Advanced Prototyping

I549   FALL 2022   PV 274
M W 9:45AM– 11:05AM

Instructor

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Office hours: TTh 2-3PM
Zoom

Associate Instructors

(Removed personnel details for publishing purposes)

DESCRIPTION

Prototyping is the activity of exploring a design space and developing design ideas. The course will cover issues surrounding the construction of prototypes (e.g., breadth, depth, look, interaction, low/high, vertical/horizontal, etc.). Students will practice manipulating different prototyping materials, both physical and digital, and learn about different prototype evaluation techniques.

Motto of the class
Prototype. Build. Share. Reflect. Repeat

LEARNING OBJECTIVES

By the end of this course, students will be able to:
1. Execute a range of techniques about prototyping in HCI/ design through project-based learning.
2. Perform quick, rapid, and hands-on prototyping to turn your ideas into testable prototypes.
3. Explore different aspects of prototyping in HCI/design dealing with modalities, material, contexts, and processes.
4. Learn accessible tools available for digital and physical prototyping in HCI/design (such as Voiceflow, IFTTT, makey-makey, Micro bits, etc.)
5. Uncover insight into customer needs and iterate prototypes.
6. Build a culture of experimentation through prototyping in teams.

DISCLAIMERS

About focus of this course:
1. This course will focus a lot on prototyping; not on the other aspects of problem solving such as learning techniques of user research, conceptualization, etc.
2. This course will focus on building a given artifact/ product/ experience flow to primarily test and iterate; rather than the entire design process.
3. This course is majorly going to focus on quick, dirty, and hands-on forms of prototyping; beyond digital forms of prototyping.
4. This course might need you to reverse your thought process of a HCD process and re-focus the purpose of building a product.
5. This course will encourage and focus on how quickly prototyping can also expand your innovation and try (even discard) your ideas and solutions.

REQUIREMENTS AND GRADING

Projects	**30%**
Exercises	**20%**
Class Activities/ Assignments	**30%**
Readings	**15%**
Attendance	**5%**

Projects

Projects are group assignments where a team of 4 or 5 students work on a given design brief. The design brief will have all the details and specifications of the requirements of submission. The projects are designed and implanted through the course to allow students to apply the learnt methods to see how they work in design practice, sometimes in agile setups. There are 2 projects for this course that contribute towards 30% of your overall grade. The projects are: 1) **Project 1:** Voice-based Kiosk; 2) **Project 2:** IoT System. *These projects will have testing and iterating properties that you have to conduct.*

Exercises

Exercises are individual assignments where a student works on a given exercise brief. The exercises are designed in a way that the student's efforts are contributed towards the projects and implanted through the course to contribute to their individual 20% of the overall grade. Exercises are also designed to allow students practice their tools, not methods, that will help them in applying the methods. *These exercises are mostly focused on the resource and competency building around prototyping tools that you might have to apply in your projects and class activities.*

Class Activities/ Assignments

Class Activities include class participation, engaging in class discussions and arranged class activities. During project presentations, this might also include presentation engagement and critique from the students. There are a range of activities planned such as group discussions, preparing elevator pitches, collecting secondary research articles, evaluating user interfaces, sketching, and hands-on prototyping. *These activities will mostly have building properties only; extending them for testing is a personal interest.* No submissions or credit on this part if you were not in class. This constitutes 30% of your overall grade.

Readings

Readings include Perusall reading and annotations on the assigned reading for the week. SignUp/ LogIn to Perusall, https://www.perusall.com/. Use the code **CHIVUKULA-ZKK4K** to access the course readings. There is a minimum of 5 quality annotations per reading which can include reflection, extension, agreement, or disagreement to the claims presented in the reading. Readings constitute 15% of your overall grade.

**Wherever there was no requirement of testing and iterating (such as in the class assignments), always feel free to take the prototypes to further test it as you see fit and improve your prototypes.

