

Mobile Multimedia Technologies

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Nokia Research Center

http://research.nokia.com/people/vidya_setlur/classes/MobileMultimedia/

Agenda

Introductions

Classroom dynamics

Motivation for course

Topics

Course requirements

Assignments for next week

Introductions

- Instructor: Vidya Setlur
- NRC webpage:
http://research.nokia.com/people/vidya_setlur
- Lab website:
<http://research.nokia.com/locations/palo-alto/>



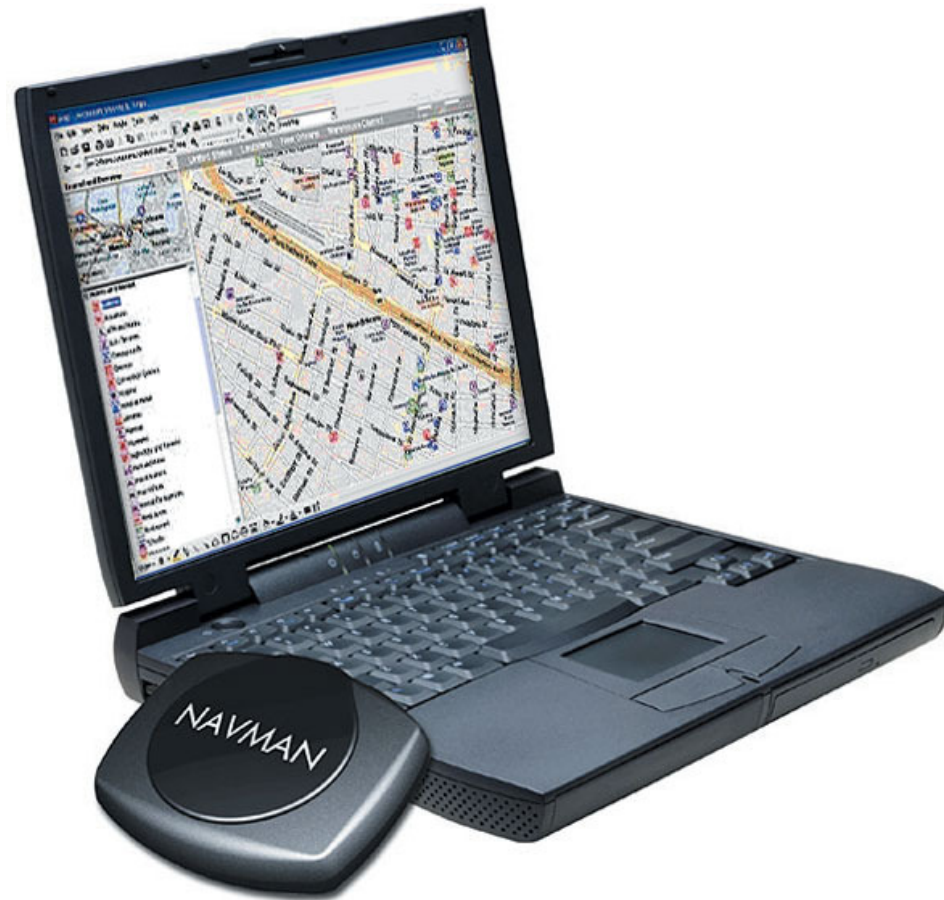
NRC Palo Alto

What is this class about?

- This class introduces a landscape of topics pertaining to developing mobile multimedia applications.
- While we do go into specifics of each topic, the class is more about creating a breadwise landscape of these technologies.
- Hands-on and **highly** discussion oriented.

Motivation for the course

This is your grandfather's portable computer





Classroom dyanmics

- ~45 minutes presentation of topic-of-the-day.
- Rest of the time is spent on in-class lab exercises, reading assignments (if any) and discussion.
- You need to bring in a phone which has at least the 2nd edition S60 SDK. (Will talk more about that in a bit.)
- Need a computer/laptop with appropriate software installed. I will let you know in advance what needs to be installed for the next class.
- Memory stick will be good to keep for transferring any data in class.

