Android UI design and what HCI has to do with it

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What is HCI?
• A discipline concerned with
  – the design, evaluation and implementation
  – of interactive computing systems for human use and with
  – the study of major phenomena surrounding them
• Design of interactive systems that are:
  – enjoyable to use, that do useful things and that enhance the
    lives of the people that use them.
  – the five-E: effective, efficient, engaging, error tolerant, easy
    to learn.
• Methods for:
  – capturing what people want to do rather than just what the
    technology/designer can do
  – understanding how to translate from what people wants to
    good design
  – involving people in the design process
  – designing for diverse users and uses

HCI processes

Requirements
Integration/implementation
Controlled & in-context evaluations
Evaluation/User Involvement
Analysis
Conceptual Design
Physical Design
Design theories & guidelines, interface inspection
Prototyping technique, dialogue, heuristics
Scenario, persona task analysis
Inquiry techniques (interview, focus group, ethnography etc)

Design Process

Early design
Brainstorm different representations
Choose a representation
Rough out interface style
Task centered walkthrough and redesign
Fine tune interface, screen design
Heuristic evaluation and redesign
Usability testing and redesign
Limited field testing
Alpha/Beta tests

Low fidelity prototypes
High fidelity prototypes
Completed system

Scope = user tasks supported

Surface
Skeleton
Structure
Scope
Strategy

goals:
One-handed interaction
Basic search
Basic interactions

Requirements:
enter numbers
enter text
formulas
format cells
filter
aggregate
graph data
save data
import data
print

user tasks:

Scope = user tasks supported

Surface
Skeleton
Structure
Scope
Strategy
Structure = Dialog progression

Surface
Skeleton
Structure
Scope
Strategy

Skeleton = Screen Layout and Functional Compartments in the Screen

Surface
Skeleton
Structure
Scope
Strategy

Surface = Visual Design Aspects

Surface
Skeleton
Structure
Scope
Strategy

Visual Design

Lo-fi prototypes

Android UI
- Developed by and for Android User Experience Team
- At http://developer.android.com/design
- Provides suggestions to maintain consistent feel and look with other apps.
  - Home, all apps, recent screen
  - System bars: status, navigation combined
  - Notification

Storyboards

Wireframes

Physical design

Screen
Common App UI: Action Bar
- A dedicated space at the top of each screen that is generally persistent throughout the app.
- Make important actions (such as New or Search, etc) prominent and accessible in a predictable way.
- Consistent navigation and view switching within apps.
- Four main components:
  - App icon: app identity, UP caret if the app is currently not displaying the top-level screen
  - View control: for view switching (drop down menus vs. tabs)
  - Action buttons: for the most important actions
  - Action overflow: the not-so-important actions

Action Bar (cont.)
- Layout consideration: main, top, bottom
- Contextual Action Bars
  - Temporary, overlays the app’s action bar for the duration of a particular sub-task.
  - Usually for acting on selected data.
- Tabs
  - Scrollable: the entire width of the bar, with the currently active view item in the center
  - Spinner: a drop-down menu allows users to switch views
  - Fixed

Android Design Principles
- Ice Cream Sandwich (Android 4.0) marks a major milestone for Android UI design
  - A new font, Roboto, for high-resolution displays
  - Support for phones without physical buttons
  - Swipe to dismiss notifications, tasks, and browser tabs
  - Designed for accessibility (e.g., explore-by-touch)
  - Richer gestural vocab. (e.g., clockwise square from upper left activates all accessibility features and loads a setup tutorial)
- Three overarching goals
  - Enchant me
  - Simplify my life
  - Make me amazing

Enchant Me
- Delight me in surprising ways
- Real objects are more fun than buttons and menus
- Let me make it mine
- Get to know me

Simplify My Life
- Keep it brief
- Pictures are faster than words
- Decide for me but let me have the final say
- Only show what I need when I need it
- I should always know where I am
- Never lose my stuff
- If it looks the same, it should act the same
- Only interrupt me if it’s important

Make Me Amazing
- Give me tricks that work everywhere
- It’s not my fault
- Sprinkle encouragement
- Do the heavy lifting for me
- Make important things fast

Insert SIM card
Turn off your phone, remove the battery, and carefully insert your SIM card with the gold contact side down. The cut-off corner should end up furthest away from the battery.
Mobile UI Design Guidelines

• Smartphones ≠ Desktop Computers
  – Smaller screen size
  – Different usage scenarios
  – Different use cases
  – Different input modalities
• Smartphone users are mobile, and multitasking
• The following are generic UI design guidelines for mobile app (not just Android)

1. Use Native UI Components

Description:
- Render screens using UI objects found in the native component set wherever possible/feasible

Benefits:
- Shorter development time
- Feel like a native app

2. Inherit Global Font Settings

Description:
- Do not create absolute, application-specific font settings
- Inherit system/user defined settings

Benefits:
- “Look” like a native app
- Enable use by persons who may need specific settings