Look at the DESIGN PRODUCTION section that provide examples of submission kinds: Prototype Poster and Prototype Video

CLASS SCHEDULE AND STRUCTURE

Schedule for 13 weeks (Subject to Change)

WEEK/ WEEK OF	TOPIC	READINGS / CLASS ACTIVITIES (CA)	WORK DUE
1 Aug 22	**INTRODUCTION** **What is prototyping?**	**Introduce P1**	**R:** (Gengnagel et al., 2016, Chapter 2)
PROJECT 1			

PROJECT 1: PROTOTYPING KIOSK			
2 Aug 29	**Anatomy of Prototypes** **Low vs. High Fidelity Prototyping	Sketching as Prototyping**	**CA: Timed Sketching** **Introduce E1**	**R:** (Lim et al., 2008; Rudd et al., 1996) **P1: Prototype Topic and Context**
3 Sept 5	**Materiality and Context** *No class on Monday*	**CA: Jugaad/ DIY Prototyping**	**E1: Sketches of P1 Ideas**
4 Sept 12	**Paper Prototyping Prototyping for Modalities**	**CA: Create Paper Prototypes (P1)**	**R:** (Cambre & Kulkarni, 2020; Snyder, 2003) **P1: Materiality and Components** **E2: Feature Discovery: Voice Flow**
5 Sept 19	**Model Making in Prototyping**	**CA: Model Making Presentations** **CA:(De)structuring a Prototype (P1 Group)**	**R:** (Hallgrimsson, 2012) **P1: Low Fidelity Prototype**
6 Sept 26	**Body Storming as Prototyping Contextual Inquiry**	**CA: Testing Plan (P1 Group)**	**R:** (Schleicher et al., 2010; Holtzblatt, K., & Beyer, H. 2014)
7 Oct 3	**Testing and Iteration**	**Wed: Show Case** **Introduce P2**	**R:** (Pearl, 2016, Chapter 6) **P1: Testing, Results, and Iteration** **P1: Final Poster + Video Reflection on P1**
PROJECT 2: PROTOTYPING IOT SETUP			
8 Oct 10	**Designing for IOT**	~~CA: Create a Space~~	**R:** (Rowland, n.d.) (Web Link) **P2: Prototype Topic and Context**

9 Oct 17	**Prototyping is Fun! Physical Computing**	**CA: Makey-Makey Something**	**R:** (*Makey Makey*, n.d., *Micro:bit Educational Foundation*, n.d.) **P2: IoT System Flow + Prototyping Plan**
10 Oct 24	**Experience Prototyping**	**CA: Re-Create a Micro:bit project**	**R:**(Buchenau & Suri, 2000) **E4: Feature Discovery in IFTTT + Notification**
11 Oct 31	**Hybrid Prototyping Prototyping with IFTTT**	**Annotated Portfolios-Prototypes as Research Tools**	**R:** (Gengnagel et al., 2016, Chapter 8) ~~**E5: IFTTTing Notifications**~~ **P2: Experience Prototype + Prototype Progress**
12 Nov 7	**Communication/ Staging of Prototypes**	**<Student Request Topic> Practice Case Studies on Prototyping**	
13 Nov 14	**Class Reflection**	**Wed: Video ShowCase**	**P2: Video + Poster Reflection on P2**

READINGS

Required Texts

There are no required textbooks for this course. Suggested book references (you should find the files on Perusall):

Gengnagel, C., Nagy, E., & Stark, R. (2016). Rethink! Prototyping| Transdisciplinary Concepts of Prototyping. Springer. https://link.springer.com/content/pdf/bfm%253A978-3-319-24439-6%252F1.pdf

Snyder, C. (2003). Paper Prototyping: The Fast and Easy Way to Design and Refine User Interfaces. Elsevier. https://play.google.com/store/books/details?id=YbzBWfTHorQC

Pearl, C. (2016). Designing Voice User Interfaces: Principles of Conversational Experiences. "O'Reilly Media, Inc." https://play.google.com/store/books/details?id=MmnEDQAAQBAJ

Tools for Prototyping

Prototyping Tools and Resources required for this course (Make sure you all have accounts to these services):
- Screen Stencils: https://www.sketchize.com/
- Voiceflow: https://www.voiceflow.com/
- Makey Makey: https://makeymakey.com/
- Micro-bits: https://microbit.org/
- IFTTT: https://ifttt.com/

List of Readings

Below is a list of required readings for the course. They will be made available through Perusall, and may be changed at the instructor's discretion.

