Achieving a Safe and Seamless User Experience Through Accessible Web Applications

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Topics

- Accessibility-based solutions to improve safety
- Implementation via accessibility APIs
- Applicable standards and existing support

Accessibility-Based Solutions to Improve Safety

Safety First?

9 November 2012

“Off-duty officer killed, Cal Trans flagger seriously hurt in chain reaction crash.... Cal Trans said the accident was likely caused by a distracted driver."

8 November 2012

“Police say a distracted driver caused a head-on crash.... The driver of the second truck and his passenger had to be extricated from the vehicle by firefighters."

3 November 2012

“Authorities say a driver distracted by his cell phone caused a head-on crash that killed an elderly man and seriously injured an elderly woman in central California."

31 October 2012

“An eastern Utah man was charged Wednesday with hitting and killing a Vernal teenager with his car while texting behind the wheel.”

"In 2010, 3092 people were killed in crashes involving a distracted driver and an estimated additional 416,000 were injured in motor vehicle crashes involving a distracted driver."

U.S. National Highway Traffic Safety Administration

Hands-Free via Speech Input

For:

- Users who ***cannot*** use a keyboard and/or touch screen (i.e. due to disability)
- Users who ***should not*** use a keyboard and/or touch screen (i.e. due to driving)

Eyes-Minimal via Simplified UI

For:

- Users who ***have difficulty*** visually accessing screen contents (i.e. due to disability)
- Users who ***have difficulty*** visually accessing screen contents (i.e. due to driving)

Eyes-Free via Speech Output

For:

- Users who ***cannot*** visually access screen contents (i.e. due to disability)
- Users who ***should not*** visually access screen contents (i.e. due to driving)

Eyes-Free via Gestures

For:

- Users who ***cannot*** activate on-screen elements directly (i.e. due to disability)
- Users who ***should not*** activate on-screen elements directly (i.e. due to driving)

"Since driving ... is primarily a visual-spatial-motor task, it is predicted (and observed) to be fairly efficiently time shared with tasks that are auditory and language based."

Models of Attention, Distraction, and Highway Hazard Avoidance

Implementation via Accessibility APIs

Accessibility APIs

Accessibility APIs allow you to interact with applications programmatically on behalf of the end user.

Example: Remember the Milk

1. Remember The Milk displays an alert that the driver is in an area with an associated task.

2. Device checks the car's speed to be sure it is safe, then speaks the displayed alert.

3. Driver says “No” to indicate he does not want to be given navigation directions.

4. Device clicks on the “No” button for the driver.

Accessibility API Events

- Focus changes
- Selection changes
- Text changes
- Value changes
- Visual appearance changes
- Addition and removal of new objects
- Etc.

Accessibility API Actions

- Press, release, and click on a button
- Toggle the state of a widget
- Drag and drop an item
- Etc.

Accessibility API Interfaces

- Application
- Component
- Desktop
- Document
- Hypertext
- Image
- Selection
- Streamable Content
- Text
- Editable Text
- Table
- Value

Accessibility API Use Cases

- Provide access to users with disabilities
- Automated testing
- (Distraction-free access for drivers?)

Requirements

- Developers: create accessible web apps.
- Layout engine: implement accessibility support for the platform.
- Platform: provide a means to expose that support to end-user tools.

Applicable Standards and Existing Support

For Web Application Developers

W3C Mobile Web Initiative

- Mobile Web Best Practices
  http://www.w3.org/TR/mobile-bp

- Mobile Web Application Best Practices
  http://www.w3.org/TR/mwabp

For Web Application Developers

W3C Web Accessibility Initiative

- Mobile Accessibility Overview
  http://www.w3.org/WAI/mobile/Overview.html
- Web Content Accessibility Guidelines
  http://www.w3.org/TR/WCAG20
- Accessible Rich Internet Applications (ARIA)
  http://www.w3.org/TR/wai-aria

For Web Application Developers

W3C HTML Speech Incubator Group

- Speech Input API Specification
  http://lists.w3.org/Archives/Public/public-xg-htmlspeech/2011Feb/att-0020/api-draft.html
- HTML Text to Speech (TTS) API Specification
  http://lists.w3.org/Archives/Public/public-xg-htmlspeech/2011Feb/att-0022/htmltts-draft.html
- Speech JavaScript API Specification
  http://lists.w3.org/Archives/Public/public-webapps/2011OctDec/att-1696/speechapi.html
- Final Report
  http://www.w3.org/2005/Incubator/htmlspeech/XGR-htmlspeech/

