Electrical and Computer Engineering

EENG-5340: Introduction to Machine Learning (Elective)

Syllabus

Catalog Description :

Data preprocessing, Introduction to supervised and unsupervised learning algorithms. Design and evaluation of models to predict and extract patterns within data. Explanation of model results. Recommender systems using collaborative filtering; Content-based learning techniques; Reinforcement learning. Three hours of lecture per week.

Prerequisites: EENG 3308 Programming Languages for Design, MATH 3203 Matrix Methods for Engineers, and PHIL 2306 Technical and Scientific Ethics

Credits: (3 hours lecture, 0 hours laboratory per week)

Text(s): Handouts

Additional Material: Stephen Marsland, Machine learning: An Algorithmic Perspective, CRC Press, Boca Raton, ISBN-13: 978-1420067187
Ethern Alpaydin, Introduction to Machine Learning, 4th edition, MIT press, ISBN-13: 978-0262043793

Course Coordinator: Azadeh Izadi, Assistant Professor, Electrical Engineering

Topics Covered: (paragraph of topics separated by semicolons)

Data preprocessing, Introduction to Machine Learning, Supervised Learning: Regression and Classification, Unsupervised Learning: Clustering and Anomaly detection, Recommender systems, Reinforcement Learning

Evaluation Methods: (only items in dark print apply):

1. Examinations / Quizzes
2. Homework
3. Report
4. Computer Programming
5. Project
6. Presentation
7. Course Participation
8. Peer Review

Course Learning Outcomes[1]: By the end of this course students will be able to:

1. Training data using supervised learning algorithms (i.e., regression and classification techniques) and developing predictive models [1,2,4]
2. Developing models using clustering techniques such as K-means [1,2,4]
3. Optimizing learning models [1,2,4]
4. Finding unusual events in the data set using an anomaly detection algorithm [1,2,4]
5. Reducing the dimension of the big data set [1,2,4]
6. Evaluating learning models [1,2,4]
7. Making recommendations using the collaborative filtering algorithm [1,2,4]
8. Using deep learning to develop content-based filtering for recommender systems [1,2,4]
9. Developing models using reinforcement learning algorithms [1,2,4]

10. Making decisions in recommender systems [1,2,5]
11. Practical advice for applying learning algorithms. [5]

[1]*Numbers in brackets refer to the method(s) used to evaluate the course objective.*

Relationship to Student Outcomes (only items in dark print apply)[2]: This course supports the following Electrical Engineering Student Outcomes, which state that our students will possess:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics [1-7]
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors []
3. an ability to communicate effectively with a range of audiences []
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts [8,9]
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives []
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions [10]
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. [11]

[2]*Numbers in brackets refer to course objective(s) that address the Student Outcome.*

Contribution to Meeting Professional Component: (in semester hours)

Mathematics and Basic Sciences:		hours
Engineering Sciences and Design:	3	hours
General Education Component:		hours

Prepared By:	Azadeh Izadi	Date:	7 Nov. 2022
Updated By:		Date:	
Updated By:		Date:	