THOMPSON RIVERS UNIVERSITY

Course Outline

Department of Computing Science

Faculty of Science

COMP 3450
Human Computer Interaction Design (3,1,0)
Fall 2015

Instructor: Phone/Voice Mail:
Office: E-Mail:

Course Description

Students are introduced to the concepts and practices of interaction design from a human-computer perspective. Students learn both theoretical and practical concepts of human-computer interaction and study how to develop user interfaces using a user-centered approach. Students learn both the general principles and specific techniques of interaction design and user experience design for various applications (mobile, web, and desktop). Students produce user interfaces through assignments following the guidelines discussed during the lectures. Students evaluate their user interfaces using various evaluation methods.

Educational Objectives/Outcomes

Objectives:

Upon successful completion of the course, the student will demonstrate the ability to:

1. Define a user-centered design process that explicitly takes account of the fact that the user is not like the developer or their acquaintances.
2. Develop and use a conceptual vocabulary for analyzing human interaction with software: affordance, conceptual model, feedback, and so forth.
3. Create and conduct a simple usability test for an existing software application or a student-created graphical user interface.
4. Use lo-fi (low fidelity) prototyping techniques to gather, and report, user responses;
5. Compare the constraints and benefits of different evaluative methods.
6. Discuss the advantages (and disadvantages) of non-mouse interfaces.

7. Conduct and report on a study that utilizes both qualitative and quantitative evaluation using statistical methods.

Prerequisites

Third year standing in a CS degree program.

Required Texts/Materials

1. Yvonne Rogers, Helen Sharp, and Jenny Preece (2011). *Interaction Design: Beyond Human-Computer Interaction*, 3rd Edition. Wesley. (**Required**)
2. David R. Benyon (2013). *Designing Interactive Systems: A comprehensive guide to HCI, UX and interaction design.* 3rd Edition. Perason Education Limited. (**Recommended**)

Syllabus - Lecture Topics:

Unit	Topic	Chapter	Duration (week)
1	What is Interaction Design?	1	1
2	Understanding and Conceptualizing Interaction	2	1
3	Establishing Requirements	10	1
4	Data Gathering/ Data Analysis, Interpretation, and Presentation	9	1
5	The Process of Interaction Design	7 & 8	1
6	Design, Prototyping, and Construction	11	1
7	Cognitive Aspects	3	1
8	Social Interaction	4	1
9	Emotional Interaction	5	1
10	Interfaces	6	1
11	Introducing Evaluation/An Evaluation Framework	12 & 13	1
12	Evaluation Studies: From Controlled to Natural	14	1
13	Evaluation: Inspections, Analytics, and Models	15	1

Syllabus – Workshop/Lab Topics :

Lab Topic	Tool/Resource	Duration
Data gathering and analysis	**SurveyMonkey**, Microsoft Excel	1 weeks
Creating personas	Sticky notes, index, cards, Microsoft Word	1 weeks

Design alternatives	Sticky notes, Microsoft Word	1 weeks
Creating scenarios and storyboards	**Storyboard That**, sticky notes	1 weeks
Paper prototyping (low fidelity)	Papers, pens, scissors, etc.	1 weeks
High fidelity prototyping	**Axure RP**, **Justinmind Prototyper**	2 weeks
jQuery UI basic	Sublime Text, **jQuery UI library**	2 weeks
GUI design principles	Sublime Text, **jQuery UI library**	2 weeks

ACM / IEEE Knowledge Area Coverage

Knowledge Areas that contain topics and learning outcomes covered in the course

Knowledge Area	Total Hours of Coverage
HCI/ Foundations	12
HCI/Designing Interaction	12
HCI/User-Centered Design and Testing	12
HCI/New Interactive Technologies	3
HCI/Statistical Methods for HCI	3

Body of Knowledge coverage

KA	Knowledge Unit	Topics Covered	T1 hours	T2 hours	Elective hours
HCI	Foundations	[Core-Tier1] • Contexts for HCI (anything with a user interface, e.g., webpage, business applications, mobile applications, and games) • Processes for user-centered development, e.g., early focus on users, empirical testing, iterative design • Different measures for evaluation, e.g., utility, efficiency, learnability, user satisfaction	12	0	0

		• Usability heuristics and the principles of usability testing • Physical capabilities that inform interaction design, e.g., color perception, ergonomics • Cognitive models that inform interaction design, e.g., attention, perception and recognition, movement, and memory; gulfs of expectation and execution • Social models that inform interaction design, e.g., culture, communication, networks and organizations • Principles of good design and good designers; engineering tradeoffs • Accessibility, e.g., interfaces for differently-abled populations (e.g., blind, motion-impaired) • Interfaces for differently-aged population groups (e.g., children, 80+)			
HCI	Designing Interaction	[Core-Tier2] • Principles of graphical user interfaces (GUIs) • Elements of visual design (layout, color, fonts, labeling) • Task analysis, including qualitative aspects of generating task analytic models • Low-fidelity (paper) prototyping • Quantitative evaluation techniques, e.g., keystroke-level evaluation • Help and documentation • Handling human/system failure • User interface standards	0	12	0
HCI	User-Centered Design and Testing	[Elective] • Approaches to, and characteristics of, the design process • Functionality and usability requirements (cross-reference to SE/Requirements Engineering)	0	0	12

		• Techniques for gathering requirements, e.g., interviews, surveys, ethnographic and contextual enquiry • Techniques and tools for the analysis and presentation of requirements, e.g., reports, personas • Prototyping techniques and tools, e.g., sketching, storyboards, low-fidelity prototyping, wireframes • Evaluation without users, using both qualitative and quantitative techniques, e.g., walkthroughs, GOMS, expert-based analysis, heuristics, guidelines, and standards • Evaluation with users, e.g., observation, think-aloud, interview, survey, experiment • Challenges to effective evaluation, e.g., sampling, generalization • Reporting the results of evaluations • Internationalization, designing for users from other cultures, cross-cultural			
HCI	New Interactive Technologies	[Electives] • Choosing interaction styles and interaction techniques • Representing information to users: navigation, representation, manipulation • Approaches to design, implementation and evaluation of non-mouse interaction o Touch and multi-touch interfaces o Shared, embodied, and large interfaces o New input modalities (such as sensor and location data) o New Windows, e.g., iPhone, Android	0	0	3

		o Speech recognition and natural language processing (cross reference IS/Natural Language Processing) o Wearable and tangible interfaces o Persuasive interaction and emotion o Ubiquitous and context-aware interaction technologies (Ubicomp) o Bayesian inference (e.g. predictive text, guided pointing) o Ambient/peripheral display and interaction				
HCI	Statistical Methods for HCI	[Elective] • t-tests • ANOVA • Randomization (non-parametric) testing, within vs. between-subjects design • Calculating effect size • Exploratory data analysis • Presenting statistical data • Combining qualitative and quantitative results	0	0	3	