CSCI 1320
Creating Modern Web Applications
Lectures 19: HCI I
Homework

• Look at a web site and say what is good and bad
  • From a user's perspective
  • Using a scenario
User Friendly

• Everyone says this is what is needed
  • What does this mean?
  • Examples?
• Is this what you meant with your good/bad points?
What Does User Friendly Mean

- Easy to use
  - For whom
- Nice to look at
  - For whom
- Other Criteria
  - Resilient to mistakes
  - Easy to learn
  - Easy to understand
  - Does what the user expects
PUT THE USER FIRST

• This is the Basic Principle
  • The app is written for the user

• Problems
  • Easy to say
  • Difficult to do
  • Even when you are the user
  • Especially when you are the user

• Don’t Make Me Think
How to Put The User First

• **Principles**
  • Learnability, flexibility, robustness

• **Listen** to users throughout the process
  • **UI design is an iterative process**
  • Should be centered around the user
  • The implementer is a poor example of a user

• **Work in terms of realistic scenarios**
  • Covering the major uses of your application
User (Usability) Testing

• Test the effectiveness of the user interface
  • What is liked or disliked (subjective)
  • Speed and ease of use
  • What errors are made (and the error rate)
• How understandable is the interface
  • What instructions/help is required, what is obvious
• Is the content logical and easy to follow
  • Consistency of navigation and presentation
  • Spelling errors, colors and fonts, English
• Universal usability testing
  • Accessibility testing
  • Internationalization testing
Doing Usability Testing

• **User studies**
  • Watching users use the site (video taping for analysis)
  • Surveys or polls after use
  • Determining what information is needed

• **Log studies**
  • What are the navigation paths? What are the common operations? How are key pages reached?
  • Detecting errors from the logs
  • Timings
  • Using Google Analytics and similar tools

• **Tools and External Sources**
  • [http://www.youtube.com/watch?v=uLyWxXNDNbI](http://www.youtube.com/watch?v=uLyWxXNDNbI)
  • [http://www.youtube.com/watch?v=xLIBe6WmrY](http://www.youtube.com/watch?v=xLIBe6WmrY)
Usability Testing Tools

• **UserTesting**

• **Usage**
  • Develop a well-thought out test first
    • What you want the user to do
    • What questions you want to ask
    • What questions you want answered
  • Sign up: [https://www.usertesting.com/users/sign_up?client=true](https://www.usertesting.com/users/sign_up?client=true)
  • Choose ORDER a TEST
  • Select no more than 3 participants
  • Use code U-BU6 in lieu of payment

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CS132 Lecture 31: Testing
HCI In Web Applications

• Look and feel of the Web Page (Visual)
  • Is it pleasant
  • Does the user focus on the appropriate things

• How the user interacts with the Page (Interactive)
  • Is interaction easy and natural
  • Effort minimization
  • Is interaction safe

• How the user interacts with the overall site
  • Web site navigation
Question

Web site navigation or control flow is not concerned with
A. How users go between pages to accomplish a task
B. The time it takes to complete a multiple-page operation
C. Handling the BACK and FORWARD buttons on a client-heavy application
D. Errors user make in clicking on links on the application’s pages
E. Web site navigation is concerned with all the above
Web Site Navigation

• Navigation is essential to web application
  • It can make or break your application
• Many types of navigation are possible
  • Link to new page
  • Form submission to new page
  • JavaScript-created new page (using AJAX)
  • Frames (iframes) within a page
  • Forward and Back browser buttons
  • Links within a page
  • Shift/Control click on a link
Understanding User Navigation

• How the user will navigate your site
  • For specific tasks
  • For specific pages
  • Based on scenarios

• What is the navigation model provided
  • Where can one go from a page
  • How can one get to a page
  • How are links dependent on history
  • How does this fit with the browser’s capabilities

• This is a central part of web application design
Navigation is Integral

• It controls how the site is used
• It controls what the user can / can’t do
• It ensures that the prerequisites for a page are satisfied
  • Before the page is used
• It ensures that users access your site in a logical way
• It directly affects user satisfaction
• It can easily introduce errors
  • Either actual ones
  • Or ones based on incorrect user expectations
Navigation Link Strategies

- Different navigation strategies
  - All options and sub-options on the left
  - Options link to another page with sub-options
  - Options on top with pull-down menus
  - Options on left with roll-over menus
  - Options on the left as a tree, one node expanded at a time
  - Options on left as a tree, user-defined expand/contract

