CSCI 8945
Advanced Representation Learning
Fall 2021

Instructor
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Time and Location of the Lectures:
- Online
- Tuesdays & Thursdays (2:20PM – 3:35PM); Wednesdays (3:00PM – 3:50PM)

Office Hours
By email appointment.

Course Description
This course presents a rigorous overview of advanced representation learning algorithms in machine learning, from the traditional subspace learning models to the recent deep representation learning models. Applications in the fields of computer vision, data mining, and natural language processing will be covered.

This course will be research oriented, encouraging students to explore the recent advances in machine learning field. The instructor will review the basic concepts of representation learning and briefly introduce some advanced topics. After that, students will in turn present research papers from the reading materials. In addition, students will need to work on a research project on machine learning theory, methodology, or applications.

Course Objectives
Students will learn how to use and design representation learning algorithms for real-world problems.
Recommended Prerequisites
CSCI 6380 or CSCI 6550

Credit Hours
4

Text(s)
No textbooks. The course materials are mainly from recent research papers in the machine learning field.

Course Topics
- An Overview of Machine Learning
- Neural Networks and Deep Learning
- Topic 1: Deep Auto-Encoders
- Topic 2: Convolutional Neural Networks
- Topic 3: Recurrent Networks
- Topic 4: Adversarial Learning
- Topic 5: Graph Neural Networks
- Topic 6: Self-Supervised Learning

Grade Distributions

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Paper Review</td>
<td>30%</td>
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<tr>
<td>Paper Presentations</td>
<td>20%</td>
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<tr>
<td>Final Project</td>
<td>50%</td>
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Reading Assignments and Paper Reviews

Students will be required to review 6 papers (ONE paper from each topic above) over the semester and submit the review to eLC by **11:59PM of the due date** shown in class schedule on course website. The reviewed paper should be chosen from the papers that will be presented in the following classes (Refer to classes schedule for more details). The reviewed papers should not contain the papers you’re going to present in the class. The review should summarize the main idea and contributions of the paper, describe the major experimental results, and discuss the strengths and weaknesses of the paper. The students are also encouraged to check the follow-up works on the topic of the assigned paper (e.g., search the latest papers that cite the assigned paper), summarize the state-of-the-art methods and results, and discuss possible future research directions.
Class Participation and Paper Presentations

Each student will be required to present two research papers over the semester. Each presenter should prepare slides for a 30 minutes talk on the paper. Recordings of the talk must be submitted to eLC by midnight (12:00AM) before the class. The talk should clearly address the following points: (1) motivation and problem statement; (2) related work; (3) methodology; (4) experiments; (5) conclusions; and (6) at least 3 questions for discussions. The presenter will also need to lead discussions on eLC.

Research Project

Students are required to work on an individual or group (no more than three students) research project on machine learning over the semester. Research project will be evaluated based on the novelty, efforts, technical soundness, presentations, and the quality of final report.

Academic Integrity and Ethics

We will strictly follow UGA’s Academic Honesty Policy. Dishonest behavior will not be tolerated and may result into failing the course. Please contact the instructor if you have any concerns regarding this issue.

Face Coverings

Following guidance from the University System of Georgia, face coverings are recommended for all individuals while inside campus facilities.

How can I obtain the COVID-19 vaccine?

- University Health Center is scheduling appointments for students through the UHC Patient Portal (https://patientportal.uhs.uga.edu/login_dualauthentication.aspx). Learn more here – https://www.uhs.uga.edu/healthtopics/covid-vaccine.
- The Georgia Department of Health, pharmacy chains and local providers also offer the COVID19 vaccine at no cost to you. To find a COVID-19 vaccination location near you, please go to: https://georgia.gov/covid-vaccine.
- In addition, the University System of Georgia has made COVID-19 vaccines available at 15 campuses statewide and you can locate one here: https://www.usg.edu/vaccination

What do I do if I have symptoms?

Students showing symptoms should self-isolate and schedule an appointment with the University Health Center by calling 706-542-1162 (Monday-Friday, 8 a.m.-5 p.m.). Please DO NOT walk-in. For emergencies and after-hours care, see https://www.uhs.uga.edu/info/emergencies.
What do I do if I test positive for COVID-19?

If you test positive for COVID-19 at any time, you are required to report it through the DawgCheck Test Reporting Survey. We encourage you to stay at home if you become ill or until you have excluded COVID-19 as the cause of your symptoms. UGA adheres to current Georgia Department of Public Health (DPH) quarantine and isolation guidance and requires that it be followed. Follow the instructions provided to you when you report your positive test result in DawgCheck.

Guidelines for COVID-19 Quarantine Period (As of 8/1/21; follow DawgCheck or see DPH website for most up-to-date recommendations)

Students who are fully vaccinated do not need to quarantine upon exposure unless they have symptoms of COVID-19 themselves. All others should follow the Georgia Department of Public Health (DPH) recommendations:

- Students who are not fully vaccinated and have been directly exposed to COVID-19 but are not showing symptoms should self-quarantine for 10 days. Those quarantining for 10 days must have been symptom-free throughout the monitoring period and continue self-monitoring for COVID-19 symptoms for a total of 14 days. You should report the need to quarantine on DawgCheck (https://dawgcheck.uga.edu/), and communicate directly with your faculty to coordinate your coursework while in quarantine. If you need additional help, reach out to Student Care and Outreach (sco@uga.edu) for assistance.

- Students, faculty and staff who have been in close contact with someone who has COVID-19 are no longer required to quarantine if they have been fully vaccinated against the disease and show no symptoms.

Mental Health and Wellness Resources

- If you or someone you know needs assistance, you are encouraged to contact Student Care & Outreach in the Division of Student Affairs at 706-542-7774 or visit https://sco.uga.edu/. They will help you navigate any difficult circumstances you may be facing by connecting you with the appropriate resources or services.

- UGA has several resources to support your well-being and mental health: https://wellbeing.uga.edu/

- Counseling and Psychiatric Services (CAPS) is your go-to, on-campus resource for emotional, social and behavioral-health support: https://caps.uga.edu/, TAO Online Support (https://caps.uga.edu/tao/), 24/7 support at 706-542-2273. For crisis support: https://healthcenter.uga.edu/emergencies/.

- The University Health Center offers FREE workshops, classes, mentoring and health coaching led by licensed clinicians or health educators: https://healthcenter.uga.edu/bewelluga/
**Monitoring conditions:**

Note that the guidance referenced in this syllabus is subject to change based on recommendations from the Georgia Department of Public Health, the University System of Georgia, or the Governor’s Office or. For the latest on UGA policy, you can visit coronavirus.uga.edu.