



MICHIGAN STATE

UNIVERSITY

Project Plan

Multi-Touch Gestures for Mac OS X Firefox

The Capstone Experience

Team Mozilla

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*From Students...
...to Professionals*

Project Overview

- Improve current Mac OS X Firefox multi-touch gesture support by introducing the following gestures:
 - Rotate
 - Pinch
 - Double Tap



Functional Specification

- Overview of gesture capabilities:

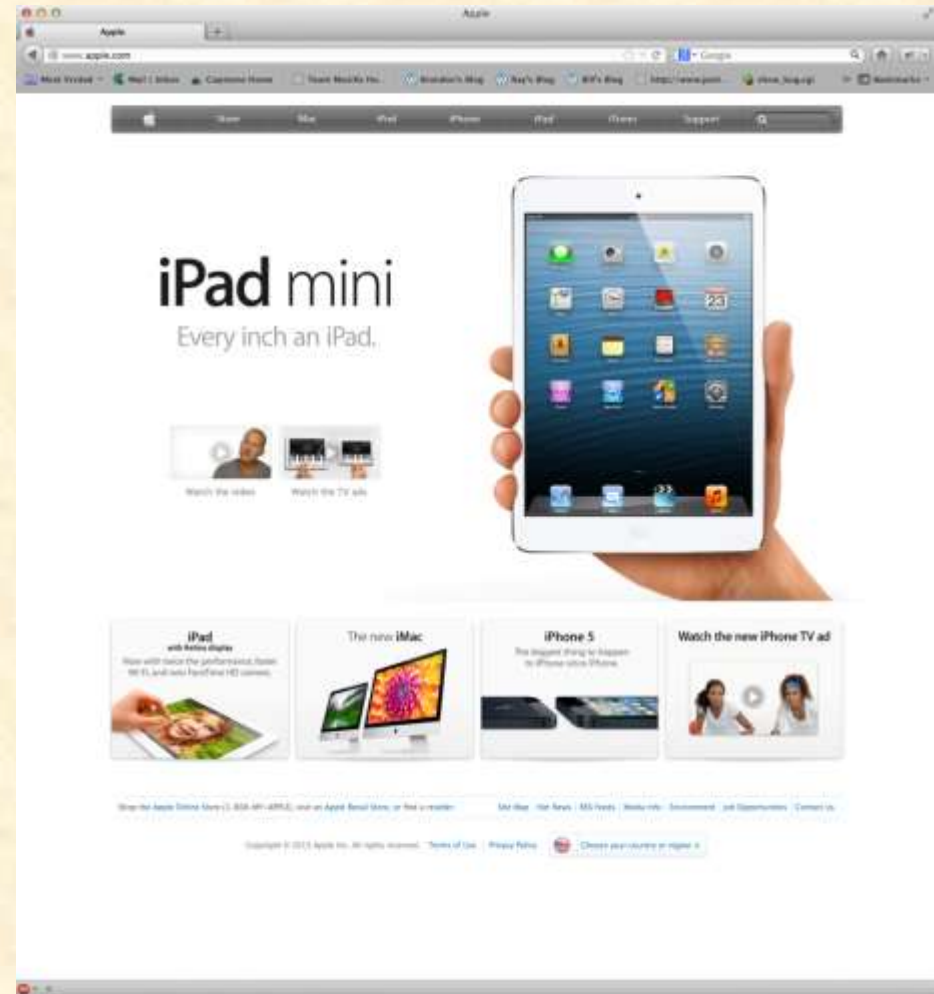
Gesture	Image	Video	Webpage
Rotate	X		
Pinch	X	X	X
Double Tap	X	X	X



Regular Document

- Typical webpage

- Text
- Images
- Links
- Tables



Synthetic Document

- Single object wrapped by synthetic HTML
 - JPEG image
 - Quicktime .MOV video



Functional Specifications: Rotate Gesture

- Rotate gesture will allow the user to rotate a synthetic document's image content
- The image must:
 - Rotate along with the user's gesture movement in such a way that is natural
 - Snap to the nearest 90 degree orientation after the gesture terminates



Functional Specifications: Pinch Gesture

- Pinch gesture will enable the user to zoom in or out of a synthetic or regular document's content
 - Zoom is as smooth and natural as possible
 - When gesture terminates, no additional action is taken



Functional Specifications: Double Tap Gesture

- Double tap gesture will allow the user to zoom in on a synthetic or regular document
 - Zoom in is:
 - Centered at position of the cursor
 - Similar to pinch to zoom
 - If gesture is repeated, zoom is reset to default value

