Graphical User Interfaces

Project Stage 1: Prototyping and Evaluation

(20 points out of a total of 100 points for the project)

Goals

The class project is a half-term group project (**teams of 2-3**) that allows you to design and implement a sophisticated, functional, and fun user interface.

For the course project, you are asked to build a simple but realistic website or mobile app (or both). The project allows you to practice several aspects of full-stack web development, including front-end coding using HTML, CSS, JavaScript, and jQuery, and back-end coding using Flask and Python (or Node.js).

In Stage 1, you will make a group and come up with an idea, prototype your interface, and discuss your idea and prototype in small groups during a special class session. The evaluation is based on Nielson's heuristics and usability walkthrough. This stage allows you to receive feedback on your project. Finally, you will submit an evaluation report that integrates the comments you received with your proposal for revising your project. The ultimate goal of this stage is to improve your project through discussion and evaluation.

Project Idea

First, you need to decide on a project idea that you would like to work on. You should note the following as you work out an idea:

- Your final application should be implemented as a full-stack web application, as we have focused on in the lecture, and have the basic functionalities. This means that your application should involve **sessions** & **user authentication**—which includes having a running database for your system and login system. As a part of that, each user should have a portal (e.g., user login) to be able to add or delete data from the database (e.g., enter a new entry in the database). Apart from the basic functionalities, you are allowed to be creative about the projects. However, if you are using something else, you should request approval from the professor.
- All code developed for the project should be new code—that is, you should not build on or extend a system that you may have developed in another context. However, it is perfectly acceptable to import complex packages (e.g., graphical packages or a speech recognizer) to be utilized by your project code, as long as such packages are noted and cited in your final report/presentation.
- Please be realistic with how much you can implement in the course of the term. You have only 4-5 weeks actually to implement the system.
- Although we are not concentrating on the security aspects of the application for this class, feel free to come up with ideas on how you can keep privacy in the system.
- Roughly speaking, your system should have both a significant, interesting interface part and a significant, interesting computational infrastructure behind the interface. On the one hand, an application that focuses solely on GUI/Styling components would likely not do anything interesting; on the other hand, an application that is primarily "computational" (e.g., neural-network training) with the most basic GUI features would not be appropriate for this course. Thus, you should aim for a project where you could imagine approximately half of the code being devoted to GUI construction

and event handling and half of the code being devoted to doing something interesting based on the user's interaction with the system.
- It is acceptable if you like to use any of the front-end frameworks like React, Angular, or Vue.

Project Description

Create a 1-page description for your project as follows:

- Name and email of the group members.
- A **title** for your project. (a catchy title is preferred ;))
- Write one paragraph (5 sentences minimum) describing the users of the system. This should expand on the potential persona(s) of people intended to use the system, what their goals are for using the system, and what constraints may come into play (both limitations of the user and constraints on the task itself).
- Write one paragraph (5 sentences minimum) about the system itself. This should not be an interface sketch/design at this point (since we will do this in Stage 2); instead, it should be a description of what the user is able to do with the system to achieve their goals.
- Write up a project plan that covers:
    - Your potential tech stack, including:
        - Front-end and back-end technologies, plus any libraries or APIs you plan to use.
        - The database you plan to use.
        - Any new technology you're going to learn. Make sure to explain what this technology does and why you choose to use it for this project.
    - Your plan for coordinating your work:
        - How will you share the code?
        - What will each member of your group focus on? Will everyone have a specialty, or will you all share the responsibilities?
        - How will you split up work between members?
    - Lastly, a table that describes, in as much detail as possible, what aspects of the project you plan to implement every week for the remaining 4 weeks.

Please note that you will revise this description into a few slides about your project for the demo. But this first description will allow you to think creatively about the problem you'd like to solve and how you intend to approach this from the users' point of view. It will also give the professor and your classmates a clear summary of the goals of your project.

Interface Prototype

The **interface prototype** is a paper sketch of what your interface looks like. This sketch should include any interface elements you will be producing—that are, all windows, components, etc., with notes about their functionality whenever it is not apparent from the drawing. **It is recommended that you draw the sketch by hand because of efficiency** (if you like to use a computer drawing program or IDE, you should make sure to use a proper rapid prototyping tool like Balsamiq). The interface sketch is intended to convey your interface design to other group members to discuss advantages, disadvantages, and possible improvements; at the same time, the sketch provides a head start on the actual implementation and layout of the interface. All pages/windows, panels, etc., should be represented in your sketches. Also, you should denote the control flow between pages/windows/panels/etc. by means of graphic indications, such as arrows going from one screen to the next, menus showing various options, etc. These sample storyboards serve as good examples of sketches that convey components, layout, and interaction between components (i.e., extra information the programmer needs to understand how the system should respond to user interaction).

Interactive Session and Evaluation Report

To prepare for the special interactive session, you should **have copies of your interface prototype (scanned or pictures** for online students**).** In the interactive session, we will break into groups, and each project will be discussed for a given time (~15 minutes) using a set of evaluation heuristics. In the end, your group has to take note of the comments you received.

Then, after the class, you will have time (a few days) to write an evaluation report (attached) summarizing (1) the comments received about your prototype and (2) what to do to revise the interface and/or code to improve the final product.

Note: All **in-person students** are expected to attend the class so they can participate in both giving and receiving comments for the entire group's projects. In case you are not able to attend this special session, you must email me and explain your excuse. You should have at least one representative for your group for this session. **Online students** can either tune in to the Zoom channel and discuss their project with other students in Zoom (one representative for each group can be enough), or in case no group member can participate, you can do the evaluation with friends and family at home. More details at the beginning of the session.

Submission

By the due date, you have to submit a PDF of your **project description** and **interface prototype**, along with the **evaluation report** written after the class (the details of which will be given at the start of class).

Grading

The material for this stage will be graded based on the completeness, depth, and quality of your interface sketch, implementation diagram, and evaluation report.