ILLINOIS
School of Information Sciences

Designing Intelligent Systems to Augment Human Performance
Course Number (IS596 DIS/DIO)
Fall 2025
Classroom and Class Time: Hybrid Lecture-Discussion
131 iSchool
Weekly contact hours 5 – 6:50PM on Tuesdays

Name of instructor: Jessie Chin
Office hours by appointment: chin5@illinois.edu

Name of co-instructor: Tre Tomaszewski
Office hours by appointment: jtomasz2@illinois.edu

Course Description:
Given the rapid changes in information environments, emerging research has proposed and investigated the potential to leverage data sciences, artificial intelligence and computational technologies to complement, support, and augment human performance. While intelligent systems have been pervasive in our daily life, it is critical to evaluate and design these systems with solid theoretical foundations in human behavior. This course will be composed of five modules, each covering a type of intelligent system, from search, decision-making, learning, health behavior, to crowd behavior. Each module will start with the lecture on the foundation in cognitive and psychological sciences of human behavior, an analytical review on the current intelligent systems or technologies/models developed to support this behavior, and an interactive discussion on what can be done to design a system to augment human performance. This course will be composed of both lectures and discussions.

Pre- and Co-requisites
None.

 # Credit hours
4 credit hours

Learning Outcomes:

1. Students will be able to explain and review important principles of human cognition and behavior in contemporary information environments

2. Students will be able to apply the theories in human cognition and behavior to evaluate the complex information systems
3. Students will be able to design and generate approaches to analyze human performance in information systems
4. Students will be able to analyze and discuss the existing intelligent systems and technologies to augment human performance
5. Students will be able to propose and evaluate the design of an intelligent system

Course Context
This course meets a number of learning outcomes connected to program objectives for the PhD program in Information Sciences, as well as the Master in Information Management program and the Master in Library and Information Sciences program, which in turn connect to larger iSchool and University of Illinois learning goals.

Program Learning Outcomes
iSchool Goal
This course meets the following goal:
1. Apply appropriate analytic approaches to the needs of a given problem and understand how aspects of logic, statistical analysis, and broader domain knowledge can inform the interpretation and confidence in their analyses.
2. Understand some of the larger sociotechnical contexts in which information management occur.
3. Students with effectively and accurately communicate to an interdisciplinary audience in both oral and written formats.

University of Illinois Campus-Wide Learning Goals
This course meets the following goals:
1. Intellectual Reasoning and Knowledge
2. Creative Inquiry and Discovery
3. Effective Leadership and Community Engagement
4. Social Awareness and Cultural Understanding
5. Global Consciousness

Course materials
All readings will be posted on the course site.

Assignments and Methods of Assessment

1. In-Class Presentation (15%)

Each student will do oral presentation on a scholarly article of intelligent system, and participate in the discussions in the class. Students can choose one article from the readings provided by the instructors (available on the Canvas site). The presentation will happen on Feb 18 (intelligent systems on search, information retrieval, and decision-making), Feb 25 (cognitive generative agents), Apr 15 (intelligent systems on reading and learning), Apr 29 (digital health and precision medicine). **The sign-up of readings will happen during Feb 4 – Feb 11.**

The in-class presentation will be graded by co-instructor in terms of the (1) correctness and completeness of presenting the theoretical background (5%), (2) clarity in explaining the methodology and approach to design, develop, and validate the agents or systems (5%), (3) analytical thinking and translation of research (3%), (4) discussion participation (2%).

2. LLM Augmented Writing and Research (25%)

There will be a discussion session on this assignment. Each student will select a paper, preferably, but not limited to, the one they will present on during assignment #1. **During class (second hour on March 3)**, the students will write a concise summary or review of the paper, featuring the main contributions, methodology, significance, and listed or perceived limitations.

Using an LLM, the students will either a) refine and expand the original summary for clarity, conciseness, and detail or b) work to develop a follow-up research goal, critique, or study proposal based on the initial paper. This will require critical thinking to truly enhance the ideas in the document and should not rely on the LLM to simply rewrite the paper. Deliverables will be the newly assembled document, the prompts used, and the LLM responses.

