



Mobile Applications Overview

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Overview

Mobile Devices

- Operating systems
- Mobile Technologies
- Motorola A780

Mobile Programming

- WAP/HTML
- J2ME
- Linux Development

Mobile Applications

- Location/Context Aware
- Ambient Communications
- Media Consumption
- Games

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Operating Systems

Symbian

Windows Mobile

Proprietary OS

Linux

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Mobile Technologies

Flash Storage – additional storage, up to 4GB in some phones

Bluetooth – Short-range p2p communication (~10m)

WiFi – Mid-range communication (p2p or infrastructure)

SMS – phone to phone short messages sent to a phone number

GPRS/EDGE – packet data on GSM phones (~4K/s)

Camera/Video – up to 4MP in some phones, full video capture

Media Playback – GIF/JPG/MPEG/WMA/Real/iTunes/etc.

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Motorola A780

- 400 MHz ARM9 with 64MB RAM
- Quad-band with EDGE technology
- Dial pad and vivid 240 x 320 TFT color touch screen
- 1.3 megapixel camera with full-screen viewfinder
- MOTOSYNC for secure over-the-air synchronization of corporate email, contacts and calendar
- Video record/playback and streamed video playback
- MP3 player supporting MIDI/WAV/AMR/WMA, Real and AAC files
- Hands-free speakerphone and speaker independent voice dial
- Embedded Bluetooth wireless technology
- Viewer for PDF and Microsoft Word, Excel and PowerPoint documents
- Java (J2ME) MIDP 2.0 with 3D Graphics
- Internet access via WAP 2.0, WML, XHTML, HTML (Opera7)
- Messaging options via MMS, SMS, IM (WV), POP3, IMAP4, SMTP
- TransFlash Memory Card to support all data, images and



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Motorola A780 (2)

Interesting features for mobile software developers

- Mounts as USB hard drive
- Linux (supports telnet, etc.)
- Native Linux development possible
- Very open Java environment

Think of it as a networked 400MHz mobile computer more than a phone!



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Mobile Programming

Different ways to program depending on experience / app you want to create

Server based

- WAP

Client based

- J2ME
- QT/Linux

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WAP/HTML

Phone has full HTML browser so you can just make a "standard" web application

Pros:

- Most commonly programmed in java servlets, perl, etc.
- Requires no special software on the phone/less complicated development
- Can debug logic (not layout) on a desktop web browser

Cons:

- Cannot interact with phone functionality (e.g. take a picture, send something to another phone over bluetooth, get location, etc.)
- UI very limited by HTML spec compared to native programming

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J2ME

Java Programming on the a780

Subset of the Java language

Develop stand alone applications installed in java, installed onto the phone

Pros:

- Can develop and emulate on any Windows box
- Can make rich user interfaces
- Can interface to most phone functionality

Cons:

- Cannot interface to Bluetooth stack
- Reduced battery life if applications left running

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Linux Development

Creating stand alone phone applications in C++ that can be installed on the phone

Pros:

- Have much more control over all phone functionality (Bluetooth, etc.)
- Can make very rich UIs using QT
- Can leverage existing Linux code
- Increased battery life

Cons:

- No emulation
- Little documentation
- Much lower level abstractions (cell ID example)
- Must develop ssh'ed into an approved server
- Must not distribute source code

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Mobile Applications

Many domains, feel free to explore others! All papers and (many) more on the course webpage...

Domains:

- Location/Context Aware
- Ambient Communications
- Media Consumption
- Games

Others...

Enterprise Markets, Accessibility, etc...

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Location/Context Aware Mobile Apps

Reno (Intel) – explicit location requests to social network

Place Its (UCSD) – putting virtual post-it style notes in places, reminders when you enter or leave that place

ComMotion (Media Lab) – location-based info services and reminders

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Ambient Communications Applications

Watch Me (Media Lab) – watch based mobile phone interface for close social group location/activity awareness

Vetere (Melboure) – “intimate” interfaces, sending emotions through mobile technology

Perceptive Presence Lamp (AI lab) – activity/location awareness through color

Monkey Business (Media Lab) – activity awareness through animatronic motion

Ruug (CMU) – lightweight communication/awareness through a living room rug

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Media Consumption (+communications)

Push to View (Motorola Labs) – sharing and discussing photos while in a conversations

Mobile Multimedia Metadata (UC Berkeley) – annotating photos based on location (shared annotations from other's tags from that place)

Music and photo use studies (HP, Motorola, Stanford, etc.) – ethnographic studies into how people use music and photos today; what are the key tasks that people wish to perform; etc.

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Mobile Gaming

Networked, location-aware in world gaming

Picking Pockets (Glasgow) – augmented reality game with WiFi hotspots used as goals

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