Terminology

- **Series 60 (S60):** Common smartphone platform for handhelds with Symbian OS.
- **Symbian OS:** Operating system designed for mobile devices, with associated libraries, UI frameworks and reference implementations of common tools, produced by Symbian Ltd.
- **Python:** An interpreted, object-oriented language that runs on Windows, Linux/Unix, Mac OS X, OS/2, Palm Handhelds, and Nokia mobile phones.
- **J2ME:** Java platform, Micro-edition version
- **Mobile Information Device Profile (MIDP):** Specification published for the use of Java on embedded devices. MIDP is part of the Java Platform, Micro Edition (Java ME) framework.
- **SVG:** Scalable Vector Graphics that is resolution-independent.
- **M3G:** File format used by the Java Mobile 3D Graphics API.

Objectives

- Understand various technology/APIs concerning mobile programming.
- Introduce interesting research ideas and papers relevant to the topics being discussed.
- Apply concepts learnt in class to a project of your choice.
- Set the precedent for any potential long-term projects with NRC.

Topics for course

Three modules:

- Python for S60
 - Setup, UI controls, messaging, networking, sound, bluetooth, camera and image handling
- J2ME
 - Setup, UI framework, multimedia APIs, game API, 2D vector graphics, 3D graphics.
- Web based technology
 - Flash Lite and an intro to AJAX

Format

- This is a hands-on course, so you must contribute in
 - lectures
 - presentations
 - discussions
 - lab exercises
 - class project

Assignments

- Periodically I will be giving you programming and reading assignments.
- Programming assignments will be due on the specified date.
- **Late policy: Don't be late: 20% maximum grade deducted every additional day.**
- While everyone is expected to finish the reading assignments, one student may be presenting his/her thoughts based on the reading while others participate in the discussion.
- You will be emailing your assignments in the format:
A<number>_Firstname (e.g. A2_VidyaSetlur.zip)

Student requirements

- **Participation 20%**

Feel free to discuss and ask questions.

- **Presentation 20%**

Each of you will get a turn to present a reading or homework assignment to class.

- **Assignments 40%**

I will be giving assignments periodically based on the topics. Please finish them and get in touch with me if you cannot get something to work.

- **Project 20%**

There will be class projects that can be done individually or in groups.

This class is a work in progress

- Your input can help guide the course.
- Instructor does not know everything.

Upcoming

- Today
 - History of computing devices
 - Trends of mobile technology
 - First assignments
- Next Tuesday
 - Introduction to pys60
- Next Thursday
 - GUI controls for pys60

History of Mobile Devices and Where We are Heading

Generation of Computational Devices

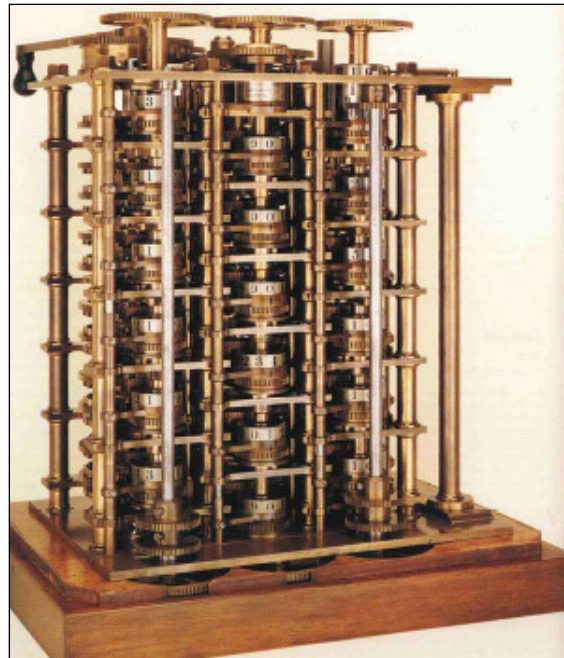
- Pre-history – to 1945
- Pioneer – 1945-55
- Historical – 1955-65
- Traditional – 1965-80
- Modern – 1980-90
- Web – 1990-...
- Mobile/Ubiquitous – 1990-...

Pre-history

- Precursors (Babbage, Jacquard Loom, ...)
- Punchcards, calculators.



Jacquard Loom



Babbage Difference Engine



Punchcards

Pre-history

- Key characteristics – focussed more on computation/number crunching
 - Ability for a mechanism to follow a sequence of operations according to preprogrammed instructions.
 - Digital encoding of information into bits and transmission of this digital information.

Pioneer

- Stored program computers (Von Neumann)
- • Complex electromechanical control systems
- (eg., bomb controls, aircraft controls...)
- Key Advances: Programmable digital computers and consideration of human factors.