The work will then be anonymously distributed for peer review *along with an LLM generated review of each paper provided by the instructors*. The student conducting the peer review will then evaluate and critique both the human and LLM generated outputs. The students should also assess and compare the strengths and limitations of both documents. The reviews will be anonymously returned to the student who wrote the summary/proposal.

Students will then present on a reflection on their experience, focusing on how LLMs *augmented their performance*, any insights from the human peer-review, and how these technologies may be integrated into the scientific research process in general and (if at all) the student's future pursuits. Students will also be asked to share their opinion on the validity, effectiveness, and ethical nature of this process.

This assignment will be graded on: Accuracy and depth of original summary [writing quality will not be assessed] (5%); Critical thinking and assessment during the process of using the LLM for enhancing their work (5%); Thoughtfulness and depth of peer review (5%), Insightfulness of the final reflection (8%), questions asked during after the presentation (2%)

Dates:
March 3rd: Writing session (30 min max)
March 25th: Refined review/proposal with prompts due
Apr 1st: Peer review due
Apr 8th: Short (5 min) Presentation and class discussion

3. Research Project (60%)

Students will conduct a systematic research project under the research mentoring of the instructor. Doctoral students can choose to conduct the project on their own, or in a group (with the max. number of people in a group being 3). Master students can choose to work on the project in a group of 2 to 3 members.

All students are expected to develop their own new systems/agents throughout the semester. Students will work with the instructors closely to develop the research project with the expectation of meeting the qualities of peer-reviewed publications. Students are encouraged to use this project as an opportunity to develop hands-on experience regarding the applications of AI. The research project is expected to be composed of an introduction, literature review/related work, methods to design the agent, a demo of the agent or its functional prototype, a proposed study to evaluate the system, and discussion and conclusion. All systems are expected to be grounded by cognitive psychology or health behavior theories to improve human performance. Students will work with the instructors closely with the expectation to demonstrate competence in designing, implementing, and evaluating the systems.

The expectations/benchmarks of the research projects will be set up through discussions with the instructor individually. Drafts of research papers are required to be submitted over the semester. All the data, codes, and scripts will be stored in a shared space as part of the projects' final products.

Dates:
Mar 11: Lightning Talk: introducing the research ideas and proposed agents/systems (5%)
Mar 14 Noon: [Submission Required] Due of first draft: Research Questions, Introduction, Related Work/Literature Review, Study Rationale, Conceptual Model and Approach of the Intelligent Systems (10%) (3~4 pages)
Apr 15 Noon: [Submission Required] Due of the second draft: Technical Explanation of the Systems, Data Use/Management Plan, Initial Demo Video (10%) (6 pages) – Graded by co-instructor
Apr 22: Check-in Research Presentation: showing the current development of agents (10%)
May 6: Final Project Presentation and Final Demo (10%) – Graded by both instructors.
May 8 Noon: [Submission Required] Final Paper (15%)

Lightning Talk:

- **Grading:** Originality (2%), Potential Impact on Human Performance (2%), Feasibility (1%)

Check-in Research Presentation

- **Grading:** Evidence of progress (4%), Plan for Next Steps (5%), Discussion and Reflection (1%)

Final Project Presentation and Final Demo

- **Grading:** Originality and Significance (2%), Robustness and Complete Implementation of the Project (5%), Evaluation and Findings (1.5%), Discussion and Reflection (1.5%).

The First and Second Draft (Late Submission: 0.5pt deducted every 12 hours)

- **Style:** Single-space, Margin 1 inch, 12 font size, Times New Roman
- **In-Text Citations and References:** American Psychological Association (APA) Style

- **Submission Information:** Submit to Canvas. All due are at **12PM CST (Noon)**
- **Grading:** Originality and Potential Impact (2%), Robustness and Correctness (3%), Whether the Comments Provided Last Time Have Been Fully Addressed (5%)

Final Paper

- **Style:** Single-space, Margin 1 inch, 12 font size, Times New Roman, **8 Pages** (Not including References, Tables or Figures, Supplementary File)
- **In-Text Citations and References:** American Psychological Association (APA) Style (0.5pt will be deducted if not following the correct style)
- **Submission Information:** The final report is due by **12PM CST (Noon) on May 8**.
- **Grading:** Significance (2%), Innovation (3%), Robustness of approaches (10%), Clarity on Technical Report, Demo, and Supplementary File (5%)

