

I-590 Topics in Informatics: Tangible and Embodied Interaction

Department of Human-Centered Computing
Indiana University School of Informatics and Computing
IUPUI

Semester: Summer 2018

Section Number: 13434

Tuesday & Thursday, 6pm to 9:15pm, IT 357

Credit Hours: Four credit hours

Course Web Site: <http://canvas.iu.edu>

Instructor: Francesco Cafaro, Ph.D.

Office Address: IT 579

Email Address: fcafar@iu.edu

Course Description

interaction, including: full-body Kinect systems, elicitation of hand gestures and body movements, tangibles, and applications to informal learning settings in the context of cultural heritage and STEM. The class will include lectures to introduce common definitions and approaches; a seminar-style, students-led review of recent literature in the field (from ACM conferences including TEI, DIS, and CHI); and a group project that will provide a hand-on learning experience on designing Kinect or tangible systems.

Prerequisites

There are no prerequisites for this course.

Contact Information

Francesco Cafaro, Ph.D.

e-mail: fcafar@iu.edu

Office: IT 579

Office hours

Thursday 4 to 6,

and by appointment

Textbook

No text book. You will read and analyze 21 research papers from recent TEI and HCI top conferences (see the reading list at the end of the syllabus). They are freely accessible from the ACM portal: <http://dl.acm.org> at IUPUI, or at <https://ulib.iupui.edu/databases/acm-digital-library> when you are not at IUPUI.

Learning Objectives:

<i>Upon completion of this course, students will:</i>	<i>PGPLs</i>	<i>Assessment</i>
1. Understand how the vision of tangible and embodied interaction (TEI) is articulated and continually reinterpreted by a community of researchers and practitioners	1. K&S 2. CT	Paper Presentations Final Paper Review Class Participation
2. Understand how traditional HCI methods (e.g., requirements gathering, prototyping, evaluation) need to be adapted to TEI contexts	1. K&S 2. CT 4. EB	Group Project Paper Presentations Final Paper Review Class Participation
3. Apply critical reading skills to texts with a diversity of disciplinary approaches, including theoretical texts, design texts, and technical texts	2. CT 1. K&S	Paper Presentations Final Paper Review Class Participation
4. Apply the design and evaluation methods of TEI to the study of a novel or existing TEI	1. K&S 2. CT 3. EC	Group Project
5. Analyze a body of research to identify the contributions that have been made and areas in which additional, novel contributions might be made	2. CT 1. K&S 3. EC	Paper Presentations Final Paper Review
6. Evaluate the strengths, weaknesses, and applicability of TEI in a variety of contexts	2. CT 1. K&S 3. EC 4. EB	Paper Presentations Final Paper Review Class Participation Group Project
7. Communicate, via both written and oral modalities, about technology and technical information in ways that will be accessible to people from a variety of backgrounds and experiences	3. EC 2. CT 1. K&S	Paper Presentations Final Paper Review Class Participation Group Project

Course Requirements:

During this class, you will: participate in the class discussions; present four research papers in groups of two students; work in a group to identify a research problem, conduct a study, and report the results in a paper; submit written critique to two research papers.

There is not a traditional final exam.

GROUP PROJECT

There is a strong focus on the group project in this course. We will start a conversation around the challenges for using tangible and embodied interaction in museums that are identified in a recent TEI work-in-progress (see paper at the end of the syllabus). Students will then work in groups to address such challenges, by designing and evaluating either a tangible or a full-body interface.

SCHEDULE

All classes will include a combination of research paper presentations (typically, 3 papers per day) and group work –except for the days of the group project presentations.

Date	Details
Tue May 8, 2018	Introduction to the class. Paper Presentations assigned. Introduction to Tangible and Embodied Interaction Introduction to the overarching Project Challenge
Thu May 10, 2018	FOUNDATIONS: TANGIBLE INTERACTION [PROJECT] Individual Presentation of Research Ideas for the Project Challenge/ Idea Lab
Tue May 15, 2018	FOUNDATIONS: EMBODIED INTERACTION [PROJECT] Groups Formation
Thu May 17, 2018	[PROJECT] Initial Research Presentations for Project Challenge
Tue May 22, 2018	EMBODIED SCHEMATA
Thu May 24, 2018	ELICITATION STUDIES
Tue May 29, 2018	[PROJECT] Presentation of User Study Methodology [PROJECT] First paper draft due
Thu May 31, 2018	EVALUATING TEI
Tue June 5, 2018	[PROJECT] Group Work
Thu June 7, 2018	INFORMAL LEARNING; CULTURAL HERITAGE
Tue June 12, 2018	APPLICATIONS OF TANGIBLES
Thu June 14, 2018	[PROJECT] Final Presentations
Tue June 19, 2018	[PROJECT] Final Paper due

GRADES

You will collect up to 100 points through the semester. Your points will be converted into a letter grade according to the table below.