Historical

- Specialized computers and interaction modes, often for a single highly trained user. Eg: air defense / SAGE.



Lincoln Labs TX-2 Sketchpad (1962)



SAGE air defense system

Historical

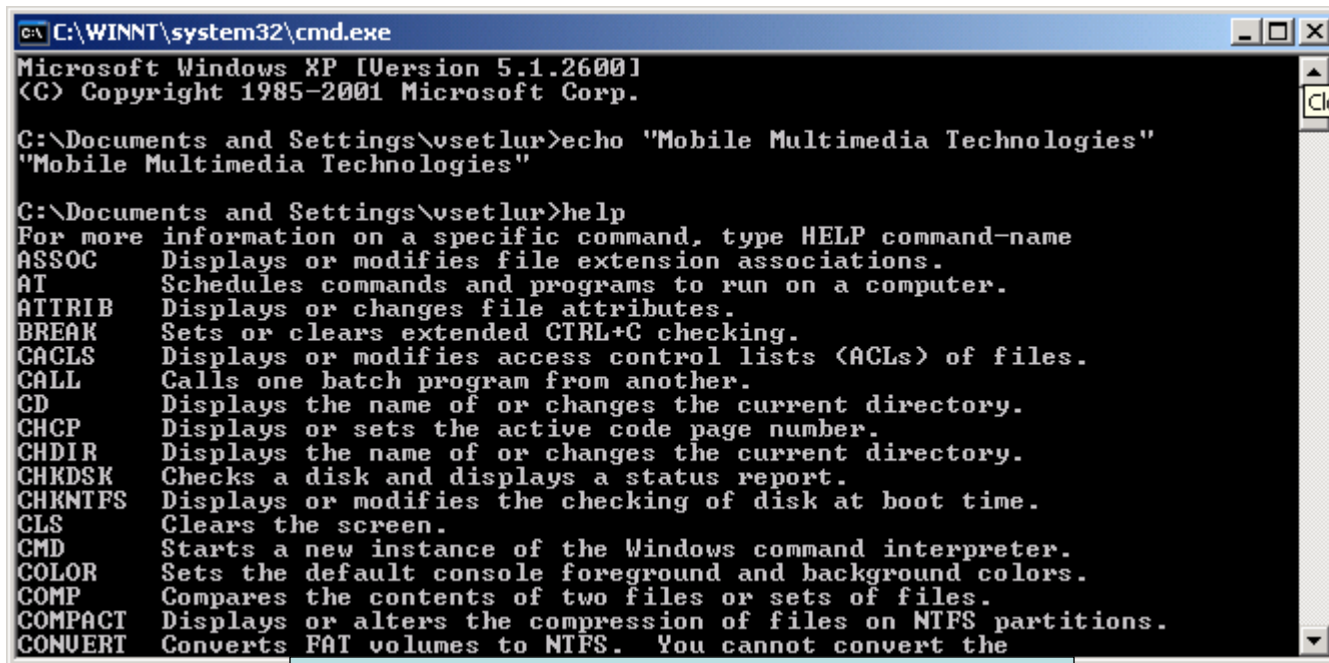
- Key advances
 - Real-time interactive systems
 - First interactive computer games
 - Graphical interaction

Traditional

- Mainframe – Batch Processing

A user prepares data off line, submits it for a "run", and is given back an off line version of the results. The computer ran one job after another without waiting for users to do anything.

Traditional



```
C:\WINNT\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\vsetlur>echo "Mobile Multimedia Technologies"
"Mobile Multimedia Technologies"

C:\Documents and Settings\vsetlur>help
For more information on a specific command, type HELP command-name
ASSOC      Displays or modifies file extension associations.
AT         Schedules commands and programs to run on a computer.
ATTRIB     Displays or changes file attributes.
BREAK      Sets or clears extended CTRL+C checking.
CACLS      Displays or modifies access control lists (ACLs) of files.
CALL       Calls one batch program from another.
CD         Displays the name of or changes the current directory.
CHCP       Displays or sets the active code page number.
CHDIR      Displays the name of or changes the current directory.
CHKDSK     Checks a disk and displays a status report.
CHKNTFS    Displays or modifies the checking of disk at boot time.
CLS        Clears the screen.
CMD        Starts a new instance of the Windows command interpreter.
COLOR      Sets the default console foreground and background colors.
COMP       Compares the contents of two files or sets of files.
COMPACT    Displays or alters the compression of files on NTFS partitions.
CONVERT    Converts FAT volumes to NTFS. You cannot convert the
```