3. Manage Color & Contrast Usage

Description:
- Maximize color contrast levels between background, foreground and adjacent UI objects (7:1 or greater)

Benefits:
- Enable use in high glare scenarios
- Enable use by persons with visual impairments

4. Manage Touch Target Sizes

Description:
- Maximize interactive target and hit size parameters for use on touch screen devices

Benefits:
- Increase accuracy of controls activation
- Decrease task time
- Enable use by persons with large fingers, multi-taskers, stylus users

5. Align Interaction Methods

Description:
- Enable your users to interact with your application in a way that is similar to existing platform interaction method

Benefits:
- Decrease interaction discovery and learning
- “Feel” like a native application
- Maximize user recall
6. Use Effective Error Messages

Description:
- Provide users with explicit identification of the error, how to resolve, and prompt resolving action

Benefit:
- Efficient error recovery
- Minimized support
- Enable use by customers with cognitive/intellectual difficulties

7. Leverage Multiple Modalities

Description:
- Communicate information in multiple presentation modalities (vibration, visual, auditory)

Benefit:
- Enable one modality to reinforce another, maximizing recognition
- Support use by the widest possible audience

8. Maintain Consistency

Description:
- Provide customers with a consistent user experience across the application
- Align with device conventions where possible

Benefits:
- Decrease support calls
- Improve utility of application
- Decrease orientation time

9. Provide Multiple Ways

Description:
- Support multiple information foraging methods and provide users with multiple ways to complete a task

Benefits:
- Efficient error recovery
- Decrease task time
- Enable users to do more in less time

10. Get in the Wild!

Description:
- Conduct formative and summative usability studies with prospective customers

Benefits:
- Learn user mental models
- Identify opportunities for improvement
- Improve application success

Specific Android Design Guidelines

- Accommodate different device and display sizes
  - Be flexible (stretch and compress).
  - Optimize layout (take advantage of larger real estate).
  - Assets for all (accommodate different DPIs).
- Use color and illumination to respond to touches
  - Provide a visual response when an actionable area is touched.
  - Help users understand the outcome of an operation in Recents, swiping a thumbnail dims it to delete.
  - Communicate the boundary with a visual cue in Recents when scrolling past the first home screen panel.
- Navigation in this direction is not possible.
Android Writing Style

• Keep it brief: ~30 characters.
  – Consult the documentation that came with your phone for further instructions → Read the instructions that came with your phone.
• Keep it simple. Use short words, active verbs, common nouns.
  – Use GPS satellites: When locating, accurate to street level → GPS: Let apps use satellites to pinpoint your location.
• Be friendly. Use contractions. Talk directly to the reader.
  – Sorry! Activity MyAppActivity (in application MyApp) is not responding → MyApp isn’t responding. Do you want to close it?

Android Writing Style

• Put the most important thing first. The first two words should inform the rest of the string.
  – Touch Next to complete setup using a Wi-Fi connection → To finish setup using Wi-Fi, touch Next.
• Describe only what’s necessary. Don’t try to explain subtle differences.
  – Signing in…Your phone needs to communicate with Google servers to sign in to your account. This may take up to five minutes → Signing in…Your phone is contacting Google. This can take up to 5 minutes.
• Avoid repetition.

An Some Don’ts

• Don’t mimic UI elements from other platforms
• Don’t use labeled back buttons on action bars
• Don’t carry over platform-specific icons
• Don’t use bottom tab bars

Setting or No Setting?

A Selfish Plea: Accessibility

• Consider users who
  • are blind/have low vision;
  • have other types of print disabilities;
  • are 65+ years of age;
  • never learned to read;
  • use English as a second language;
  • use languages other than English as their native language
  • wish to use their smart devices in an eyes-free environment.

Problems Encountered by Individuals with Limited/No Vision

• The decreasing size of handsets has brought advantages to many users but at the expense of small keypads, limited side tones, and small visual displays that people with visual disabilities find inaccessible.
• People with visual impairments often cannot locate or identify controls or input slots or operate controls that require sight.
• Some people are unable to distinguish between certain color combinations used on the screens and keypads.
Problems Encountered by Individuals with Hearing Impairment

• Users of hearing aids experience disturbances due to electromagnetic interference (EMI) from digital mobile phones. The rapid pulsation of radio signals from digital mobile telephones can give rise to a buzzing, humming, squealing or squelch inside the hearing aid.

• Hearing impaired users cannot locate or identify controls that require hearing (e.g., a voice-based interactive mobile telephone that can be controlled only by listening to menu items and then pressing buttons).

Problems Encountered by Individuals with Mobility, Speech and Cognitive Disabilities

3. People with mobility disabilities:
   – With the advent of smaller mobile telephones, people who have physical impairments may find it hard to hold and activate the buttons/menus on a phone.

4. People with speech disabilities:
   – Communicating using a mobile telephone in general and speaking clearly to activate functions by voice commands is not always possible.

5. People with cognitive disabilities:
   – People with cognitive or learning impairments may experience problems with the operating systems of complicated mobile telephones.