Buchenau, M., & Suri, J. F. (2000). Experience prototyping. *Proceedings of the 3rd Conference on Designing Interactive Systems: Processes, Practices, Methods, and Techniques*, 424–433. https://doi.org/10.1145/347642.347802

Cambre, J., & Kulkarni, C. (2020). Methods and Tools for Prototyping Voice Interfaces. *Proceedings of the 2nd Conference on Conversational User Interfaces*, 1–4. https://doi.org/10.1145/3405755.3406148

Gengnagel, C., Nagy, E., & Stark, R. (2016). *Rethink! Prototyping| Transdisciplinary Concepts of Prototyping*. Springer. https://link.springer.com/content/pdf/bfm%253A978-3-319-24439-6%252F1.pdf

Holtzblatt, K., & Beyer, H. (2014). Contextual Design: Evolved. Synthesis Lectures on Human-Centered Informatics, 7(4), 1–91. https://doi.org/10.2200/S00597ED1V01Y201409HCI024

Hallgrimsson, B. (2012). *Prototyping and modelmaking for product design*. Hachette UK.

Lim, Y.-K., Stolterman, E., & Tenenberg, J. (2008). The anatomy of prototypes: Prototypes as filters, prototypes as manifestations of design ideas. *ACM Trans. Comput.-Hum. Interact.*, *15*(2), 1–27. https://doi.org/10.1145/1375761.1375762

Makey Makey. (n.d.). Joylabz Official Makey Makey Store. Retrieved August 9, 2022, from https://makeymakey.com/

Micro:bit Educational Foundation. (n.d.). Retrieved August 9, 2022, from https://microbit.org/

Pearl, C. (2016). *Designing Voice User Interfaces: Principles of Conversational Experiences*. "O'Reilly Media, Inc." https://play.google.com/store/books/details?id=MmnEDQAAQBAJ

Rowland. (n.d.). What's different about user experience design for the Internet of Things? *Designing Connected Products: UX for the Consumer*.

Rudd, J., Stern, K., & Isensee, S. (1996). Low vs. high-fidelity prototyping debate. *Interactions*, *3*(1), 76–85. https://doi.org/10.1145/223500.223514

Schleicher, D., Jones, P., & Kachur, O. (2010). Bodystorming as embodied designing. *Interactions*, *17*(6), 47–51. https://doi.org/10.1145/1865245.1865256

Snyder, C. (2003). *Paper Prototyping: The Fast and Easy Way to Design and Refine User Interfaces*. Elsevier. https://play.google.com/store/books/details?id=YbzBWfTHorQC

Additional Design Method Links

Here are some links of design method collections (to learn more about prototyping) that can be used for the course:

- Design. Think. Make. Break. Repeat.: http://designthinkmakebreakrepeat.com/
- IDEO: https://www.designkit.org/methods
- Delft Design Guide: Design Strategies and Methods: https://arl.human.cornell.edu/PAGES_Delft/Delft_Design_Guide.pdf
- Service Design Tools: https://servicedesigntools.org/tools
- Hyper Island Toolbox: https://toolbox.hyperisland.com/
- Ethics-focused Methods Collection: https://everydayethics.uxp2.com/methods/#all
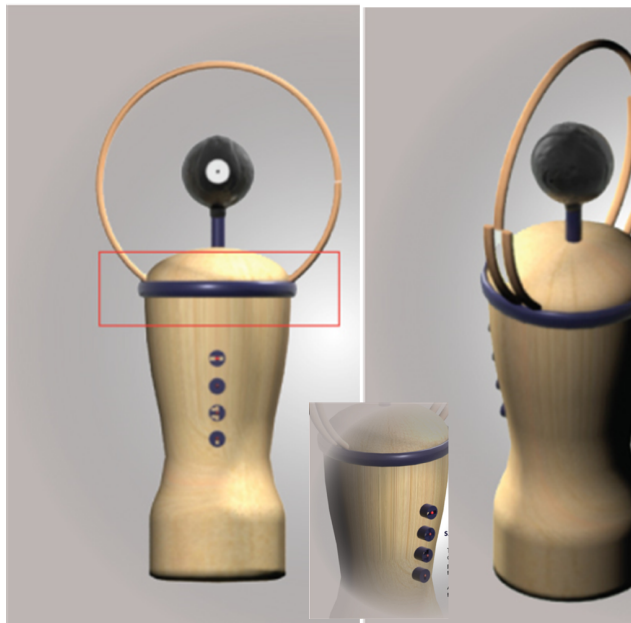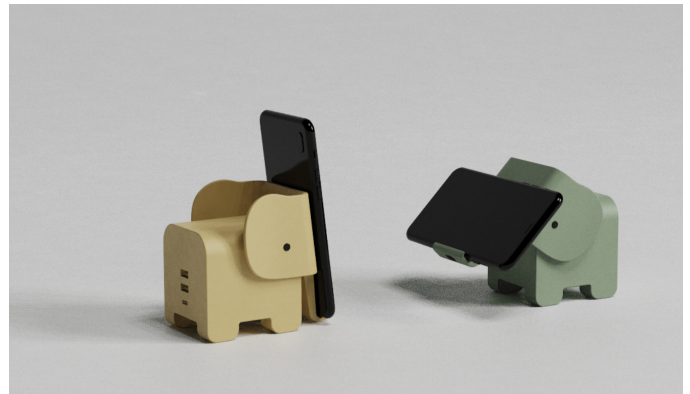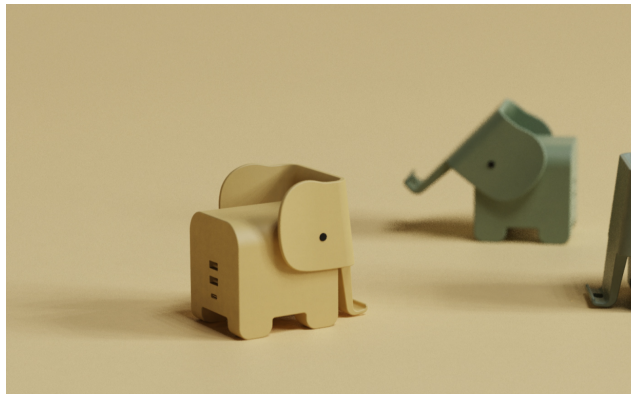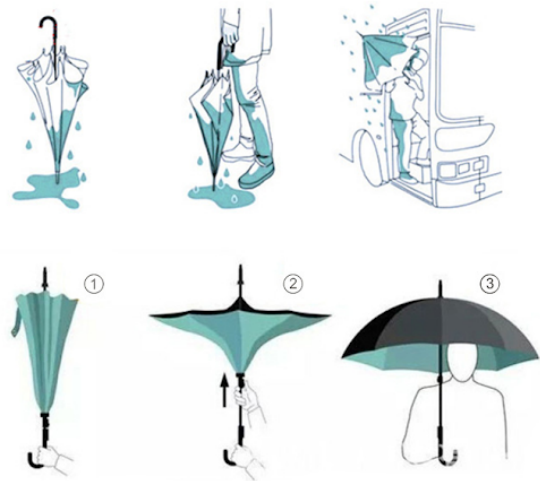
DIGITAL PRODUCTION
Prototype "Posters" or "Videos"
Size: A3 (297 x 420 mm). Any reference in your assignments about a requirement of a "Prototype Poster", it is a one page structure to communicate about your prototype (w.r.t. assignment) which can take any form ranging from:

Look at this example:
https://www.yankodesign.com/2022/08/14/this-collapsible-lantern-kit-is-the-only-light-you-need-to-keep-the-darkness-at-bay-indoors-well-as-outdoors/
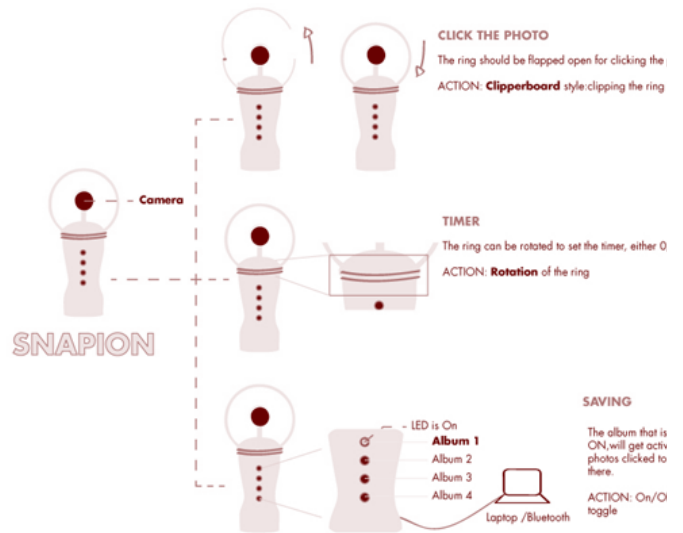
POLICIES

Academic Misconduct
We are morally and procedurally bound by IU's policies on academic misconduct, the details of which you can read about here:
https://handbook.iuhighschool.iu.edu/policies/code-of-student-rights-responsibilites.html

Religious Observation
Students missing class for a religious observance can find the officially approved accommodation form by going to the Vice Provost for Faculty and Academic Affairs webpage for religious accommodations. The form must be submitted at least 2 weeks prior to the anticipated absence.

Title IX and IU's Sexual Misconduct Policy
As your instructor, one of my responsibilities is to create a positive learning environment for all students. Title IX and IU's Sexual Misconduct Policy prohibit sexual misconduct in any form, including sexual harassment, sexual assault, stalking, and dating and domestic violence. 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, you can make an appointment with: The Sexual Assault Crisis Services (SACS) at (812) 855-8900 (counseling services) Confidential Victim Advocates (CVA) at (812) 856-2469 (advocacy and advice services) IU Health Center at (812) 855-4011 (health and medical services) It is also important that you know that Title IX and University policy require me to share any information brought to my attention about potential sexual misconduct, with the campus Deputy Title IX Coordinator or IU's Title IX Coordinator. In that event, those individuals will work to ensure that appropriate measures are taken and resources are made available. Protecting student privacy is of utmost concern, and information will only be shared with those that need to know to ensure the University can respond and assist. I encourage you to visit stopsexualviolence.iu.edu to learn more

COVID
If you have a positive COVID-19 test, have COVID-like symptoms, or have been instructed to quarantine you should not attend class. To ensure that you can do this, attendance in this class will:

- Only be taken to comply with accreditation requirements, or
- Not be taken, or
- Be taken but will be prorated and will not lower a student's grade when that student was absent due to compliance with campus isolation expectations. For those students, alternative assignments or make-ups will be offered on a case-by-case basis.

Please work with your instructor to determine a path to continue your progress in the class during these absences, in whatever way the instructor determines fits within course objectives.

Bias-Based Incident Reporting
Bias-based incident reports can be made by students, faculty and staff. Any act of discrimination or harassment based on race, ethnicity, religious affiliation, gender, gender identity, sexual orientation or disability can be reported through any of the options: 1) email biasincident@indiana.edu or incident@indiana.edu; 2) call the Dean of Students Office at (812) 855-8188; or 3) use the IU mobile App (m.iu.edu). Reports can be made anonymously.