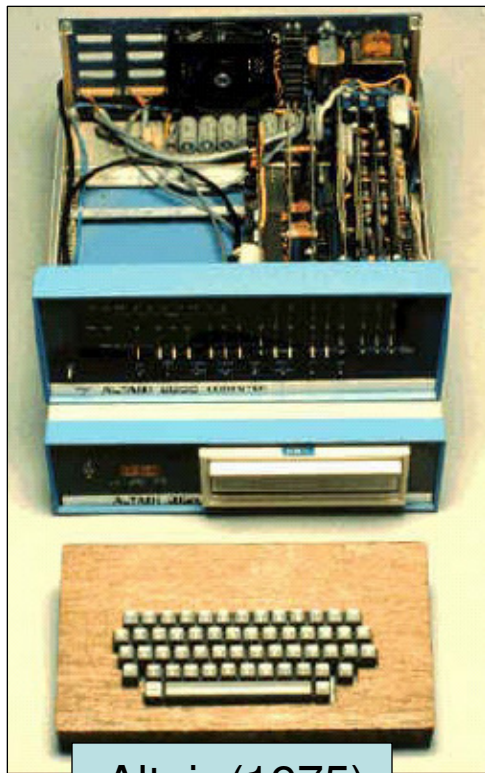
Time Sharing – Command Dialog

Traditional

- Key advances
 - Spread of computers to industry and government
 - Real-time data entry
 - Interactive applications

Modern

- Personal Computers
- GUI



Altair (1975)



Apple I

Modern

- Machines become inexpensive and appeal to the common mass market.
- Created the opportunity for a wide number of developers to start building software.
 - Bill Gates and Paul Allen wrote version of BASIC for MITS Altair – giving Microsoft its start

Commercialized Personal Computers



IBM PC (1981)



Apple II (1977)

Graphical User Interfaces

- Bitmapped screen – pixels rather than characters
- WYSIWIG (What You See is What You Get)
- WIMP (Windows, Icons, Menus, and Pointing)

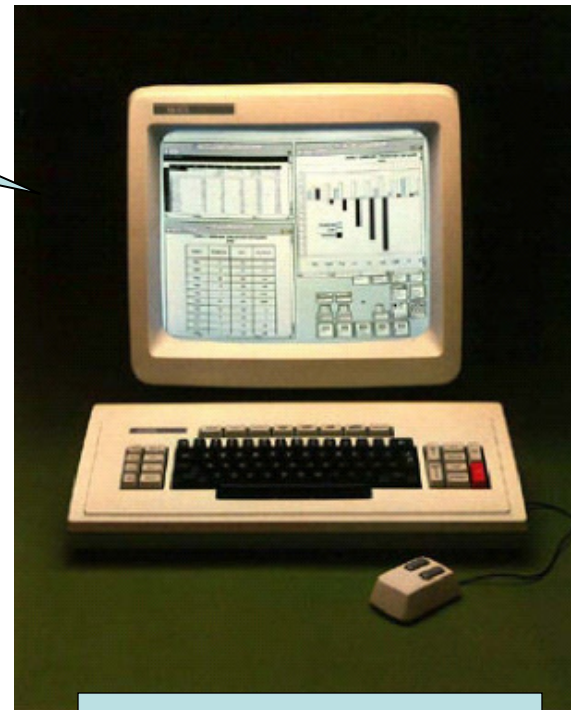
orkstations

Introduced windows commercially,
\$17K

Integrated networked document
environment, WYSIWIG
text editing, icons, property sheets,
window management



Alto (Xerox PARC)



Star (Xerox PARC)

Modern PC



Apple Macintosh

GUI Software Platforms

- Windows 3.0, 95, 98, NT, XP, Vista...
Brought GUIs to the mass market
- Macintosh OS7,8,9, OSX, Cheetah, Puma, etc.
- ...

Web Interfaces

- World Wide Web, Berners Lee, 1990
- First Graphic browser – Mosaic
- Search Engine - Webcrawler, Lycos, Altavista...1993-95
- Google, 1998
- Graphic design (Director, Flash,...)
- ...

