Instructor Information

Instructor(s)
Dajiang Zhu

Office Number
SEIR 323

Office Telephone Number
CSE

Email Address
dajiang.zhu@uta.edu

Faculty Profile
https://mentis.uta.edu/explore/profile/dajiang-zhu

Office Hours
Monday and Wednesday 11:30-12:30 PM
Because of the pandemic, students are encouraged to schedule online meeting via Teams

Course Information

Section Information
CSE6389-001

Time and Place of Class Meetings
Monday and Wednesday 1:00-2:20 PM
Modality: Fully Online Option 2
- All instruction and testing are online, but some synchronous online class attendance or participation is required.
- For the first class (08/26/2020 1:00-2:20 PM) and all the presentations by the students, all the students are encouraged to attend via Teams (synchronous).
- For a full definition of the course modalities, please go to https://www.uta.edu/academics/courses-and-schedules.

Description of Course Content
This course will introduce standard approaches to neuroimage analysis, including basic concepts of neuroimaging, basic algorithms, principles of software systems, and their applications.

Student Learning Outcomes
Understanding the neuroimaging related algorithms and machine learning approaches, implement some of them in the programming projects.

Required Textbooks and Other Course Materials
Atam Dhawan, Medical Image Analysis, Wiley-IEEE Press (Second edition)
S. Kevin Zhou, Hayit Greenspan, Dinggang Shen, Deep Learning for Medical Image Analysis (1st Edition)
Descriptions of major assignments and examinations
The programming project sets will be assigned in class and each student need to present the approach and results after finishing each project. Each student will also select 1-3 papers to read and present in class. All the presentations for projects and papers will be fully and deeply discussed in class.

Technology Requirements
- Online teaching tools: The synchronous content (e.g. student presentation) is via Teams (you will see a group named with our course number). The asynchronous content (e.g. recorded video) will be uploaded to Canvas.
- Webcam is needed in synchronous lectures (e.g. the first class and the presentations).

Grading Information

Grading
Project sets. (50%)
Class presentations. (50%)
A (85~100)
B (70~84)
C (60~69)
D (<=59)
For example, if you have 80 (project) and 90 (presentation), your final score will be 80*0.5+90*0.5=85
*The grading information will be mentioned in the first class.

Course Schedule

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<tr>
<th>Week 1.</th>
<th>Wed Aug 26: Introduction</th>
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| Week 2.       | Mon Aug 31: Neurons Synapses  
                |   Wed Sep 2: Neurotransmitters |
| Week 3.       | Mon Sep 7: No class  
                |   Wed Sep 9: Brain development, aging and plasticity |
| Week 4.       | Mon Sep 14: Brain anatomy and function  
                |   Wed Sep 16: Brain coordinate system and atlas |
| Week 5.       | Mon Sep 21: Imaging modalities  
                |   Wed Sep 23: Diffusion tensor imaging and functional MRI |
| Week 6.       | Mon Sep 28: CNN introduction - Xiaowei Yu  
                |   Wed Sep 30: CNN paper discussion (Image net classification with deep convolutional neural networks) - Reza Etemadi Idgahi |
| Week 7.       | Mon Oct 5: CNN paper discussion (Deep ensemble learning of sparse regression models for brain disease) - Aishwarya Pothula  
                |   Wed Oct 7: CNN paper discussion (Cortical graph neural network for AD and MCI diagnosis and transfer learning across populations) - Shivam Singh |
| Week 9.       | Mon Oct 19: GCN introduction - Feng Tong  
                |   Wed Oct 21: GCN paper discussion (Distance Metric Learning Using Graph - Application to Functional Brain Networks) - Yanjun |
Week 10.
**Mon Oct 26:** GCN paper discussion (Graph Convolutional Networks Improve the Prediction of Cancer Driver Genes) - **Houliang Zhou**  
**Wed Oct 28:** GCN paper discussion (Graph Neural Network for Interpreting Task-fMRI Biomarkers) - **Lu Zhang**

Week 11.
**Mon Nov 2:** GCN paper discussion (Inductive Representation Learning on Large Graphs) - **Feng Tong**  
**Wed Nov 4:** GCN paper discussion (Learning Convolutional Neural Networks for Graphs) - **Quan Nguyen**