Individual Assignments (3 points)

- Individual Presentation of research idea/Idea Lab 3 Points
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Team Paper Presentations (20 points)

- Paper Presentation 1 10 Points
 - Paper Presentation 2 10 Points
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Group Project (Research Paper) (50 points)

- Initial Research Presentation 5 Points
 - First Paper Draft 10 Points
 - User Study (Methodology) Presentation 5 Points
 - Final Presentation 15 Points
 - Final Paper 15 Points
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Participation (27 points)

- Attendance 5 Points
- In-Class Participation 1 2 Points
- In-Class Participation 2 2 Points
- In-Class Participation 3 2 Points
- In-Class Participation 4 2 Points
- In-Class Participation 5 2 Points
- In-Class Participation 6 3 Points
- In-Class Participation 7 3 Points
- In-Class Participation 8 3 Points
- In-Class Participation 9 3 Points
- In-Class Participation 10 3 Points

Grading

Grades will be assigned using the IUPUI grading scale:

<http://registrar.iupui.edu/gradecover.html>

You will receive a score for each graded assignment or group work. The sum of all points that you can receive during the semester is 100. In order to compute your final grade, you can simply add up all the points that you received during the semester, and convert your score to a letter grade using the table below.

Letter grade	Score	Interpretation
A+	>=99	Professional Level Work; Highly Contributed to the Learning Environment and Autonomously Explored Extra-Curricular Ubicomp Areas
A	>=93	Professional Level Work
A-	>=90	Excellent Work
B+	>=87	Acceptable Work
B	>=83	Acceptable Work, not at a Professional Level
B-	>=80	Acceptable Work, below Average
C+	>=77	Poor Work
C	>=73	Poor Work, Minimally Acceptable
C-	>=70	Unacceptable Work
D+	>=67	Unacceptable Work
D	>=63	Unacceptable Work
D-	>=60	Unacceptable Work
F	<60	Failed

Attendance

H-566 is a seminar class, in which most of the learning will occur through class participation and discussion. For this reason, **attendance is mandatory** and will directly affect 5 points of your final grade. You will be required to check in at the beginning of each class. Please plan to be on class on time. If you are not in class at 6 pm, you may be considered absent that day.

Your attendance will be graded in the following way:

	Letter Grade	Points
Up to 2 absences	A	5
3 absences	B	4
4 absences	C	3
5 absences	D	1
6 or more absences	F	0

Class Participation

READ THE RESEARCH PAPERS BEFORE CLASS! In order to be prepared for class and being able to actively contribute to the discussion, you need to read the research papers that will be presented that week –regardless of whether or not you are leading the discussion that day.

Your class participation will be recorded through the semester. Your class participation to these classes will affect your final grade. You will not be able to successfully participate in those classes if you have not read the papers.

Long Medical Absence (more than two days)

It is your responsibility to promptly notify the instructor promptly if you have compelling medical reasons that prevents you from being in class for more than two days through the semester—so that we can determine additional assignments for the “participation” portion of your grade.

Late Assignments

Assignments are due at 11:59 pm the day BEFORE class (unless otherwise specified). If you submit an assignment between 1 minute and 24 hours after the deadline, the penalty is 20% of the total score. If you submit more than 24 hours after the submission deadline, the assignment will count 0% towards your final score.

Paper Presentations

You will present four research papers to the class, using the template that will be posted on Canvas. Presentations will be done in pairs, so plan ahead and make sure to coordinate the content and agenda of your presentation with your classmate.

You will be able to select four papers from the reading list during the first day of class. You cannot choose two papers that belong to the same topic.

If you were not in class the first day, it is your responsibility to notify the instructor as soon as possible, and the instructor will assign you two papers.