- Which works best?
Other Navigation Methods

• Filtering
• Search
• Site map
• A-Z index
• Image maps
Designing For Navigation

• User interface design criteria
  • Common sense (do what is logical or expected)
  • Consistency
  • Minimize the possibility for errors
  • Keep the user informed (bread crumbs)

• Don’t make me think
  • Navigation should be obvious
  • Clicking on an object should do the logical thing

• Don’t make me work
  • Minimize the amount of navigation needed
  • Make common operations simple
Other Navigation Guidelines

- Do not create or direct the user to pages with no navigational options
- Clearly differentiate navigational elements from one another
- Group and place them in a consistent and easy to find place on each page
- On long pages, provide a ‘list of contents’ with links that take users to the corresponding content
- Provide feedback to let users know where they are (breadcrumbs)
- Ensure that tab labels are clearly descriptive
- Ensure tabs are located at the top of the page and look clickable
- Do not require users to scroll purely navigational pages
- Use site maps where there are many pages
- Provide ‘glosses’ to help users select correct links
- Do not expect users to use breadcrumbs effectively
Representing Navigation

• How might you describe navigation
  • For a typical web site
  • For your project?
• Typically done as a graph
  • Nodes = pages
  • Links = navigations between pages
    • Labeled with what link does what
• Complications
  • Multiple ways of getting to a page
  • Might go back to referring page
  • Links might be conditional
Representing Navigation

• How complex is the resultant diagram?
  • Is it something you can or want to draw
  • How do you represent user actions (back/forward)
  • How do you represent possible concurrency

• What are the alternatives
  • Draw diagrams for common uses of the application
  • Should have a set of graphs covering all navigations
    • This will tell you what to do in managing links
    • And what links need to be available on each page
  • Represent the graph in another form
    • List of links for each page
    • Harder to get an overview
  • Simplified FSA notations (e.g. StateCharts)
Using Navigation Diagrams

• For design purposes
  • What links have to be available
  • What should happen if the user clicks here?
  • What are the common navigation paths
    • Based on scenarios
    • Can we simplify these

• For implementation purposes
  • What should happen if the user clicks here
  • What is fixed/variable on each page
  • What should the back/forward button do
Client-Side Navigation

• What does the user see if your web app uses AJAX or web sockets?
  • What does forward mean?
  • What does backward mean?
  • What does right-click on a link mean?

• This is a key difficulty with client-side applications
  • Don’t meet the user’s expectations
  • Don’t work well with browsers
  • Encode in the # part of URL
    • Calls to set history, calls to load page
Controlling Navigation

- Control flow is not explicit in HTML or web applications
  - It is implicitly controlled by links
  - Some requires to the server for a particular URL can result in different pages

- Control flow is implicitly controlled by the user
  - Back and forward buttons
  - Multiple copies of a page visible at once
  - Explicit typing of internal URLs

- Client-heavy applications
  - Application has more control, but need to meet expectations
  - Be sure to handle Back and Forward buttons explicitly
  - Need to keep your own history
Navigation Problems

• **Causes “bugs” in web applications**
  • Remember last action, but user clicks on prior page
  • Explicit session id can create security problems
  • Page preconditions might not be met

• **Causes user errors or misconceptions**
  • Multiple shopping carts
Handling Navigation Problems

• Defensive Programming
  • Each page should check the preconditions
  • Ensure you have the necessary information

• Keep the user informed
  • The page should inform the user what the server thinks
  • Make explicit what will happen on a link

• Keep the client and server in sync
  • Automatically update the shopping cart
Next Time

- HCI II: DESIGN (TA Lecture)
Evaluation of Navigation

• What does it mean to have good navigation
  • What are the criteria
  • What might you evaluate

• Criteria
  • Performance (time per task)
  • User satisfaction
  • Error rate

• Results
  • Time per task: no significant differences
  • User satisfaction: no significant differences
  • Error rates: some significantly better
    • All options/sub-options on left; drop downs
Control Flow History

- Problem: dealing with AJAX, Web Sockets
  - Browser only knows that URL changes
  - Page stays the same however
- What can change in the URL without changing page?
- Encode the control flow in #tag part of the URL
  - Set this on AJAX/Socket based changed
  - Handle this when set by browser
Problem

• Suppose we have data about tweets involving the flu
  • Each has a given geolocation
  • Each has a given time

• How would you display them?
  • What should the display look like
  • What should the interaction look like
  • How would the user get there

• How do you start?