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?

Example: 1.0

- Google Maps w/o Java Script
Example: 2.0

- Google Maps

Origin

- Tim O'Reilly and Dale Dougherty at Web 2.0 conference (2004)
- Successful (post dotcom) companies are similar
- Web 2.0 captures this difference

1.0 vs 2.0

Meme map

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

Google

2. Harnessing Collective Intelligence

The Web 2.0 Architecture of Participation:
“People in the Machine Nurture the Cloud”

- 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/

3. Data is the next Intel
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

AJAX

• 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
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)

Cappuccino
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

```objective-j
- (void)applicationDidFinishLaunching:(CPNotification)aNotification
  {
    var theWindow = [[CPWindow alloc]
      initWithFrame:CGRectMakeZero(),
      styleMask:CPBorderlessBridgeWindowMask],
      contentView = [theWindow contentView];
    [theWindow orderFront:self];
  }
```
Cappuccino Demo

Atlas (beta)

- Cappuccino IDE
- Written in Cappuccino
- Code editor
- Interface builder
- Standalone application for OS X
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('section');
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)");
var elements = document.querySelectorAll("table > tr > td");
```
**Web Storage**

```javascript
// 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, Application Cache**

```javascript
//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:
/favicon.png
/html5/src/logic.js
/html5/src/style.css
/html5/src/background.png
```

**Web Workers**

```javascript
//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);
```

**Web Sockets**

```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

```javascript
// 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></audio>
document.getElementById("audio").muted = false;

<video src='movie.mp4' autoplay controls></video>
document.getElementById("video").play();
```

HTML5 Graphics

```html
<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>
```

Typography with CSS

```css
/* 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;

CSS Transitions

/* 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

@-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