Week 12.
**Mon Nov 9:** RNN introduction - **Aishwarya Pothula**  
**Wed Nov 11:** RNN paper discussion (Predicting Alzheimer’s disease progression using deep recurrent neural networks) - **Rushikesh Patel**

Week 13.
**Mon Nov 16:** RNN paper discussion (Modeling Brain Diverse and Complex Hemodynamic Response Patterns via Deep Recurrent Autoencoder) - **Mohit Jeste**  
**Wed Nov 18:** RNN paper discussion (Interpretable, highly accurate brain decoding of subtly distinct brain states from functional MRI using intrinsic functional networks and long short-term memory recurrent neural networks) - **Flynn Sequeira**

Week 14.
**Mon Nov 23:** RNN paper discussion (Diffusion Convolutional Recurrent Neural Network-Data-Driven Traffic Forecasting) - **Sevastopoulos**  
**Wed Nov 25:** No Class

Week 15.
**Mon Nov 30:** RNN paper discussion (A hybrid Convolutional and Recurrent Neural Network for Hippocampus Analysis in Alzheimer’s Disease) - **Bhaskar Trivedi**  
**Wed Dec 2:** Project Presentations (group 1-4)

Week 16.
**Mon Dec 7:** Project Presentations (group 5-8)

“As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. — Dajiang Zhu.”

**Institution Information**

UTA students are encouraged to review the below institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit the Institutional Information page (https://resources.uta.edu/provost/course-related-info/institutional-policies.php) which includes the following policies among others:

- Drop Policy  
- Disability Accommodations  
- Title IX Policy  
- Academic Integrity  
- Student Feedback Survey  
- Final Exam Schedule

**Additional Information**

**Mandatory Face Covering Policy**

All students and instructional staff are required to wear facial coverings while they are on campus, inside buildings and classrooms. Students that fail to comply with the facial covering requirement will be asked to leave the class session. If students need masks, they may obtain them at the Central Library, the E.H. Hereford University Center’s front desk or in their department. Students who refuse to wear a facial covering in class will be asked to leave the session by the instructor, and, if the student refuses to leave, they may be reported to UTA’s Office of Student Conduct.

**Attendance**
At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator of student success. Each faculty member is free to develop his or her own methods of evaluating students’ academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I recommend all the students to attend the class via Teams (for synchronous lectures, presentations). However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients “begin attendance in a course.” UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report must contain the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Canvas. This date is reported to the Department of Education for federal financial aid recipients.

**Electronic Communication:** UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at [http://www.uta.edu/oit/cs/email/mavmail.php](http://www.uta.edu/oit/cs/email/mavmail.php).

**Campus Carry:** Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit [http://www.uta.edu/news/info/campus-carry/](http://www.uta.edu/news/info/campus-carry/)

**Student Feedback Survey:** At the end of each term, students enrolled in face-to-face and online classes categorized as “lecture,” “seminar,” or “laboratory” are directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback via the SFS database is aggregated with that of other students enrolled in the course. Students’ anonymity will be protected to the extent that the law allows. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit [http://www.uta.edu/sfs](http://www.uta.edu/sfs).

**Final Review Week:** For semester-long courses, a period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

**Emergency Exit Procedures:** Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

**Student Support Services:** UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall),
call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at http://www.uta.edu/universitycollege/resources/index.php.

The IDEAS Center (2nd Floor of Central Library) offers free tutoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. To schedule an appointment with a peer tutor or mentor email IDEAS@uta.edu or call (817) 272-6593.

Emergency Phone Numbers

In case of an on-campus emergency, call the UT Arlington Police Department at 817-272-3003 (non-campus phone), 2-3003 (campus phone). You may also dial 911. Non-emergency number 817-272-3381

Library Information

Research or General Library Help
Ask for Help
- Academic Plaza Consultation Services (library.uta.edu/academic-plaza)
- Ask Us (ask.uta.edu/)
- Research Coaches (http://libguides.uta.edu/researchcoach)

Resources
- Library Tutorials (library.uta.edu/how-to)
- Subject and Course Research Guides (libguides.uta.edu)
- Librarians by Subject (library.uta.edu/subject-librarians)
- A to Z List of Library Databases (libguides.uta.edu/az.php)
- Course Reserves (https://uta.summon.serialssolutions.com/#!/course_reserves)
- Study Room Reservations (openroom.uta.edu/)