BUSA 545: Machine Learning
Spring 2024

January 10 – May 10: Mondays, 3:40 – 6:10 PM 8750 N
Central Parkway, Dallas, TX

Instructor: Dr. Vinayaka Gude
Email Address: vinayaka.gude@tamuc.edu
Location: 2058, 8750 North Central Parkway, Dallas

Office Hours: Monday, Tuesday & Thursday: 9 -11:30 AM (or by appointment).

COURSE INFORMATION

There is no mandatory textbook for this course. All the material will be provided through lectures and tutorials.

Recommended Textbooks

Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems by Aurélien Géron
(ISBN-13: 978-1491962299; ISBN-10: 1491962291)

COURSE DESCRIPTION

This course is aimed at developing practical machine learning and data science skills which are quintessential for future professionals in the field of analytics. The course will cover theoretical concepts of broad range of machine learning and deep learning concepts and methods. The tutorials, assignments and projects provide students with practical knowledge to solve real world problems.

PRE-REQUISITES

Basic knowledge in Python and understanding of probability and linear algebra.

COURSE OBJECTIVES

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

- Determine to which problems machine learning is applicable and which model or models would be most appropriate in each case.
- Develop an understanding of training a machine learning algorithm including over-fitting, noise, convergence and stopping criteria.
- Understand and implement the training, testing, and validation phases of learning algorithms development and deployment.
- Apply machine learning algorithms for a wide-range problems in data analysis, text mining, computer vision and prediction.

COB SLO-Course Objective Alignment

COB STUDENT LEARNING OUTCOMES (SLOS)	COURSE OUTCOMES - AFTER SUCCESSFULLY COMPLETING THIS COURSE, STUDENTS WILL BE ABLE TO:	MEASUREMENT METHODS (OUTCOME ASSESSMENTS)
1, 2, 5	• Identify and describe complex business problems in terms of analytical models • Understand and apply statistical concepts and methods of business analytics • Develop models in excel and other analytical tools for various decision-making problems • Interpret results/solutions and identify appropriate courses of action for a given problem • Communicate technical information in the form of visualizations and detailed reports.	• Machine Learning Final Project and • Presentation Assignments

GRADING

Project

The main goal of this course is to prepare you to apply machine learning algorithms on realworld problems and the final project is intended for that purpose. Each student will select a specific topic of their interest to analyze. After data exploration, you'll develop, train and test the relevant machine learning models. The submission guidelines for the project will be posted on the course page along with example projects and resources to find datasets.

Assignments

There is an assignment due every week on the topics discussed in the class.

Final Grade

At the end of this semester, if your total is between 90 and 100, you will get an A; if it's between 80 and 89, you will get a B, and so on. Please note that the actual points will be used to calculate your final grade. No curving will be used in this class.

Tasks	% of the final grade
Assignments	60
Project	30
Quizzes	10

Points	Grade
90-100	A
80-89	B
70-79	C
60-69	D
Below 60	F

COMMUNICATION AND SUPPORT

If you ask me questions by emails, I will reply within 48 hours. However, I usually answer them much faster.

If you have questions about software operations, please make sure to include the screenshots of the issues in the emails.

All assignment due dates, deadlines, and exam time are central time in the United States.

COURSE AND UNIVERSITY POLICIES

Students with Disabilities

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services

Gee Library- Room 132

Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
StudentDisabilityServices@tamuc.edu

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. (See Code of Student Conduct from Student Guide Handbook).

Campus Concealed Carry

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations. For a list of locations, please refer to (http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34Sa fetyOfEmployeesAndStudents/34.06.02.R1.pdf) and/or consult your event organizer). Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

STATEMENT ON AI USE IN COURSES [MAY 2023]:

Texas A&M University-Commerce acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. If no instructions are provided the student should assume that the use of such software is disallowed.

In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources.

TENTATIVE COURSE OUTLINE

Week	Topic(s)	Tasks
1	Course Overview, Python and Exploratory Analysis Review	
2	Intro to AI, ML& DL	Assignment 1
3	Supervised Learning: Regression	Assignment 2
4	Classification: Logistic Regression	Assignment 3

5	Decision Trees & Random Forest	Assignment 4
6	Support Vector Machines	Assignment 5
7	Neural Networks	Assignment 6
8	Deep Learning Introduction	
9	Deep Learning: Computer Vision	Assignment 7
10	Time Series Analysis: Autoregressive Models	
11	Time Series Analysis: RNN & LSTM	Assignment 8
12	Unsupervised learning: Clustering	Assignment 9
13	Reinforcement Learning	Assignment 10
14	Genetic Algorithms & Fuzzy Systems	
15	Machine Learning Challenges, Implementation & Data Ethics	
16	Final Projects	