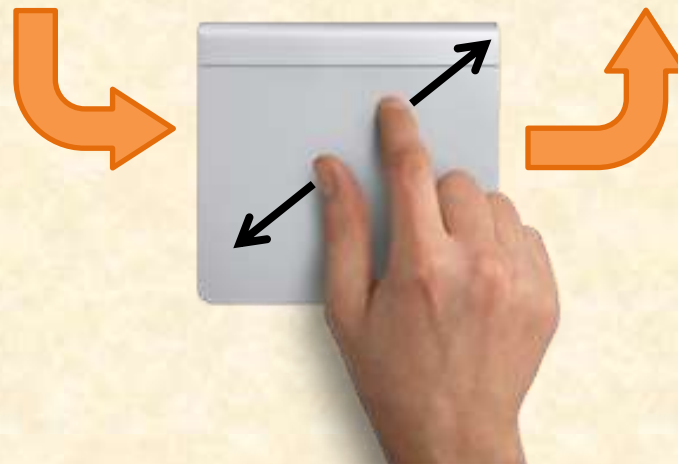


Design Specifications

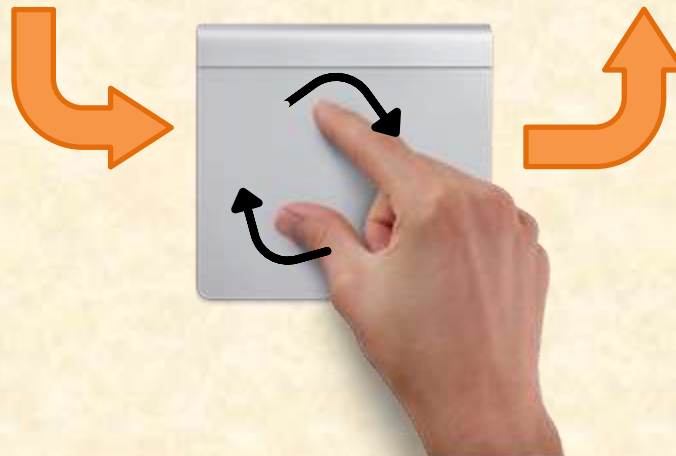
- Gestures will be detected by the Apple Trackpad
 - Magic Trackpad for Desktop
 - Built-in Trackpad on Macbook
 - Recognized by Mac OS X



