

Course Syllabus

CIS 4930 / CIS 6930 Special Topics: Human-Centered Input Recognition Algorithms (HCIRA)

Course Syllabus, v1.2, last revised 1/21/2019

Course Logistics

Meeting Times:

- Thursdays Period 10, 11, E1 (5:10 to 6:00pm, 6:15 to 7:05pm, 7:20 to 8:10pm)
- 150 minutes total class time

Meeting Location:

- Computer Sciences & Engineering E220 (CSE E220)

Instructor Information

Instructor: Lisa Anthony, PhD

- E-mail address: [lanthony@cise.ufl.edu \(mailto:lanthony@cise.ufl.edu\)](mailto:lanthony@cise.ufl.edu) (put 'HCIRA' in the subject)
- Office hours: Mondays 12:00pm to 3:00pm
- Office location: CSE Building, E542
- Class Web site: Canvas!

Teaching Assistant(s): n/a

Course Information

Catalog Descriptions:

- CEN 4930 – Special Topics in CISE – Credits: 3.
- CEN 6930 – Special Topics in CIS – Credits: 3.

Variable content provides an opportunity for in-depth study of topics not offered elsewhere and of topics of current significance.

Course Overview:

Are you interested in natural user interaction? Do you want to learn more about how computer systems recognize and interpret user input in “natural” modalities, like touch, gesture, speech, and whole-body motion? This course will cover typical approaches in recognition of input in these modalities that are informed by what we know about human input behaviors. Each semester the modality of emphasis may vary. In Spring 2019, the course will cover touchscreen surface-based gesture recognition. Selected algorithms that will be covered may include: Wobbrock et al's \$1 recognizer, Anthony & Wobbrock's \$N recognizer, Vatavu et al's

\$P recognizer, among others. Class structure will be in a project-based seminar format, in which we will discuss in-class weekly readings of the research papers that introduced these algorithms. Students will implement at least one of these algorithms and test it online in live demos and offline on sample data. Students will also extend at least one of these algorithms and test it in the same ways.

This is a cross-listed undergraduate and graduate course.

Pre-requisites and Co-requisites:

- CIS 4930: COP 3530.
- CIS 6930: COP 3530 or equivalent.

Important Note about Class Format:

This class is a seminar-based course. Rather than instructor-given lectures, class meetings will focus on discussion and analysis of the algorithms and their performance as described in the assigned research papers. As a result, students will need to do the readings **before** coming to class. A short quiz will be given at the beginning of each class meeting to make sure everyone is ready to begin discussion.

Course Components:

This course involves the following components:

- Readings – recent research papers in the area of human-centered input recognition algorithms, and related topics.
- Quizzes – online in-class quizzes on the readings each week.
- In-Class Discussion – class discussion of the algorithms and their performance, as well as other related topics; participation in these discussions will be part of a Class Participation grade.
- Projects – two (2) individual projects will be completed, including (1) implementing and testing an existing covered human-centered recognition algorithm, (2) proposing, implementing, and testing an improvement or extension to an existing covered human-centered recognition algorithm.

Course Objectives:

By the end of this course, students will be able to:

- Explain the motivation and impetus for research on human-centered input recognition algorithms.
- Cite multiple examples of human-centered input recognition algorithms for the modality of emphasis in the current semester.
- Understand the factors that could affect performance of a recognition algorithm on human input, including population, context, and modality.
- Understand how to use data visualization to reveal nuances in human input behaviors that could affect performance of a recognition algorithm.
- Explain the process of conducting offline recognition experiments to test the performance of a recognition algorithm.
- Implement and test an existing recognition algorithm based on the related research paper, pseudocode, and (if applicable) reference implementations.
- Propose human-centered extensions to existing recognition algorithms based on the topics covered in

the current semester.

- Implement and test a human-centered extension to an existing recognition algorithm.
- Present the results of offline recognition experiments in oral and written form.

Course Materials

Material and Supply Fees:

- No fees are collected for this course.

Textbooks Required and Accessing Readings:

No textbook is required for this course. Weekly readings in the form of research papers will be posted to the course website at least two weeks prior to the due date. Students will be responsible for accessing the readings and downloading any relevant links provided.

UF students have access to downloads from publisher sites such as the [ACM Digital Library](http://dl.acm.org/) (<http://dl.acm.org/>) and the [IEEE Xplore Digital Library](http://ieeexplore.ieee.org/) (<http://ieeexplore.ieee.org/>) on-campus on the UF wireless network, or off-campus through the VPN. Students should consult the [UF Computing Helpdesk](http://helpdesk.ufl.edu/self-help/connectivity-instructions/) (<http://helpdesk.ufl.edu/self-help/connectivity-instructions/>) for assistance if needed.

Software Required:

Students are **required to bring a laptop to class**[\[1\]](#) to take the in-class quizzes and participate in the project working sessions. For the projects, research software including recognition algorithms, datasets, visualization tools, and so on may be necessary to download and install on students' computers. While no problems are anticipated, students are responsible for the computer security of their own machines.

