Deep Learning

Stevens Institute of Technology

Fall 2021

Instructor: Jia Xu

Canvas Course Address: https://sit.instructure.com/courses/61188

Lecture:

- CS 583-A - Deep Learning
- Gateway North 204 | Monday | 3:00 PM - 5:30 PM
- CS 583-B - Deep Learning
- Gateway South 216 | Thursday | 3:30 PM - 6:00 PM

Contact Info: jxu70@stevens.edu

Virtual Office Hours:

Instructor: Tuesdays 11:00 AM-1:00 PM

Recitations:

Ahmed Kowsher Thursdays 2:00 PM-3:00 PM Section A

Hrishikesh Dinkar Kanade Mondays 11:00 AM-12:00 PM Section B

TAs:

Hrishikesh Dinkar Kanade hkanade@stevens.edu: Thursdays 11:00 AM-1:00 PM

Preet Jhanglani pjhangl1@stevens.edu Mondays 2:00 PM-4:00 PM

Ahmed Kowsher ga.kowsher@gmail.com Thursdays 3:00 PM-5:00 PM

Ritesh Panditi ritesh.panditi98@gmail.com Mondays 11:00 AM-1:00 PM

Prerequisite(s): Linear Algebra, Probability Theory, Machine Learning

COURSE DESCRIPTION

This course will introduce basic methods in deep learning. We will focus on how to apply deep learning techniques to real-world applications, for example, natural language processing, and speech processing. The dominant modeling paradigm is data-driven machine learning, viewing the above applications as pattern classification tasks.

This is a laboratory-oriented course in the theory and practice of building computer systems using deep neural networks, aiming to use modern computational technology performing artificial intelligence (AI) applied studies.

STUDENT LEARNING OUTCOMES

This is a practical course; the students will be able to use DL methods for solving real-world ML, CV, and NLP problems. The students will also learn math and theories for understanding ML and DL.

COURSE FORMAT AND STRUCTURE

This course is fully online. To access the course, please visit stevens.edu/canvas . For more information about course access or support, contact the TRAC by calling 201-380-6599 or 201-216-5500.

Course Logistics

- Deadlines are an unavoidable part of being a professional and this course is no exception. Course requirements must be completed and posted or submitted on or before specified due date and delivery time deadline. Due dates and delivery time deadlines are defined as Eastern Time (as used in Hoboken, NJ). Please note, students living in distance time zones or overseas must comply with this course time and time and due date deadline policy. Avoid any inclination to procrastinate. To encourage you to stay on schedule, due dates have been established for each assignment; assignments received more than 1 day late will receive 0 points. [this should be aligned with what your late policy states]
- An assignment file should be appended by your username, such as "assignment1_kim53.doc". This may make it easier for me to manage assignment files you download to my computer.

Instructor's Online Hours

I will be available via email 16:00-17:00 on Mondays and Fridays besides my office hours. When emailing me, please place in the subject line the course number/section and the topic of the email (i.e. CS583 – Assignment 2 Question). This will help me tremendously in locating your emails quicker when I scan the hundreds of emails that seem to make it into my box each day.*

Virtual Office Hours

Virtual Office Hours are a synchronous session (through Zoom) to discuss questions related to weekly readings and/or assignments. Office hours will be held Tuesdays 12:30-14:30 EST on Zoom.

COURSE MATERIALS

TENTATIVE TOPICS: COURSE MATERIALS

Textbook(s): Deep Learning. Ian Goodfellow, Yoshua Bengio, and Aaron Courville.

Other Readings: S. Boyd and L. Vandenberghe. Introduction to Applied Linear Algebra. Cambridge University Press, 2018. (Available online.)

Y. Nesterov. Introductory Lectures on Convex Optimization Book. Springer, 2013. (Available online.)

D. S. Watkins. Fundamentals of Matrix Computations. John Wiley & Sons, 2004.

Francois Chollet. Deep learning with Python. Manning Publications Co., 2017. (Available online.)

M. Mohri, A. Rostamizadeh, and A. Talwalkar. Foundations of machine learning. MIT press, 2012.

J. Friedman, T. Hastie, and R. Tibshirani. The elements of statistical learning. Springer series in statistics, 2001. (Available online.)