Grading Scale

97-100 = A+
94-96 = A
90-93 = A-
87-89 = B+
83-86 = B
80-82 = B-
77-79 = C+
73-76 = C
70-72 = C-
67-69 = D+
63-66 = D
60-62 = D-
59 and below = F

Course Policies

Attendance/ Participation Policy
The iSchool expects students to attend all classes except in cases of emergency.
Student Code on Attendance: http://studentcode.illinois.edu/article1/part5/1-501/

If you have an emergency, communicate with the instructor as early as possible to prevent negatively impacting your grade. Students missing more than one class—or who regularly arrive late or leave early—will not pass the class unless alternate arrangements are made.

Students share some of the responsibility for fostering an inclusive classroom. Students are expected to be respectful of others' perspectives and lived experiences during class discussion.

General Policy

1. All assignments are required for all students. Completing all assignments is not a guarantee of a passing grade.
2. All work must be completed in order to pass this class.

3. Late or incomplete assignments will not be given full credit unless the student has contacted the instructor prior to the due date of the assignment (or in the case of emergencies, as soon as practicable). **Late submission will be deducted 0.5pt every 12 hours. No late submission of final paper will be accepted.**
4. There will be **no make-up assignments or no extra assignments** for specific students to gain additional credits for this course. If students have any questions about the grading of their assignments, please discuss with the instructor **within a week they receive the grades**. The scores of previously graded assignments will not be adjusted in the final weeks.

Academic Integrity

The iSchool has the responsibility for maintaining academic integrity so as to protect the quality of education and research in our school and to protect those who depend on our integrity. Consequences of academic integrity infractions may be serious, ranging from a written warning to a failing grade for the course or dismissal from the University.
See the student code for academic integrity requirements: http://studentcode.illinois.edu/article1/part4/1-401/

Please review and reflect on the academic integrity policy of the University of Illinois, http://studentcode.illinois.edu/article1_part4_1-401.html, to which we subscribe. By turning in materials for review, you certify that all work presented is your own and has been done by you independently, or as a member of a designated group for group assignments.

If, in the course of your writing, you use the words or ideas of another writer, proper references must be given (using APA citation style). Not to do so is to commit plagiarism, a form of academic dishonesty or plagiarism. Please be aware that the consequences for plagiarism or other forms of academic dishonesty will be severe. Students who violate university standards of academic integrity are subject to disciplinary action, including a reduced grade, failure in the course, and suspension or dismissal from the University.

Note on Large Language Models (LLMs) (ChatGPT, etc.)

You are welcome to use LLMs to aid with your written work as long as they are properly cited. Please include a footnote/endnote that gives your prompt and a summary of changes you made to the output. To be specific, LLMs can be used to improve your writing, but not writing for you from scratch. LLMs have its limitations. Your written work will be read closely. Please use LLMs appropriately.

Statement of Inclusion

http://www.inclusiveillinois.illinois.edu/mission.html

As the state's premier public university, the University of Illinois at Urbana-Champaign's core mission is to serve the interests of the diverse people of the state of Illinois and beyond. The institution thus values inclusion and a pluralistic learning and research environment, one which we respect the varied perspectives and lived experiences of a diverse community and global workforce. We support diversity of worldviews, histories, and cultural knowledge across a range of social groups including race, ethnicity, gender identity, sexual orientation, abilities, economic class, religion, and their intersections.

Religious Observances
In keeping with our Statement of Inclusion and Illinois law, the University is required to reasonably accommodate its students' religious beliefs, observances, and practices in regard to admissions, class attendance, and the scheduling of examinations and work requirements.

If you anticipate the need for an accommodation, please communicate with your instructor in the first two weeks of class. If you are an undergraduate student and your instructor requires an absence letter, you must fill out the Religious Observance Accommodation Request form: https://odos.illinois.edu/community-of-care/resources/students/religious-observances/
Other accommodations may also be available.