UNIVERSITY POLICIES

Campus policies governing IUPUI courses may be found at: http://registrar.iupui.edu/course_policies.html

Administrative Withdrawal

A basic requirement of this course is that you will participate in all class meetings and conscientiously complete all required course activities and/or assignments. **If you miss more than half of the required activities within the first 25% of the course, you may be administratively withdrawn from this course.** *Our course meets twice per week; thus if you miss more than four classes in the first four weeks, you may be withdrawn.*

Administrative withdrawal may have academic, financial, and financial aid implications. Administrative withdrawal will take place after the full refund period, and if you are administratively withdrawn from the course you will not be eligible for a tuition refund. If you have questions about the administrative withdrawal policy at any point during the semester, please contact the instructor or visit <http://registrar.iupui.edu/withdrawal-policy.html> (Links to an external site.)

[Important Supplement for IUPUI Syllabi](#)

IUPUI Policy on Disability Accommodations

Students needing accommodations because of disability will need to register with [Adaptive Educational Services](#) and complete the appropriate forms issued by AES before accommodations will be given. The AES office is located in Taylor Hall, UC 100. You can also reach the office by calling 274-3241.

IUPUI Policy on Religious Holidays

IUPUI respects the right of all students to observe their religious holidays and will make reasonable accommodation, upon request, for such observances. Students seeking accommodation for religious observances must submit a request in writing to the course instructor by the end of the second week of the semester and should use the [Request for Course Accommodation Due to Religious Observance Form](#). More information on the IUPUI Policy on Religious Holidays is available here: <http://registrar.iupui.edu/religious.html>.

IUPUI Policy on Academic Integrity:

The IU Code of Student Rights, Responsibilities, and Conduct states that students must uphold and maintain academic and professional honesty and integrity; the code defines academic misconduct as any activity that tends to undermine the academic integrity of the institution. Students engaging in academic misconduct may therefore receive penalties from their course instructor and disciplinary action from the university. Policies against academic misconduct apply to *all* course-, department-, school-, and university-related activities. Academic misconduct may involve human, hard-copy, or electronic resources and includes but is not limited to the following: cheating, fabrication, plagiarism, interference, violation of course rules, and facilitating academic dishonesty. For definitions of these activities, visit <http://studentcode.iu.edu/responsibilities/academic-misconduct.html>. For information on how faculty and students are expected to handle cases involving academic misconduct, visit <http://registrar.iupui.edu/misconduct.html>. Additional information about the rights and responsibilities of IU students is available at <http://studentcode.iu.edu/>.

Title IX - IUPUI Policy on Sexual Misconduct

As your instructor, one of my responsibilities is to help create a safe learning environment on our campus. Title IX and our own Sexual Misconduct policy prohibit sexual misconduct. If you have experienced sexual misconduct, or know someone who has, the University can help. If you are seeking help and would like to speak to someone confidentially, please visit <http://stopsexualviolence.iu.edu/help/index.html> (Links to an external site.) for contact information.

It is also important that you know that federal regulations and University policy require me to promptly convey any information about potential sexual misconduct known to me to our campus' Deputy Title IX Coordinator or IU's Title IX Coordinator. In that event, they will work with a small number of others on campus to ensure that appropriate measures are taken and resources are made available to the student who may have been harmed.

Protecting a student's privacy is of utmost concern, and all involved will only share information with those that need to know to ensure the University can respond and assist. I encourage you to visit stopsexualviolence.iu.edu (Links to an external site.) to learn more about available resources on campus and in the community.

Education and Title VI

Title VI of the Civil Rights Act of 1964 protects people from discrimination based on race, color or national origin in programs or activities that receive Federal financial assistance.

RESOURCES FOR STUDENTS

Student Advocate

The Student Advocate Office is located in the Campus Center, Suite 350, and can be contacted by phone at 278-7594 or email at stuadvoc@iupui.edu. For more information, visit the Student Advocate website at <http://www.life.iupui.edu/advocate/>

Adaptive Educational Services

Students needing accommodations because of physical or learning disabilities should contact Adaptive Educational Services, Taylor Hall (UC), Room 137: <http://aes.iupui.edu/>

Counseling & Psychological Services

Students who wish to seek counseling or other psychological services should contact the CAPS office by phone at 274-2548 or email at capsindy@iupui.edu. For more information, visit the CAPS website at <http://life.iupui.edu/caps/>

READING LIST

(only the name of the first author is included)