Additional Recommended Resources:

- TBD

Course Outline

Presentation Days

As mentioned in the **Course Policies** section on "Attendance", attendance at presentation and demo days is required. Course presentation days are scheduled for:

- **Project 1:** March 21st
- **Project 2 Proposals:** March 28th
- **Project 2:** April 18th

Course Topics & Weekly Readings

See [Canvas Home Page](#).

Grading

The following items will contribute to students' grades in this course:

- Class Participation 20%
- Reading Quizzes 20%
- Project 1 25%
- Project 2 Proposal 5%
- Project 2 30%
- Extra Credit opportunities:
 1. CISE HCC Experiment Pool¹ 2%
- *No mid-term or final exams*

More details on the projects, deliverables, grading, and expectations will be made available closer to the due dates.

¹ The human-centered computing (HCC) research faculty in the CISE department may recruit periodically throughout the semester for participants in their research studies. Each study participated in will be worth 1-2%, and students can earn up to 2% extra credit on their final course grade. Participation in the studies is optional, but strongly encouraged. A replacement extra credit activity of a 500-word report on a human-centered input recognition algorithm not otherwise covered in this course will be worth 1% (up to 2 essays can be submitted). It is possible that no extra credit opportunities will be available this semester if no studies are recruiting.

Please note: no partial credit will be awarded for extra credit submissions.

Grading Scale:

- 100-92 A, 91-90 A-
- 89-88 B+, 87-82 B, 81-80 B-
- 79-78 C+, 77-72 C, 71-70 C-
- 69-68 D+, 67-62 D, 61-60 D-
- 59-0 E

All final course grades will be rounded to the nearest whole number. Canvas estimates of final course grades are not to be considered accurate until I announce it. I recommend you do your own math to verify final grades. The Canvas system has a "What If" tool.

This course will use the Canvas e-Learning course management system to post grades and to communicate with class members. If you have a question about the course that other students could benefit from hearing the answer, please post to the appropriate discussion thread on Canvas rather than sending individual emails to the instructor/TA.

Expectations for Graduates vs. Undergraduates in this Course:

Graduate-level sections of this course involve more advanced material and more in-depth study than the undergraduate sections. Graduate students enrolled in this course must:

- Collect a dataset from 3 to 5 users to use in testing Project 2. More details will be provided with Project 2.

Undergraduate students who are interested may do the additional work as extra credit. See the instructor beforehand to arrange this.

Undergraduate Grading Scale Note:

A C- will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx> (<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>)

Graduate Grading Scale Note:

Graduate students need an overall GPA of 3.00 truncated and a 3.00 truncated GPA in their major (and in the minor, if a minor is declared) at graduation. For more information on grades and grading policies, please visit:

<http://gradcatalog.ufl.edu/content.php?catoid=4&navoid=907#grades> (<http://gradcatalog.ufl.edu/content.php?catoid=4&navoid=907#grades>)

Honor Code & Collaboration:

High level questions, syntax topics, and algorithms can be discussed amongst each other and amongst the groups. Not allowed in this course include the following:

- 1) **plagiarism** (misrepresenting others' ideas as your own),
- 2) **copying code**,
- 3) **social loafing** (e.g., for group work), and
- 4) **work offensive to others**.

As for other courses in CISE in the past, offenders will be held to the UF Honesty Policy (see below) including reporting incidents to the Dean of Students. The results of this have included failing grades, ethics lectures, and a permanent mark in records (which can lead to expulsion).

Course Policies

Late Assignments:

All assignments will be assessed a late penalty of -10% for each day late. After 3 days, students will receive a 0. The only exception to this rule is if students contact the instructor **in writing before the assignment due date** to make arrangements for lateness. Excuses are not accepted.

Attendance:

Attendance will not be graded. Engagement in class discussions contributes to class participation, however, so if students must miss class, the instructor recommends increasing participation on the other days.

Reading quizzes must be taken in person in class. For professional obligations (e.g., interviews,

conferences, etc.), contact the instructor **in writing by the Monday before the quiz** to schedule a time to take the quiz prior to the class meeting. For medical emergencies, a doctor's note will be required. If a student is sick or will be absent for a significant period of time, please contact the instructor to work out a way to catch up. **Attendance and participation is required for all project presentations and demo days.** If a student cannot attend, make-up work may be required at the instructor's discretion.

Make-ups:

Students who contact the professor **before the due date** with appropriate requests for extension and/or makeup assignments will be given an additional amount of time to make up late assignments equal to the time lost due to the unforeseen circumstance.

Incompletes:

Incompletes will be granted for only the most extreme circumstances, e.g. medical or family reasons. To be considered for an incomplete, the student **must** 1) let the professor know at in advance that they are seeking an incomplete, and 2) provide documentation to support the request.

Requirements for class attendance and make-up exams, assignments, and other work are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx> (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>)

Classroom Expectations:

To be courteous to your fellow students, please:

- Turn all cell phone ringers to silent and step outside to take calls.
- Turn off all audible notifications on laptops and phones.
- Refrain from texting during class.
- Use laptops only for taking notes or looking up relevant information (no Facebook, YouTube, Twitter, etc.).