COURSE REQUIREMENTS

Attendance Yes

Participation Yes

Homework Yes

Quizzes Yes

Project(s) Yes

Exams Yes

TECHNOLOGY REQUIREMENTS

Baseline technical skills necessary for online courses

- Basic computer and web-browsing skills
- Navigating Canvas

Technology skills necessary for this specific course

- Live web conferencing using Zoom
- Recording a slide presentation with audio narration

- Recording, editing, and uploading video via Kaltura

Required Equipment

- Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection
- Webcam: built-in or external webcam, fully installed
- Microphone: built-in laptop or tablet mic or external microphone

Required Software

- Current or first previous major release of Chrome, Firefox, Edge, or Safari browser
- Microsoft Word or Latex or Page
- Microsoft PowerPoint or Keynote

GRADING PROCEDURES

Grading information will be given in the class.

Late Policy

- Late submissions of assignments or project documents for whatever reason will be punished. 5% of the score of an assignment/project will be deducted per hour. For example, if an assignment is submitted 15 hours and 1 minute later than the deadline (counted as 16 hours) and it gets a grade of 95%, then the score after the deduction will be: 95% - 5*16% = 15%.

Academic Integrity

- Students in graduate courses (600 level) are bound by the Graduate Student Code of Academic Integrity.
    - If you teach a graduate course, you should include only the Graduate Student Code of Academic Integrity portion only.
- Graduate students in 500-level courses are bound by the Graduate Student Code of Academic Integrity, while undergraduate students in those courses have special provisions that have been agreed upon by the Dean of Graduate Academics and the Honor Board.
    - If you teach a 500-level course, be sure to include both the Undergraduate Honor System and the Special Provisions for Undergraduate Students in 500-level Courses portions.

Undergraduate Honor System

Enrollment into the undergraduate class of Stevens Institute of Technology signifies a student's commitment to the Honor System. Accordingly, the provisions of the Stevens Honor System apply to all undergraduate students in coursework and Honor Board proceedings. It is the responsibility of each student to become acquainted with and to uphold the ideals set forth in the Honor System Constitution. More information about the Honor System including the constitution, bylaws, investigative procedures, and the penalty matrix can be found online at http://web.stevens.edu/honor/

The following pledge shall be written in full and signed by every student on all submitted work (including, but not limited to, homework, projects, lab reports, code, quizzes and exams) that is assigned by the course instructor. No work shall be graded unless the pledge is written in full and signed.

"I pledge my honor that I have abided by the Stevens Honor System."

Reporting Honor System Violations

Students who believe a violation of the Honor System has been committed should report it within ten business days of the suspected violation. Students have the option to remain anonymous and can report violations online at www.stevens.edu/honor.

Graduate Student Code of Academic Integrity

All Stevens graduate students promise to be fully truthful and avoid dishonesty, fraud, misrepresentation, and deceit of any type in relation to their academic work. A student's submission of work for academic credit indicates that the work is the student's own. All outside assistance must be acknowledged. Any student who violates this code or who knowingly assists another student in violating this code shall be subject to discipline.

All graduate students are bound to the Graduate Student Code of Academic Integrity by enrollment in graduate coursework at Stevens. It is the responsibility of each graduate student to understand and adhere to the Graduate Student Code of Academic Integrity. More information including types of violations, the process for handling perceived violations, and types of sanctions can be found at www.stevens.edu/provost/graduate-academics.

Special Provisions for Undergraduate Students in 500-level Courses

The general provisions of the Stevens Honor System do not apply fully to graduate courses, 500 level or otherwise. Any student who wishes to report an undergraduate for a violation in a 500-level course shall submit the report to the Honor Board following the protocol for undergraduate

courses, and an investigation will be conducted following the same process for an appeal on false accusation described in Section 8.04 of the Bylaws of the Honor System. Any student who wishes to report a graduate student may submit the report to the Dean of Graduate Academics or to the Honor Board, who will refer the report to the Dean. The Honor Board Chairman will give the Dean of Graduate Academics weekly updates on the progress of any casework relating to 500-level courses. For more information about the scope, penalties, and procedures pertaining to undergraduate students in 500-level courses, see Section 9 of the Bylaws of the Honor System document, located on the Honor Board website.