Screen Mockup: Pinch Gesture



Screen Mockup: Rotate Gesture



Screen Mockup: Double Tap Gesture

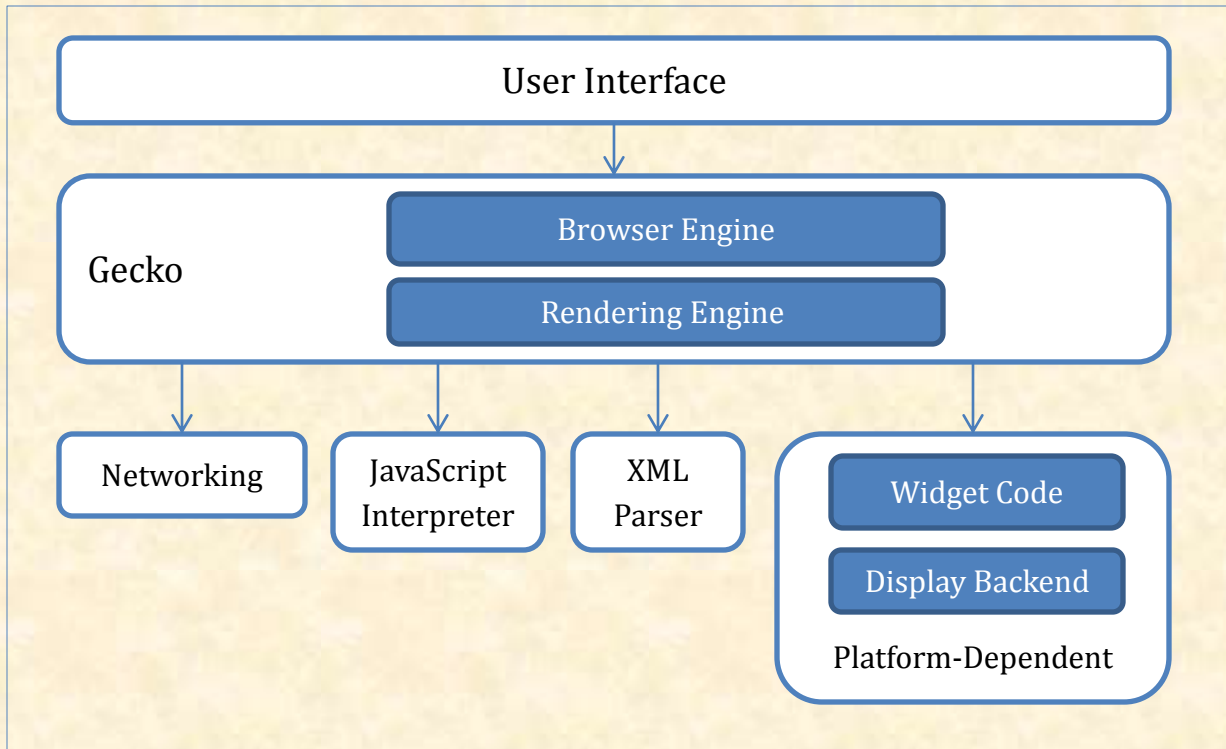


Technical Specifications

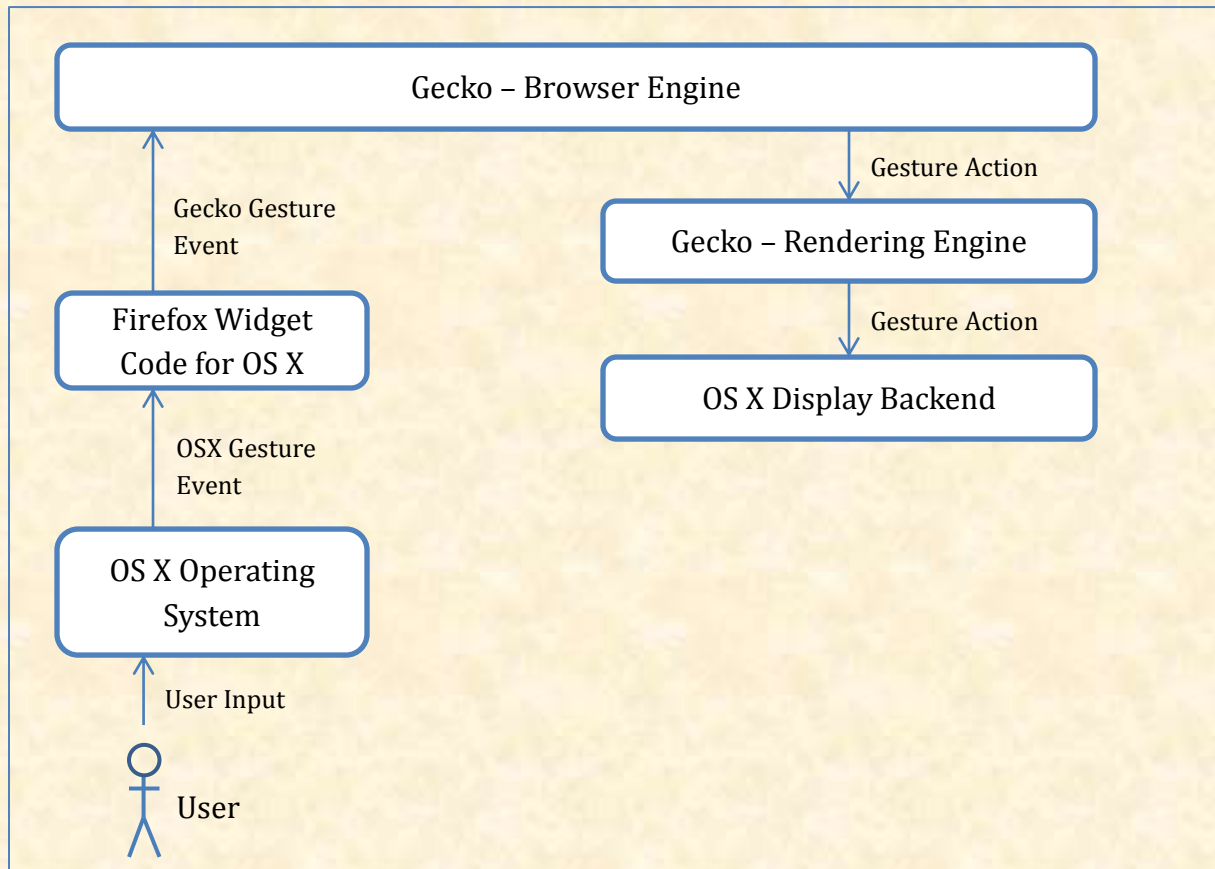
- Languages
 - JavaScript
 - CSS
 - Objective-C
 - C++



System Architecture



Gesture Event Data Flow



Technical Specification

- Zooming
 - Full zoom management feature included in Gecko
 - Screenshot of page to scale
 - Pinch to zoom requires:
 - Ability to trap event in the browser engine
 - New zoom amount
 - Translate screenshot based on center of gesture
 - Re-render after gesture terminates



Technical Specification

- Rotation
 - Framework and functions exist
 - *CSS transform* property
 - *CSS transition* property
 - Rotation gesture event records rotation delta



System Components

- Hardware Platforms
 - Apple Magic Trackpad
 - Built-in trackpad on Macbook
- Software Platforms / Technologies
 - Mac OS X
 - Mozilla Firefox



Testing

- Write scripts to automate testing of gestures
 - Generate random combinations of gesture input
 - Test gesture
 - Record results, alert any error or unexpected results
- Manually test gestures when debugging
- Get feedback from Mozilla community
- Classmates to briefly test gestures



Risks

- Understanding Firefox architecture
 - Browser is complex, need solid understanding to work well
 - Mitigation: Ask community, study data flow
- Coding standards
 - Mozilla has high code quality standards
 - Mitigation: Write good code up-front, understand standards
- Writing our own tests
 - We'll likely need to write test code to test our features
 - Mitigation: Look at test code for full zoom and other features