University Policies and Resources

Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor in this class.

Note that failure to comply with this commitment will result in disciplinary action compliant with the UF Student Honor Code Procedures.

See <http://www.dso.ufl.edu/sccr/procedures/honorcode.php> (<http://www.dso.ufl.edu/sccr/procedures>)

[/honorcode.php\)](#)

Accommodation for Students with Disabilities

Students requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

UF Counseling Services

Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

- UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, <http://www.counseling.ufl.edu/cwc/Default.aspx> (<http://www.counseling.ufl.edu/cwc/Default.aspx>), counseling services and mental health services.
- Career Resource Center, Reitz Union, 392-1601, career and job search services.
- University Police Department 392-1111

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu (<mailto:rbielling@eng.ufl.edu>)
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu (<mailto:taylor@eng.ufl.edu>)
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@ufl.edu (<mailto:nishida@ufl.edu>)

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the Office of Title IX Compliance, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu (<mailto:title-ix@ufl.edu>)

Software Use

All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community,

pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Course Evaluations

Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at <https://evaluations.ufl.edu> (<https://evaluations.ufl.edu>). Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results> (<https://evaluations.ufl.edu/results>).

Undergraduate ABET

ABET Outcomes

This course is related to (but does not assess) the following ABET outcomes:

- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- (g) an ability to communicate effectively
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

[1] Consistent with UF College of Engineering computer requirements: "The University of Florida requires students to have access to a computer. The College of Engineering further requires that students have access to and on-going use of a laptop/mobile computer." For more information, see <http://www.eng.ufl.edu/students/career-resources/computer-requirements/> (<http://www.eng.ufl.edu/students/career-resources/computer-requirements/>)

Course Summary:

Date	Details	
Thu Jan 17, 2019	 Practice Quiz- Requires Respondus LockDown Browser (https://ufl.instructure.com/courses/363361/assignments/3765375)	due by 5:10pm
	 01/17: \$1, Protractor- Requires Respondus LockDown Browser (https://ufl.instructure.com/courses/363361/assignments/3773203)	due by 5:25pm
Thu Jan 24, 2019	 01/24: \$N, \$N-Protractor- Requires Respondus LockDown Browser (https://ufl.instructure.com/courses/363361/assignments)	due by 5:25pm

Date	Details	
	/3778205)	
Thu Jan 31, 2019	 01/31: Understanding Users- Requires Respondus LockDown Browser (https://ufl.instructure.com/courses/363361/assignments/3780989)	due by 5:25pm
Thu Feb 7, 2019	 02/07: Visualizing Data- Requires Respondus LockDown Browser (https://ufl.instructure.com/courses/363361/assignments/3784012)	due by 5:25pm
Thu Feb 14, 2019	 02/14: Recognition Experiments- Requires Respondus LockDown Browser (https://ufl.instructure.com/courses/363361/assignments/3786763)	due by 5:25pm
Thu Feb 21, 2019	 02/21: \$P- Requires Respondus LockDown Browser (https://ufl.instructure.com/courses/363361/assignments/3786767)	due by 5:25pm
Thu Feb 28, 2019	 02/28: \$P+- Requires Respondus LockDown Browser (https://ufl.instructure.com/courses/363361/assignments/3792699)	due by 5:25pm
Thu Mar 21, 2019	 Project #1 Live Demo Executable (https://ufl.instructure.com/courses/363361/assignments/3791585)	due by 2pm
	 Project #1 Oral Presentation (https://ufl.instructure.com/courses/363361/assignments/3791584)	due by 2pm
	 Project #1 Source Code (https://ufl.instructure.com/courses/363361/assignments/3791583)	due by 5pm
	 Project #1 Written Report (https://ufl.instructure.com/courses/363361/assignments/3791587)	due by 5pm
Thu Mar 28, 2019	 Project #2 Proposal (https://ufl.instructure.com/courses/363361/assignments/3798603)	due by 2pm
Mon Apr 1, 2019	 HCIRA Project #2 Proposals Meeting Sign-Ups	to do: 9am
Thu Apr 18, 2019	 Project #2 Live Demo Executable (https://ufl.instructure.com/courses/363361/assignments/3798606)	due by 2pm
	 Project #2 Oral Presentation (https://ufl.instructure.com/courses/363361/assignments/3798605)	due by 2pm
	 Project #2 Dataset & Data Collection Software Source Code (grad students only) (https://ufl.instructure.com/courses/363361/assignments/3803795)	due by 5pm
	 Project #2 Source Code (https://ufl.instructure.com/courses/363361/assignments/3798604)	due by 5pm

Date	Details
	 Project #2 Written Report (https://ufl.instructure.com/courses/363361/assignments/3798607) due by 5pm
	 Mid-Mid-Semester Class Participation ESTIMATE (https://ufl.instructure.com/courses/363361/assignments/3783838)
	 Mid-Semester Class Participation ESTIMATE (https://ufl.instructure.com/courses/363361/assignments/3798543)
	 Reading Quizzes Curve Adjustment (https://ufl.instructure.com/courses/363361/assignments/3806132)