LEARNING ACCOMMODATIONS

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. The Office of Disability Services (ODS) works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, psychiatric disorders, and other such disabilities in order to help students achieve their academic and personal potential. They facilitate equal access to the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage independence and self-advocacy with support from the ODS staff. The ODS staff will facilitate the provision of accommodations on a case-by-case basis.

For more information about Disability Services and the process to receive accommodations, visit https://www.stevens.edu/office-disability-services. If you have any questions please contact: Phillip Gehman, the Director of Disability Services Coordinator at Stevens Institute of Technology at pgehman@stevens.edu or by phone 201-216-3748.

Disability Services Confidentiality Policy

Student Disability Files are kept separate from academic files and are stored in a secure location within the Office of Disability Services. The Family Educational Rights Privacy Act (FERPA, 20 U.S.C. 1232g; 34CFR, Part 99) regulates disclosure of disability documentation and records maintained by Stevens Disability Services. According to this act, prior written consent by the student is required before our Disability Services office may release disability documentation or records to anyone. An exception is made in unusual circumstances, such as the case of health and safety emergencies.

INCLUSIVITY

Name and Pronoun Usage

As this course includes group work and class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect. This includes the ability for all students to have their chosen gender pronoun(s) and chosen name affirmed. If the class roster does not align with your name and/or pronouns, please inform the instructor of the necessary changes.

Inclusion Statement

Stevens Institute of Technology believes that diversity and inclusiveness are essential to excellence in academic discourse and innovation. In this class, the perspective of people of all races, ethnicities, gender expressions and gender identities, religions, sexual orientations, disabilities, socioeconomic backgrounds, and nationalities will be respected and viewed as a resource and benefit throughout the semester. Suggestions to further diversify class materials and assignments are encouraged. If any course meetings conflict with your religious events, please do not hesitate to reach out to your instructor to make alternative arrangements.

You are expected to treat your instructor and all other participants in the course with courtesy and respect. Disrespectful conduct and harassing statements will not be tolerated and may result in disciplinary actions.

MENTAL HEALTH RESOURCES

Part of being successful in the classroom involves a focus on your whole self, including your mental health. While you are at Stevens, there are many resources to promote and support mental health. The Office of Counseling and Psychological Services (CAPS) offers free and confidential services to all enrolled students who are struggling to cope with personal issues (e.g., difficulty adjusting to college or trouble managing stress) or psychological difficulties (e.g., anxiety and depression). CAPS is open daily from 9:00 am – 5:00 pm M-F. Evening hours are available by appointment in the Fall / Spring semesters and up-to-date information regarding the availability of evening appointments can be found by visiting www.stevens.edu/CAPS. To schedule an appointment, call 201-216-5177.

Due to the pandemic, in-person appointments may be limited until further notice. Up-to-date information about the availability of in-person services can be found at www.stevens.edu/CAPS. Teletherapy (therapy via secure video platform) is available to registered students physically located in the states of New York or New Jersey. Students located outside of NY / NJ are encouraged to pursue local treatment through their personal health insurance. To learn more about the process of finding a therapist please visit the CAPS webpage on Seeking Help Off-Campus.

EMERGENCY INFORMATION

In the event of an urgent or emergent concern about the safety of yourself or someone else in the Stevens community, please immediately call the Stevens Campus Police at 201-216-5105 or on their emergency line at 201-216-3911. These phone lines are staffed 24/7, year round. For students who do not reside near the campus and require emergency support, please contact your local emergency response providers at 911 or via your local police precinct. Other 24/7 national resources for students dealing with mental health crises include the National Suicide Prevention Lifeline (1-800-273-8255) and the Crisis Text Line (text "Home" to 741-741). If you are concerned about the wellbeing of another Stevens student, and the matter is *not* urgent or time sensitive, please email the CARE Team at care@stevens.edu. A member of the CARE Team will respond to your concern as soon as possible.