Designing Interactive Systems II

Computer Science Graduate Programme SS 2010

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Review: Mobile Window Systems

- **Android**
  - Reasons for fast growth?
  - Sharing application components
  - Activities, Services, Broadcast Receivers, Content Providers

- **iPhone**
  - Advantage of the iPhone OS Architecture?
  - Multitasking in iOS 4?
  - Tracking touches?
Web 2.0
Example: 1.0

- Google Maps w/o Java Script
Example: 2.0

• Google Maps
• Tim O’Reilly and Dale Dougherty at Web 2.0 conference (2004)
• Successful (post dotcom) companies are similar
• Web 2.0 captures this difference
Meme map

- Tagging, not taxonomy
- Rich User Experiences
- Participation
- Enabling the long tail
- Radical Decentralization
- Radical Trust
I. Web as platform
1. The Web as a platform
2. Harnessing Collective Intelligence

The Web 2.0 Architecture of Participation:
“People in the Machine Nurture the Cloud”
3. Data is the next Intel

- Web 2.0 sites have sophisticated databases with valuable information.
- Open APIs for non-commercial use.
- Google Maps API
  http://www.google.com/apis/maps/
4. End of the software cycle

- Software must be maintained on a daily basis
- **Real-time** DIA cycle
- Users are treated as co-developers
  - Perpetual beta
5. Lightweight Programming Models

- Simplicity in APIs
- Generates new interesting applications of software
- Barrier to entry is low
5. Software above the level of single device

- Web offers a common point for many different devices.
- PC as mediator between web and mobile device
- Leverage the power of the Web platform
  - Web becomes invisible
6. Rich User Experience

• Full scale applications
• Fluid movements are appealing
• (Re)implementation on the web vs. specialized desktop applications
Exercise

• Thinking of the design principles we’ve just discussed, think of a website that demonstrates properties of Web 2.0. Provide examples where this site uses these properties. Be prepared to discuss them.

• Web as a platform
  Harnessing Collective Intelligence
  Data is the next Intel
  End of the software cycle
  Lightweight programming models
Tag Clouds

- wordle.com
Enhanced Image Loading

- Photosynth and Seadragon
• Asynchronous JavaScript + XML

• What is Ajax?
  • Standards (W3C) using XHTML & CSS
  • Dynamic Display and Interaction using the Document Object Model (DOM)
  • Asynchronous data retrieval: XMLHttpRequest
  • JavaScript is the glue
Architecture

![Diagram showing the comparison between classic web application model and Ajax web application model.](image)
Interaction Model
AJAX: Implications

• High Interactivity: Rich Applications.
• Usability?
  • Expert Users (coders).
    - How will this affect the Long Tail?
    - Accessibility not being considered
    - Changed Web behavior
Google Web Toolkit (GWT)

- Build AJAX apps in Java
  - http://code.google.com/webtoolkit/
- GWT takes care of client-server communication
Developing for the GWT

• **Using Java**
  • Known development process
  • Easy to understand concepts (**events**, **listeners**)
  • Simple distinction between **server** and **client** side code
  • Translation into **high performance** AJAX code

• **Abstraction** of complex processes
  • Image Caching
  • Remote Calls
Model-View-Presenter

- Strict decoupling of Model and View
- Contrast to MVC
Prototype JS + Script.aculo.us

- Object-oriented browser-independent JavaScript Framework (PrototypeJS)
- User Interface Widgets and Effects (Scriptaculous)
What is Cappuccino

• Application development framework
• Build web-based applications
• Introduces new language: Objective J
• Two frameworks: AppKit and Foundation
From Web to Desktop

- Mozilla Prism
- NativeHost
- MS Office Live
- iWork.com
- eyeOS
- Chrome OS
Objective J

- Strict superset of JavaScript
- Compiled at runtime in the browser
- Adds inheritance, message calls, delegation
- Undo/Redo manager, Layer-backed views

```objc
- (void)applicationDidFinishLaunching:(NSNotification*)aNotification {
    var theWindow = [[CPWindow alloc]
                    initWithContentRect:CGRectMakeZero()
                    styleMask:CPBorderlessBridgeWindowMask],
        contentView = [theWindow contentView];
    [theWindow orderFront:self];
}
```
Cappuccino

Drag a page onto a widget to make a link.

Welcome!

Start typing at any time to search. Add your widget to the page.

