CSCI 4520 - Introduction to Machine Learning

Spring 2020 – CRN: 17186

Instructor: Dr. Mehdi Allahyari <mallahyari@georgiasouthern.edu>
Office: CEIT 2321
Course Webpage: https://sci2lab.github.io/mehdi/teaching/cs4520

Lecture Times

	TUESDAY	THURSDAY
CRN 17186	12:30 PM – 01:45 PM CEIT 2207	12:30 PM – 01:45 PM CEIT 2207

Office Hours

MONDAY	WEDNESDAY	
4:00 PM – 5:00 PM	4:00 PM – 5:00 PM	
TUESDAY	THURSDAY	or by appointment
4:00 PM – 5:00 PM	4:00 PM – 5:00 PM	
CEIT 2321	CEIT 2321	

Course Description

Machine Learning methods aim to enable computers to automatically learn and improve their performance through experience (e.g., programs that learn to recognize human faces, recommend music and movies, and detect Spam emails). This introductory course is designed to give upperlevel undergraduate a broad overview of many concepts and algorithms in ML. The goal is to provide students with a deep understanding of the subject matter and skills to apply these concepts to real world problems. This course covers the theory and practical algorithms for machine learning from a variety of perspectives. We cover topics such as classification, linear and logistic regression, decision tree learning, unsupervised learning, clustering and dimensionality reduction. In addition, the course covers fundamental concepts such as training, validation, overfitting, and error rates as well as practical use of machine learning algorithms using open source libraries from the Python programming ecosystem.

Prerequisites

Students entering the class are expected to have a pre-existing working knowledge of prob- ability, linear algebra, statistics and calculus. For example, it is expected that you know about standard probability distributions and also how to calculate derivatives. In addition, recitation sessions will be held to review some basic concepts. For the programming assignments, you should have good background in programming, and it would be helpful if you know Python.

Texts

There is no required textbook for this course. There are several recommended books:

1. Andreas C. Muller and Sarah Guido *Introduction to Machine Learning with Python*. O'Reilly. (Recommended)

2. Aurelien Geron. *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow* O'Reilly. (Recommended)

3. Tom Mitchell. *Machine Learning*,

4. Christopher Bishop. *Pattern Recognition and Machine Learning*

Course Requirement and Grading: The format of the class will be lecture, with some discussion. I strongly encourage interaction and questions. There are assigned readings for each lecture that are intended to prepare you to participate in the class discussion for that day.

The grading in the class will be divided up as follows:

- Homeworks (20%)
- Midterm Exam (20%), will be given roughly in the 8th week of the class
- Final Exam (25%), May 5, 2020 @ 12:30 PM - 02:30 PM
- Group Project (30%)
- Attendance and Participation (5%)

Final Letter Grades: Final letter grades will be determined according to the following scale:

A ≥ 85	85 > B ≥ 80	80 > C ≥ 70	70 > D ≥ 65	F < 65

The grade that you earn in this course will be the grade assigned. There are no bonus assignments and certainly no free points given out at the end (regardless of your reasoning). Bonus points are reserved for the students that answer the most questions in the class.

Homework Assignments: The best way to learn about a machine learning method is to program it yourself and experiment with it. Therefore, the assignments will usually involve implementing machine learning algorithms, and experimentation to test your algorithms on some data. You will be asked to summarize your work, and analyze the results, in brief (3-4 page) write ups. The implementations should be done in Python.

Collaboration Policy: Homeworks must be done individually, except where otherwise noted in the assignments. 'Individually' means each student must hand in their own answers, and each student must write their own code in the programming part of the assignment. However, students can collaborate in figuring out answers and helping each other solve the problems at **high level**. This means it should not involve any sharing of pseudocode or code or simulation results. Violation of this policy will result in the grade of F, in accordance with university regulations.

Late Penalties: Homework submissions are allowed up to 48 hours after the deadline. Students turning in a homework after the due date will receive a point deduction as follows:.

1. If submitted 0–24 hours after the deadline, then 20 points will be deducted from the project score.
2. If submitted 24–48 hours after the deadline, then 40 points will be deducted from the project score.
3. If submitted more than 48 hours after the deadline, a score of 0 will be given for the project.

Email: Email should be used only for personal matters that need to be discussed with the instructor and regrade requests. All questions about course material should be during the class or office hours. Email communication should NOT be treated as an alternative to meeting with the instructor (or TA) during office hours. Email will not be used to provide private tutorials or to explain material that was covered in

missed lectures. Students must use their GSU email accounts and put a `[cs4520]` tag in the subject of their emails when corresponding with the instructor or TA on course-related matters

Academic Honesty:

As a Georgia Southern University student, you have agreed to abide by the University's academic honesty policy and the Student Honor Code:

"On my honor, I pledge to be academically honest in all my coursework and will not tolerate the academic dishonesty of others. I also pledge to engage in ethical behavior on-campus and off- campus, to live an honorable lifestyle, and to create a campus environment that is characterized by individual responsibility, civility, and integrity."

Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to the instructor. Academic honesty means that any work you submit is your own work.

Common forms of academic dishonesty against which students should guard are:

1. Copying from another student's test paper or laboratory report, or allowing another student to copy from you;
2. Fabricating information, research, and/or results;
3. Collaborating with others on assignments without the faculty's consent;
4. Helping another student to write a laboratory report or computer software code that the student will present as her or his own work, or accepting such help and presenting the work as your own;
5. Cooperating with and/or helping another student to cheat;
6. Turning in material from a public source such as a book or the Internet as your own work.

Steps to help prevent academic dishonesty are:

1. Familiarize yourself with the regulations.
2. If you have any doubt about what constitutes academic dishonesty, ask your instructor or a staff member at the Office of the Vice President for Instruction.
3. Refuse to assist students who want to cheat.
4. Do not allow anyone to copy any of your work, and report anyone who tries to copy from you to the instructor or TA as soon as possible.
5. Do not post your code to a public website. This is a violation of the academic honesty policy as unauthorized assistance

If you are going to be absent on the day of an examination, you must provide a University-approved excuse for your absence BEFORE the day of the examination.

For further information please refer to the Georgia Southern Student Conduct Code, available at the URL below.

http://students.georgiasouthern.edu/conduct/student-code-of-conduct/

Unfamiliarity with the rules and regulations of the academic honesty environment at the Georgia Southern University will not be grounds for leniency.

Class Accommodation: Students with a disability or health-related issue who need a class accommodation should make an appointment to speak with the instructor or contact Student Disability Resource Center[1] as soon as possible. Students who require such an accommodation for an exam must contact the instructor at least two weeks before the exam is scheduled.

Syllabus Policy: Students are responsible for learning and following all policies stated in this syllabus. This course syllabus is a general plan for the course; deviations announced to the class by the instructor

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[1]http://students.georgiasouthern.edu/sdrc/

may be necessary.

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