Web Interfaces



View Multimedia From Our Vantage Point



Car Buying & Car Insurance
Pain Relief



[Click here for advertising information - reach millions every month!](#)

Search the Web and Display the Results in Standard Form

Search with Digital's Alta Vista [[Advanced Search](#)] [[Add URL](#)]



Contests
Make Me Laugh...



Creative Web
Create a Site...

[Download free demo versions of AltaVista Technology software](#)



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Web Interfaces

The screenshot displays the Yahoo! Mail web interface. On the left, there's a sidebar with folders like Inbox, Drafts, Sent, Spam, and Trash. The main area shows a list of messages, with the selected message being a ticket from MythTV. The ticket details are visible below the list, showing the subject, reporter, owner, type, status, priority, milestone, component, version, severity, and resolution. The ticket is titled "#833: Frontend crash when playing different recordings from 1 channel" and was reported by jochen to danielk. The status is new, priority is minor, milestone is 0.20, component is mythtv, version is head, severity is medium, and resolution is not set.

YAHOO! MAIL
Sign Out My Account Switch Back

Yahool! My Yahoo! News Search the Web... Search

Check Mail Compose
mythtv Go

Inbox 10 messages Compose Search: "mythtv" Send Feedback Options Help

1193 message(s) found matching "mythtv" Show Snippets

From	Subject	Received	Location
MythTV	[mythtv-commits] Re: Ticket #833: Frontend crash when playing different recordings from 1 channel	Wed, 1/4/06, 3:09 PM	Trash
MythTV	[mythtv-commits] Re: Ticket #935: Preview Thumbnail regeneration	Wed, 1/4/06, 2:08 PM	Trash
MythTV	[mythtv-commits] Re: Ticket #937: [PATCH]: mythfilddb database --file	Wed, 1/4/06, 1:13 PM	Trash
MythTV	[mythtv-commits] Ticket #937: [PATCH]: mythfilddb database --file	Wed, 1/4/06, 1:08 PM	Trash
MythTV	[mythtv-commits] Re: Ticket #888: MythTV PT menus	Wed, 1/4/06, 12:38 PM	Trash
MythTV	[mythtv-commits] Re: Ticket #920: mythweb rewriting rules break	Wed, 1/4/06, 12:15 PM	Trash
MythTV	[mythtv-commits] Re: Ticket #929: Backend segfault, gdb backtrace	Wed, 1/4/06, 11:32 AM	Trash

[mythtv-commits] Re: Ticket #833: Frontend crash when playing different recordings from 1 channel
MythTV <mythtv@cs.mythtv.org> To: mythtv-commits@mythtv.org

#833: Frontend crash when playing different recordings from 1 channel


Reporter: jochen | Owner: danielk
Type: defect | Status: new
Priority: minor | Milestone: 0.20
Component: mythtv | Version: head
Severity: medium | Resolution:

Comment (by jochen):
With new recorded programs the solution works.

Web Interfaces

- First Generation – browsers and full screen interaction
Universal access to sites irrespective of location or computing platform
- Second Generation – Better visual design
(e.g, CSS, Flash, multimedia,...)
- Web 2.0 – Browser as powerful client, accessing
Web-based services and integrating microcontent from various sources creating a new type of service. Blurs boundary between applications and web.

Mobile Computing

- PDAs:
 - Apple Newton (1993) - Depended heavily on handwriting, failed in the market
 - Palm Pilot (1996) - Used Graffiti, first commercial success
 - Mobile Connected Devices
- Cell Phones ++
- 
- The image shows two early mobile devices. On the left is a Palm Pilot, a small handheld device with a monochrome screen displaying a list of items. On the right is an Apple Newton, a larger handheld device with a color screen displaying a handwritten note about a conference location.



Palm Pilot



Apple Newton

Mobile Devices and Smartphones



Entertainment Devices



iPod

Mobile Industry Trends

- A programmable device used for communication.
- Internet + mobile
- Mobile applications
 - Highway environment
 - Outdoor games
 - Indoor collaborations
- Camera phones



Assignment

- Prepare a one slide poster with your chosen mobile user. This could be a family member, a friend, a neighbor or a relative who lives far away. We are looking for a few details about their life and what they typically do and would like to have in terms of technology. You will have 5 min to present details of your user during next class on Tuesday.

Phones

- Check out the [list](#) of phones here and e-mail me the model you have by tomorrow.