Double click to edit text!
Cappuccino Demo
Atlas (beta)

- Cappuccino IDE
- Written in Cappucino
- Code editor
- Interface builder
- Standalone application for OS X
HTML 5
Evolution of Web Technologies

- HTML 1991
- HTML 2 1992
- CSS + JS 1996
- HTML 4 1997
- CSS 2 1998
- XHTML 2000
- AJAX 2005
- HTML 5 2009
New JavaScript Selectors

Finding elements by class (DOM API)

```javascript
var element = document.getElementById('section1');
element.focus();

var elements = document.getElementsByTagName('div');
elements[0].focus();

var elements = document.getElementsByClassName('section');
elements[0].focus();
```

Finding elements by CSS syntax (Selectors API)

```javascript
var elements = document.querySelectorAll("ul li:nth-child(odd)"antha);

var elements = document.querySelectorAll("table.test > tr > td");
```
// use localStorage for persistent storage

// use sessionStorage for per tab storage

textarea.addEventListener('keyup', function () {
    window.localStorage['value'] = area.value;
    window.localStorage['timestamp'] = (new Date()).getTime();
}, false);

textarea.value = window.localStorage['value'];
//Web SQL
var db = window.openDatabase("Database Name", "Database Version");
db.transaction(function(tx) {
    tx.executeSql("SELECT * FROM test", [], successCallback, errorCallback);
});

//Application Cache API
<html manifest="cache-manifest">
window.applicationCache.addEventListener('checking', updateCacheStatus, false);

CACHE MANIFEST

# version 1
CACHE:
/html5/src/refresh.png
/html5/src/logic.js
/html5/src/style.css
/html5/src/background.png
Web Workers

//main.js:

var worker = new Worker('extra_work.js');
worker.onmessage = function(event) { alert(event.data); };

//extra_work.js:

// do some work; when done post message.
postMessage(some_data);
```javascript
var socket = new WebSocket(location);
socket.onopen = function(event) {
    socket.postMessage("Hello, WebSocket");
}
socket.onmessage = function(event) { alert(event.data); }
socket.onclose = function(event) { alert("closed"); }
```
Drag’n’Drop, Geolocation

//Drag’n’Drop
document.addEventListener('dragstart', function(event) {
    event.dataTransfer.setData('text', 'Customized text');
    event.dataTransfer.effectAllowed = 'copy';
}, false);

//Geolocation
if (navigator.geolocation) {
    navigator.geolocation.getCurrentPosition(function(position) {
        var lat = position.coords.latitude;
        var lng = position.coords.longitude;
        var options = { position: new google.maps.LatLng(lat, lng) }
        var marker = new google.maps.Marker(options);
        marker.setMap(map);
    });
}
HTML5 Audio & Video

```html
<audio src="sound.mp3" controls>
    <source src="sound.mp3" type="audio/mpeg"/>
    <source src="sound.ogg" type="audio/ogg"/>
    Your browser does not support the audio element.
</audio>

document.getElementById("audio").muted = false;

<video src='movie.mp4' autoplay controls>
    <source src="movie.mp4" type="video/mp4"/>
    <source src="movie.ogg" type="video/ogg"/>
    Your browser does not support the video element.
</video>

document.getElementById("video").play();
```
<canvas id="canvas" width="838" height="220"></canvas>

<script>
var canvasContext = document.getElementById("canvas").getContext("2d");
canvasContext.fillRect(250, 25, 150, 100);

canvasContext.beginPath();
canvasContext.arc(450, 110, 100, Math.PI * 1/2, Math.PI * 3/2);
canvasContext.lineWidth = 15;
canvasContext.lineCap = 'round';
canvasContext.strokeStyle = 'rgba(255, 127, 0, 0.5)';
canvasContext.stroke();
</script>
/* Loading fonts */
@font-face {
    font-family: 'LeagueGothic';
    src: url(LeagueGothic.otf);
}

@font-face {
    font-family: 'Droid Sans';
    src: url(Droid_Sans.ttf);
}

/* Text Wrapping */
div {
    text-overflow: ellipsis;
}

/* Text Columns */
-webkit-column-count: 4;
-webkit-column-rule: 1px solid #bbb;
-webkit-column-gap: 2em;

The quick brown fox...
Opacity, HSL, Rounded Corners

/* Opacity */
color: rgba(255, 0, 0, 0.88);
background: rgba(0, 0, 255, 0.80);

/* HSL Color Model */
color: hsla(128,75%, 33%, 1.00);

/* Rounded Corners */
border-radius: 39px;
/* Transitions */
box {
    -webkit-transition: margin-left 1s ease-in-out;
}

/* Transforms */
-webkit-transform: rotateY(45deg);
-webkit-transform: scaleX(25deg);
-webkit-transform: translate3d(0, 0, 90deg);
-webkit-transform: perspective(500px)
CSS Animations

```css
@-webkit-keyframes pulse {
  from {
    opacity: 0.0;
    font-size: 100%;
  }
  to {
    opacity: 1.0;
    font-size: 200%;
  }
}

div {
  -webkit-animation-name: pulse;
  -webkit-animation-duration: 2s;
  -webkit-animation-iteration-count: infinite;
  -webkit-animation-timing-function: ease-in-out;
  -webkit-animation-direction: alternate;
}
```
Conclusion

- It's good usability to make interfaces more reactive.
  - Web 2.0 approach offers tricks to provide it in a faster way
- Offers a richer experience in the web browser
- It’s a continuum (Desktop Application versus Web Browser vs. hosting data online for mobile access)
  - “Computing in the Cloud”
- Still have basic usability issues in websites
  - Jeff Johnson: Web Bloopers