Development of Mobile Applications for New Media

Luiz Velho
IMPA

Outline

- Meta-Media
- Mobile Applications
- Three Case Studies

A Revolution in Process

- Informatics + Telecommunications
- Digital Content
- Interactive Interfaces
- Virtual Communities
- Big Data
- Internet Services

New Media
<Meta-Media>

Trends in Hardware

- Processing
  - Parallelism
- Memory
  - Unlimited
- Network
  - Pervasive
- Data (I/O)
  - High Fidelity

Software Perspectives

- Interoperability
  - Standards
- Distributed Computing
  - Agents
- Smart Interfaces
  - Avatars
- Augmented Reality
  - Immersion
Product Directions

• Ubiquity
  - Various Kinds

• Portability
  - Miniaturization

• Connectivity
  - Multimodal

• Design
  - Form and Function

Meta-Media

Challenges

• Integration
  - Technologies / Data / Areas

• New Paradigms
  - Computation / Languages / Interface

• Application Context
  - Personal Satisfaction
  - Social and Cultural Insertion
  - Business Models

Mobile Applications

What's Different Now?

• Desktop

• Web

• Mobile

Ecosystem

Specifics of Mobile Apps

• Portable
  - Phone / Tablet / Watch / …

• Networked
  - Cellular / Wifi / Bluetooth

• Sensors
  - GPS / Accelerometer / Compass

• Media
  - Cameras / Audio / Display
A New Platform

- Ubiquitous
  - Outdoors / Indoors / Vehicle
- Natural Interface
  - Multitouch / Proximity
- High Quality A/V
  - Stereo Sound / HD Video / Megapixel Photo

Interactive Media Devices

- Gesture / Sketch Interaction
- Real-Time 3D Graphics
- Pictures / Movies
- Music / Podcast
- Rich Text

Graphics & Vision

- Games
- Augmented / Virtual Reality
- Computational Photography
- Media Authoring / Performance
- Social Networks

Our Focus - New Media

Themes

- Art / Entertainment
- Navigation / Travel
- Music / Photo
- Social

Methodology

App Lifecycle

- Design
- Development
- Testing
- Deployment
- Maintenance

The Real Picture

- Feedback Loop

Make
Learn
Show

Idea

case studies...
Case Studies

App Frameworks

- Music
  - Blues Machine
  - Lattice
- Exploratorium
  - Botanic
- Exhibits
  - Tom Jobim: Music & Nature
  - Olhar 3D

New Music Instrument

- Two-Dimensional Tiling
- Multi-Touch

Short jingle in G (minor pentatonic scale) performed in Lattice
Blues Machine
- iTable
- iPhone

Lattice
- iPad

The Botanic App
- Tom Jobim and Botanical Garden

Genesis
- The Book
The Book

- "My Beloved Botanical Garden"

Motivation

- Research
  - new media

- Experimentation
  - mobile platforms

- Practice
  - real apps

  (innovation cycle)

Why

- Macro / Micro Navigation
  - Botanical Garden (JB-Rio)

- Rich Media Content
  - Tom Jobim Space (IACJ)

What

- Information
  - Visitor’s Guide

- Navigation Tool
  - Map / Tours

- Data Collection
  - Photos / Notes

How

- Functionality
  - Information / Exploration / Sharing

- Multimedia Content
  - Poetry / Music / Photos

- Design Choices
  - iOS / iPhone

Design

- Concept

- UI Design

- Visual Style
Concept

- Inspire / Explore / Share

User Interface - I

- Basic Structure

- Flow

User Interface - II

- Complete Structure

Visual Style I

- Element Design Evolution (ex: Map View)

Visual Style II

- iOS 6
- iOS 7

R&D

- Maps
- Augmented Reality
- 360° Panoramas
- Media & Animation
Maps - I

- No available GIS data!

Maps - II

- Construction Steps

Augmented Reality - I

- Spatial Orientation
  - All Sites

- Turn-to-Turn Navigation
  - Selected Site

Augmented Reality - II

- Software Architecture
  - UIKit (camera)
  - CoreMotion (sensors)
  - OpenGL (graphics)

  - Labels on Screen

360° Panoramas - I

- Interactive Augmented Reality

360° Panoramas - II

- Representation and Rendring
Animation - I

- "Uber Media" Engine
  - Sequence of Image Based Animations (Ken Burn's Effect)
  - Transition Between Animations
  - Synchronized Audio
- Simple Authoring Language
  - Key-Frame based

Animation - II (example)

Future Directions

- Institutional Content
- Data Management
- Content Authoring
- Social Network

Expo Framework

Architecture

- Micro-Location
  - iBeacons
- Content
  - WiFi (Streaming)
- Authoring
  - State Machine
iBeacons

- Region Monitoring
  - Notifications (enter and exit Exhibit)
- Beacon Ranging
  - Proximity (Expo Areas)

Expo Flow

- Approach: Welcome
- Entrance: Book Signing
- Idle: Browse, etc
- Areas: Content-Dependent Interaction
- Exit: Send Info

Exhibit State Machine

- outside
- check in
- idle
- enter
- in spot
- finish
- check out

Events
- monitoring
- ranging
- user action

Area State Machine

(Example - play content)

In X

Events
- start play
- stop play

Expo Data Model

- User
  - name
  - email
  - visits [*]
  - items [*]
- Visit
  - date
  - duration
  - spots [*]
- Spots
  - name
  - time in
  - duration
  - visit *
- Items
  - name
  - contents
  - etc …