[CS-8395 Spring 2020]

Deep Learning in Medical Image Computing

I. Course Information

Deep learning is a genre of machine learning that enabled large progress in many fields, including medical image computing. Medical image computing is an interdisciplinary field of computer vision, engineering, and medicine, which aims to understand the biomedical images quantitatively.

Instructor:	Yuankai Huo, Ph.D.
Class Meets:	Tuesday & Thursday, 4:00 pm – 5:15 pm, FGH 110
TA Office Hours:	Tuesday & Thursday, 1:00 pm – 4:00 pm, TA Office (FGH 385)
Instructor Office Hours:	Tuesday & Thursday, 3:00 pm – 4:00 pm, FGH 376
Contact Instructor:	yuankai.huo@vanderbilt.edu
Course Website:	https://my.vanderbilt.edu/cs8395
Submission & Discussion:	https://www.vanderbilt.edu/brightspace

*Please ask me if anything is not clear in syllabus before Jan 09.

II. General Requirement

Linear algebra / calculus, programming ability in Python, research/graduate study interests

III. Course Text

No textbook. Reading topics are posted to https://my.vanderbilt.edu/cs8395

IV. Schedule, Slides, Assignments and Projects

https://my.vanderbilt.edu/cs8395

V. Assignments, Exams and Projects

1. Reading Assignments

15 reading assignments are required for each student. The student should bring the hard-copy of each reading assignment before the class that corresponding to that reading. You **DO NOT** need to submit the e-version in Brightspace.

2. Assignments

Four assignments will be assigned for basic tasks in image processing using deep learning. The collaborations are not allowed, which means each student should work on the assignments by himself except asking the lecturer/TA. For Assignment 0, one written report is required. For Assignment 1 to 3, a 3-minutes in class presentation (network design, data processing, hyper-parameters, results etc.) and a written report is required.

3. Midterm Exam

A mid-term exam will be conducted in class before the fall break. The format of the exam will be open book, open note, open internet. The topic of the mid-term exam will cover the basic concepts and derivations in deep learning.

4. Final Project

Final project can be done by one student or a team with maximum three members. The topic of the final project can be chosen from the topics covered in the class or any deep learning tasks related to medical image computing. At the end of the semester, a presentation and final report are required for accomplishing the final project. 4-5 pages report per team member and 10 min presentations per team member are the typical requirements. No late assignments are permitted. Practice your presentations. *Even if you cannot get anything else right,* ***END ON TIME****.* There will be a speech timer to give you a 1-minute warning.

VII. Grades:

1200 Points Possible. Grades are **NOT** "curved."

A+	1170-1200
A	1100-1169
A-	1050-1099
B+	1000-1049
B	950-999
B-	900-949
C+	850-899
C	800-849
C-	750-799
D+	700-749 (Graduate Credit: F)
D	650-699 (Graduate Credit: F)
D-	600-649 (Graduate Credit: F)
F	0-599

Example Gradings

	Class Attend.	Paper Reading	Assign. 0	Assign. 1	Assign. 2	Assign. 3	Mid Term	Final Project	Total
Total	100	150	100	150	150	150	100	300	1200
Typ. A+	100	150	100	150	150	130	90	300	1170
Typ. A	100	150	100	130	130	130	90	270	1100
Typ. A-	100	150	90	130	130	110	80	270	1060
Typ. B+	100	150	90	130	110	110	70	240	1000
Typ. B	100	150	80	130	110	110	70	210	960
Typ. B-	90	130	70	110	110	110	70	210	900

Class Attendance	
Miss <= 2 classes	100
Miss 3 classes	90
Miss 4 classes	80
Miss 5 classes	70
Miss 6 classes	60
Miss 7 classes	50
Miss >= 8 classes	0

Paper Reading (Total 15 readings)	
Solid Understanding	10
Mostly Read	8
Weak Effort	5
No Turn in	0

Mid Term Example	
Scores	0-100

	Assign. 0	Assign. 1	Assign. 2	Assign. 3	Final Project
Amazing Work	100	150	150	150	300
Solid Project	90	130	130	130	270
Significant Efforts	80	110	110	110	240
Much Work Needed	70	90	90	90	210
Show Understanding	60	70	70	70	180
Turn in Something	50	50	50	50	150
No Turn in	0	0	0	0	0

* For assignments 1-3, 50% scores are presentation and 50% are write-up.
* For final project, 20% scores are proposal, 40% are presentation and 40% are write-up.

V. Late policy

Late assignments will ***not*** be accepted.

Academic Ethics and Course Rules

Undergraduates and graduate students are governed by an academic ethics code that states that faculty and students share a responsibility for ensuring that we all work in a community where integrity is upheld. There are many ways to describe breaches in academic integrity, but one principle is overriding: no person should represent the ideas and contributions of others as his or her own. Copying another person's homework or exam solutions fall into this category. In other contexts, the submission of term papers drawing on other's ideas and publications without proper citation is a serious breach of academic ethics. If you believe that a person in a course is not conducting himself or herself in an appropriate way, you should bring the matter to the attention of the instructor. In addition, you should be aware of your responsibilities in this course involving homework and the examinations.

EEO/AA Statement

In compliance with federal law, including the provisions of Title VII of the Civil Rights Act of 1964, Title IX of the Education Amendment of 1972, Sections 503 and 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act (ADA) of 1990, the ADA Amendments Act of

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