Layout Engines Supporting ARIA

- Trident
- WebKit
- Gecko
- Presto

Choosing One

- Trident
- WebKit
- Gecko
- Presto

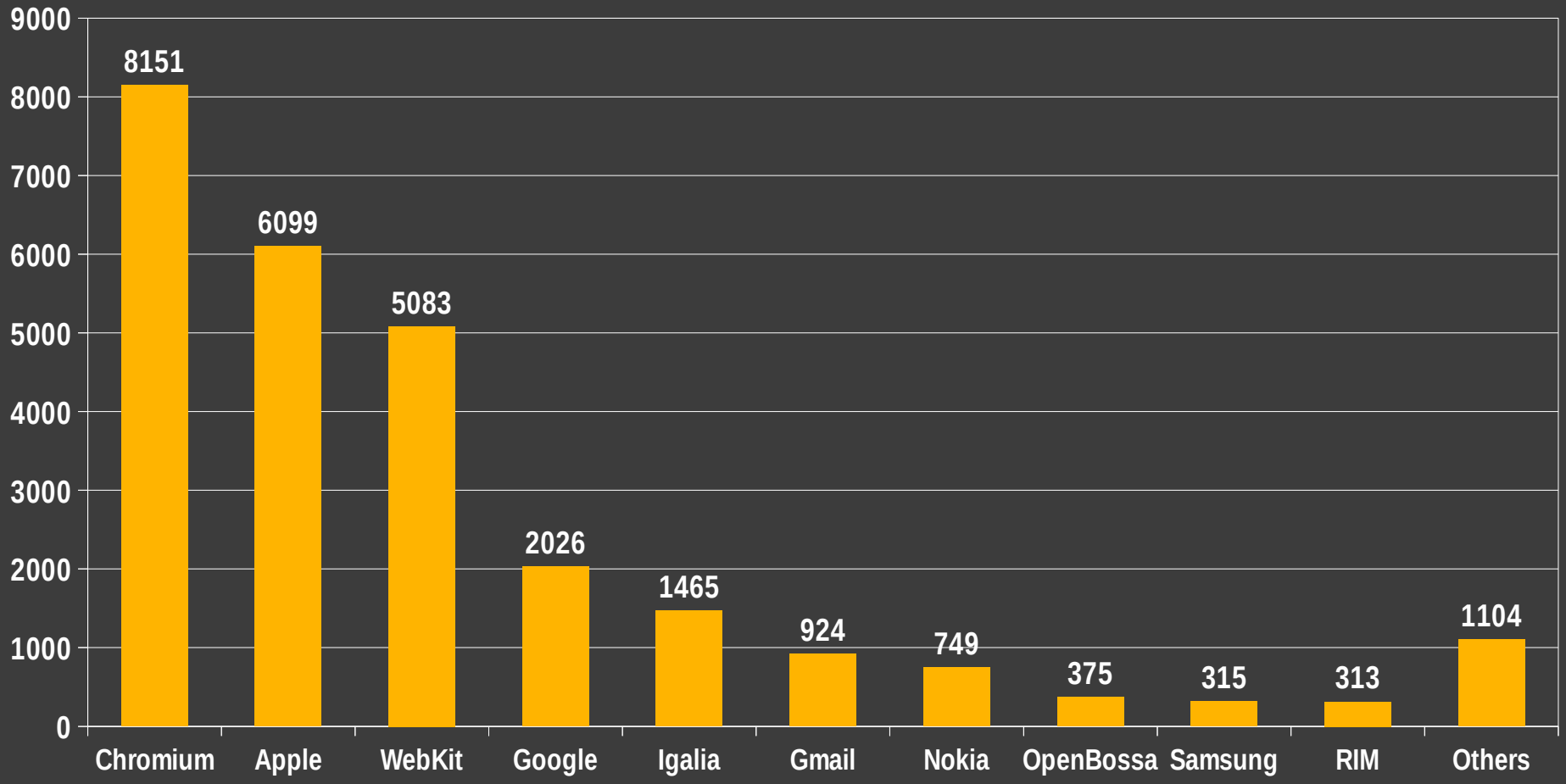
WebKit: Free as in Freedom

- Primarily BSD-style and LGPL licenses
- http://svn.webkit.org/repository/webkit/trunk

WebKit: Embedded-Friendly

- Desktop (Safari, Chromium, Epiphany, etc.)
- iPhone, iPad, iPod Touch
- Android
- Palm Pre
- Amazon Kindle
- Others

WebKit: Developer Community



Commits Per Affiliation in 2011

WebKit: Accessibility

- Mature, platform-independent core support
- Adaptations from WebCore to platform, e.g.:
  - Macintosh
  - Chromium
  - GTK
  - EFL
  - Qt
  - Win

The Indie UI Working Group

"The mission of the Indie UI Working Group ... is to develop event models for Application Programming Interfaces (APIs) that facilitate interaction in Web applications that are input method independent, and hence accessible to people with disabilities."

W3C Web Accessibility Initiative

Indie UI Working Group Members:

- Access Co, LTD
- Apple
- Google
- IBM
- Institut Telecom
- Nokia
- Opera
- Univ. Catholique de Louvain
- Univ. of Manchester
- Invited (accessibility) experts

Representation from the Automotive Industry?
http://www.w3.org/WAI/IndieUI/participation

Summary

- In-vehicle device applications can be used more safely via alternative input and/or output.
- The alternatives are quite similar to, and may even be thought of as, assistive technologies.
- Accessibility APIs and standards for accessible web applications are established and being used.
- The automotive industry should evaluate this solution.

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Questions?

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