Week-by-Week Topic and Assignment Schedule
Assignment submissions and readings will be available in the Canvas space. *Please note that schedule and readings are subject to change.*

Topics

1. Jan 21. Overview. Human Cognitions, Intelligence, and Artificial intelligence
2. Jan 28. Search, Foraging, Decision-Making
3. Feb 4. Cognitive Architecture and Cognitive Agents (Led by Tre)
4. Feb 11. Hands-on Workshop on Generative Agents (Led by Tre)
5. Feb 18. Intelligent Systems on Search, Information Retrieval and Decision-Making [Presentation and Discussion]
6. Feb 25. Cognitive Generative Agents [Presentation and Discussion]
7. Mar 4. Lecture on Memory and Knowledge Acquisition, In-Class Writing Session
8. **Mar 11.** Lightning Talk (Online)
9. **Mar 25.** Comprehension, Knowledge Acquisition, Learning, Metacognition (Online)
10. Apr 1. Health Behavior and Persuasion
11. Apr 8. Discussion on LLM Augmented Writing and Research
12. Apr 15. Intelligent Systems on Reading and Learning [Presentation and Discussion]
13. **Apr 22.** Research Presentation on Agent Development (Led by Tre) (Online)
14. Apr 29. Digital Health and Precision Medicine [Presentation and Discussion]
15. **May 6.** Final Presentation (Online)
    a. Due of Final Report: Noon (12PM) on May 8

Accessibility Statement
To obtain accessibility-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TTY), or e-mail a message to disability@uiuc.edu.

To ensure disability-related concerns are properly addressed from the beginning of the semester, I request that students with disabilities who require assistance to participate in this class contact me as soon as possible to discuss your needs and any concerns you may have. The University of Illinois may be able to provide additional resources to assist you in your studies through the office of Disability Resources and Educational Services (DRES). This office can assist you with disability-related academic adjustments and/or auxiliary aids. Please contact them as soon as

possible by visiting the office in person: 1207 S. Oak St., Champaign; visiting the website: http://disability.illinois.edu; calling (217) 333-4603 (V/TTY); or via e-mail disability@illinois.edu. NOTE: I do not require a letter from DRES in order to discuss your requested accommodations.

Emergency Planning Statement
Plan for emergency situations in the classroom by reviewing the important material found at http://police.illinois.edu/emergency-preparedness/.

Land acknowledgement Statement
Adopted by the University of Illinois in 2018
More information: https://chancellor.illinois.edu/land_acknowledgement.html

As a land-grant institution, the University of Illinois at Urbana-Champaign has a responsibility to acknowledge the historical context in which it exists. In order to remind ourselves and our community, we will begin this event with the following statement. We are currently on the lands of the Peoria, Kaskaskia, Peankashaw, Wea, Miami, Mascoutin, Odawa, Sauk, Mesquaki, Kickapoo, Potawatomi, Ojibwe, and Chickasaw Nations. It is necessary for us to acknowledge these Native Nations and for us to work with them as we move forward as an institution. Over the next 150 years, we will be a vibrant community inclusive of all our differences, with Native peoples at the core of our efforts.

Land Acknowledgement Statement Suggested by Native American House:
I/We would like to begin today by recognizing and acknowledging that we are on the lands of the Peoria, Kaskaskia, Piankashaw, Wea, Miami, Mascoutin, Odawa, Sauk, Mesquaki, Kickapoo, Potawatomi, Ojibwe, and Chickasaw Nations. These lands were the traditional territory of these Native Nations prior to their forced removal; these lands continue to carry the stories of these Nations and their struggles for survival and identity.
As a land-grant institution, the University of Illinois has a particular responsibility to acknowledge the peoples of these lands, as well as the histories of dispossession that have allowed for the growth of this institution for the past 150 years. We are also obligated to reflect on and actively address these histories and the role that this university has played in shaping them. This acknowledgement and the centering of Native peoples is a start as we move forward for the next 150 years.

Library Resources
https://www.library.illinois.edu/infosci/

Writing and Bibliographic Style Resources
The campus-wide Writers Workshop provides free consultations. For more information see http://www.cws.illinois.edu/workshop/

The iSchool sponsors a Writing Resources course site https://courses.ischool.illinois.edu/course/view.php?id=3389
And provides access to writing coaches who offer free consultations here: https://publish.illinois.edu/ischoolwritingresources/