BUSA 597: Machine Learning
Fall 2022

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Location: 2066, 8750 NorthPark Central

Office Hours: Mondays: 9 – 11:30 AM (or by appointment).

COURSE INFORMATION

Course Modality: **Blended**

COVID-19 Related

A&M-Commerce requires the use of face-coverings in all instructional and research classrooms/laboratories. Exceptions may be made by faculty where warranted. Faculty have management over their classrooms. Students not using face-coverings can be required to leave class. Repetitive refusal to comply can be reported to the Office of Students' Rights and Responsibilities as a violation of the student Code of Conduct.

Students should not attend class when ill or after exposure to anyone with a communicable illness. Communicate such instances directly with your instructor. Faculty will work to support the student getting access to missed content or completing missed assignments.

Recommended Textbooks

Python Data Science Handbook: Essential Tools for Working with Data by Jake VanderPlas
(ISBN-13: 978-1491912058; ISBN-10: 1491912057)

Available at: https://jakevdp.github.io/PythonDataScienceHandbook/

Building Machine Learning Systems with Python by Willi Richert and Luis Pedro Coelho
(ISBN-13: 978-1782161400; ISBN-10: 1782161406)

Available at: http://totoharyanto.staff.ipb.ac.id/files/2012/10/Building-Machine-Learning-Systems-with-Python-Richert-Coelho.pdf

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)

Introduction to Machine Learning with Python: A Guide for Data Scientists by Andreas C. Mueller and Sarah Guido (ISBN-10: 1449369413; ISBN-13: 978-1449369415)

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 real-world 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 developing, training and testing the relevant machine learning models on this data. 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	50
Project	30
Final Exam	15
Quiz	5

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

TECHNOLOGY REQUIREMENTS

You will need to use Anaconda distribution to run the python programs.

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/34SafetyOfEmployeesAndStudents/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.

TENTATIVE COURSE OUTLINE

Week	Topic(s)	Tasks
1	Introduction to Artificial Intelligence, Machine Learning and Deep Learning	
2	Supervised Learning: Training and Classification	Assignment 1
	Neural Networks	
3	Support Vector Machines	Assignment 2
	Decision Trees and Random Forests	
4	Dimensionality reduction	Assignment 3
	Unsupervised learning: Clustering	
5	Computer Vision: CNN	Assignment 4
6	Time Series Analysis: RNN & LSTM	Assignment 5
7	Autoencoders & GAN's	
	Reinforcement Learning	
8	Deploying ML and DL models at scale	Final Project