Thu May 10, 2018 FOUNDATIONS: TANGIBLE INTERACTION

- Hiroshi Ishii. Tangible bits: towards seamless interfaces between people, bits and atoms.
<http://dl.acm.org/citation.cfm?id=258715>
- Philipp Schoessler. Kinetic Blocks: Actuated Constructive Assembly for Interaction and Display.
<http://dl.acm.org/citation.cfm?id=2807453>
- Eva Hornecker. Getting a grip on tangible interaction: a framework on physical space and social interaction.
<http://dl.acm.org/citation.cfm?id=1124838>

Tue May 15, 2018 FOUNDATIONS: EMBODIED INTERACTION

- Paul Dourish. Embodied Interaction: Exploring the Foundations of a New Approach to HCI.
<http://www.dourish.com/embodied/embodied99.pdf>
- David England. Whole Body Interaction: An Introduction.
http://link.springer.com/chapter/10.1007/978-0-85729-433-3_1
- Eva Hornecker. The role of physicality in tangible and embodied interactions
<http://dl.acm.org/citation.cfm?id=1925826>

Tue May 22, 2018 EMBODIED SCHEMATA

- Alissa N. Antle. Playing with The Sound Maker: Do Embodied Metaphors Help Children Learn?
<http://dl.acm.org/citation.cfm?id=1463754>
- Anna Macaranas. Bridging the Gap: Attribute and Spatial Metaphors for Tangible Interface Design. <http://dl.acm.org/citation.cfm?id=2148166>
- Jörn Hurtienne. Soft Pillows and the Near and Dear: Physical-to-Abstract Mappings with Image-Schematic Metaphors.
<https://dl.acm.org/citation.cfm?id=2839483>

Thu May 24, 2018 ELICITATION STUDIES

- Jacob O. Wobbrock. User-defined gestures for surface computing.
<http://dl.acm.org/citation.cfm?id=1518866>
- Meredith Ringel Morris. Reducing legacy bias in gesture elicitation studies.
<http://dl.acm.org/citation.cfm?id=2591689>
- Francesco Cafaro. Framed Guessability: Improving the Discoverability of Gestures and Body Movements for Full-Body Interaction.

Thu May 31, 2018 EVALUATING TEI

- Daniel Reinhardt. The Impact of Tangible Props on Gaming Performance and Experience in Gestural Interaction.
<http://dl.acm.org/citation.cfm?id=3173258>
- Christina Pollalis. Evaluating Learning with Tangible and Virtual Representations of Archaeological Artifacts.

<http://dl.acm.org/citation.cfm?id=3173260>

- Jessica Roberts. Scoring Qualitative Informal Learning Dialogue: The SQuILD Method for Measuring Museum Learning Talk.

<https://repository.isls.org/handle/1/269>

Thu June 7, 2018 INFORMAL LEARNING; CULTURAL HERITAGE

INFORMAL LEARNING

- Jessica Roberts. Interpreting data from within: supporting human-data interaction in museum exhibits through perspective taking. <http://dl.acm.org/citation.cfm?id=2593974>
- Michael S. Horn. The role of cultural forms in tangible interaction design.

<http://dl.acm.org/citation.cfm?id=2460643>

SUPPORTING CULTURAL HERITAGE

- Daniela Petrelli. Integrating material and digital: a new way for cultural heritage.

<http://dl.acm.org/citation.cfm?id=2486239>

Tue June 12, 2018 APPLICATIONS OF TANGIBLES

- Pedro Lopes. Affordance++: Allowing Objects to Communicate Dynamic Use. <http://dl.acm.org/citation.cfm?id=2702128>
- Rohit Ashok Khot. TastyBeats: Designing Palatable Representations of Physical Activity. <http://dl.acm.org/citation.cfm?id=2702197>

- Sarah Gallacher. Getting quizzical about physical: observing experiences with a tangible questionnaire. <http://dl.acm.org/citation.cfm?id=2807529>

WORK-IN-PROGRESS PAPER FOR PROJECT CHALLENGE

Swati Mishra and Francesco Cafaro. 2018. Full Body Interaction beyond Fun: Engaging Museum Visitors in Human-Data Interaction. In Proceedings of the Twelfth International Conference on Tangible, Embedded, and Embodied Interaction (TEI '18). ACM, New York, NY, USA, 313-319.

<https://dl.acm.org/citation.cfm?id=3173291>

The Instructor reserves the right to make changes to syllabus, course schedule, and reading list, if necessary.