Introduction

SWE233: Intelligent User Interfaces

Daye Nam
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Introductions

Daye Nam

B.S. Yonsei University 2016
M.S. University of Southern California 2018
Ph.D. Carnegie Mellon University 2024
Research Scientist at Google 2024-2025
Assistant Professor at UC Irvine

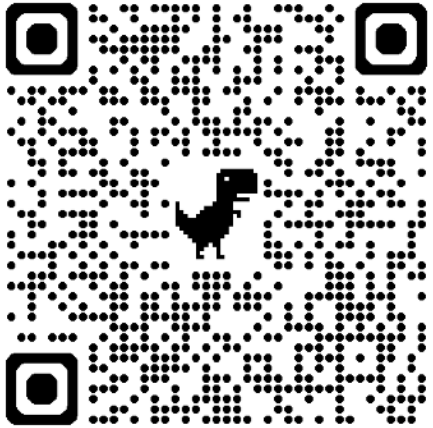
You?

Your (preferred) name
Why are you taking this course?
A fun fact

Activity

Intro survey

https://forms.gle/EJJq5qGcSzhPSZV96



Intelligent User Interfaces

Intelligent User Interfaces

User interface

Everything the user encounters when using a product (e.g., a particular machine, device, computer program, or system)

Intelligent user interface

User interface that is intelligent

Intelligent user interfaces can

complement human capabilities by identifying and augmenting shortcomings in what people can do;

be integrated into the tools that people and organizations already use to structure and carry out their work

Questions we will ask

How can interaction be made clearer and more efficient?
How can interfaces offer better support for their users' plans and goals?
How can informatino be presented more clearly and effectively?
How can the design and implementation of good interfaces be made easier?
…

Questions that have been asked for ~50 years

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- "… It addresses the same questions that have driven research in the gereral area of user interfaces for the past ten years:"

ELIZA

Created by Joseph Weizenbaum in 1964

One of the first natural language interfaces

Knowledge Navigator

Apple concept video from 1987

Created by Hugh Dubberly et al., for a keynote speech of CEO John Sculley

Visily

Google Glass (old version)

Answers to the questions so far

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ELIZA, by supporting a natural language-based interaction and mimizing the necessary domain knowledge (e.g., programming) and cognitive load

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How can the design and implementation of good interfaces be made easier?

Visily, by automatically convert a static image into a fully editable mockup and reducing the user loads

Course Themes

- Foundations of Human-Computer Interaction and UI Design Principles
- User Modeling and Personalization Techniques
- Adaptive and Context-Aware Interfaces
- Conversational AI and Natural Language Interfaces
- Agentic Interfaces and Multi-Step Task Delegation
- Multi-Modal Interfaces (Voice, Gesture, AR/VR)
- Programming by Demonstration and Example-Based Systems
- Research Methods for HCI (Surveys, Interviews, Qualitative Analysis)
- Evaluation Methods for Intelligent UI (A/B Testing, Longitudinal Studies, Wizard of Oz)
- IDEs and AI-Powered Programming Tools
- Debugging and Search Interfaces
- Data Science Workflows and Computational Notebooks
- Explainable AI (XAI) in User Interfaces
- Trust, Transparency, and User Control in Intelligent Systems

Course logistics

Evaluation

80% Research Project
- **5%** Problem Identification
- **25%** Project Proposal
  - Report: 15%
  - Presentation: 10%
- **15%** Prototype Design
- **35%** Final Report
  - Report: 15%
  - Presentation: 10%
  - Holistic evaluation: 10%

10% Paper Presentation
10% In-Class Participation
[Optional] 10% Prototype Implementation

Research Project

A quarter-long project, where you design and prototype an intelligent user interface.

Expected outcome:

A CHI/UIST/ICSE/FSE/ACL/Neurips…
paper *except for* the results

- Abstract
- Introduction
- Literature review
- Methods
- Evaluation
- …

SWE-agent: Agent-Computer Interfaces Enable Automated Software Engineering

"What It Wants Me To Say": Bridging the Abstraction Gap Between End-User Programmers and Code-Generating Large Language Models

Michael Xieyang Liu, Advait Sarkar, Carina Negreanu

Using an LLM to Help With Code Understanding

Daye Nam, Andrew Macvean, Vincent Hellendoorn, Bogdan Vasilescu, Brad Myers

Project (Tentative timeline)

Oct 8: Problem Identification Identify a problem for intelligent UI solution

Oct 27: Project Proposal Literature review and proposed solution

Oct 20&22: Proposal Presentation Present your proposal for feedback

Nov 17: Prototype Design System architecture and interface design

Dec 10: Final Report Complete evaluation methodology

Dec 1 & 3: Final Presentation Showcase your complete project

Paper Presentation & Discussion

We will read and discuss systems with intelligent user interfaces, mainly within the software engineering domain

Presentaion

Each student will present at least one paper over the quarter.
As presenters, you will do a presentation of the paper and connect the paper to many aspects we cover in the first part of the quarter.

Paper selection

You will bid for a paper you want to present in the next class.
Bid for papers that are close to your potential project topic.

Course infrastructures and logistics

Infrastructure/source of truth

- Course website: schedule, slides, syllabus, office hours
- Canvas: homework, grades, other material
- Slack: communication and collaboration (will send you today)

Logistics

- Lecture in-person only
- You are required to attend presentation sessions (proposal/final)
- Office hours: Monday 4:00 pm - 5:00 pm, but flexible