Mobile Multimedia Technologies

Vidya Setlur

Nokia Research Center

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

Agenda

Introductions

Classroom dynamics

Motivation for course

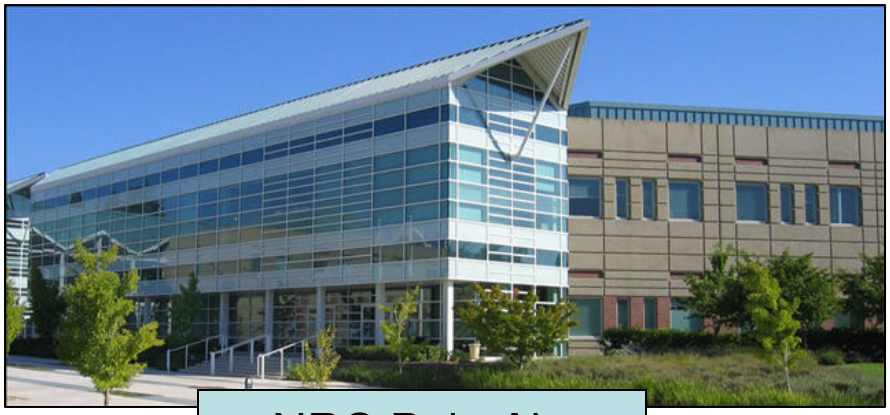
Topics

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/



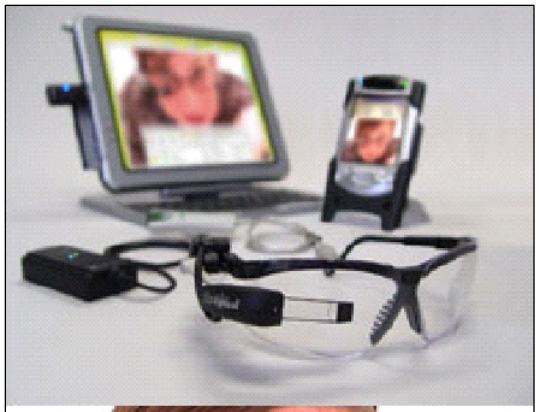
NRC Palo Alto

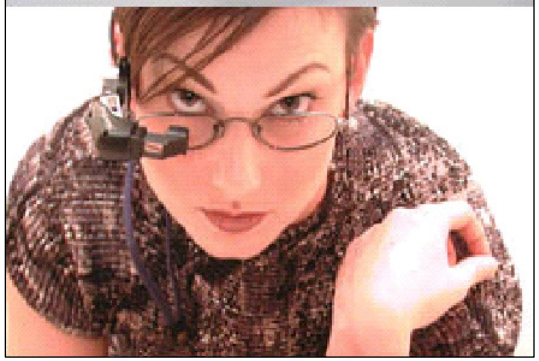
What is this class about?

- 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.

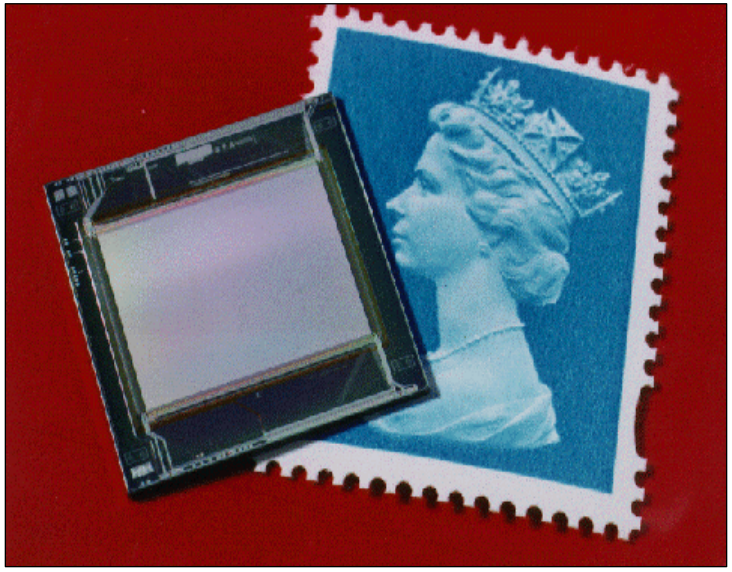
Motivation for the course

This is your grandfather's portable computer






31 BOULEVARD DU REGENT
Nav Menu
Ent Dest.
Store
POI
CLIMATE




PHILIPS
MTS-RUS
08/11
12:57
BEE LINE
ALCATEL
mobile-review.com

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 assigment 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

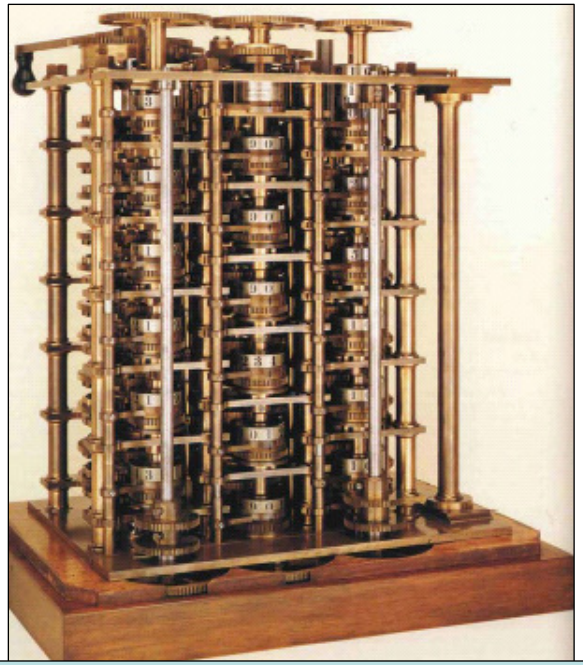
Generation of Computational Devices

- 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

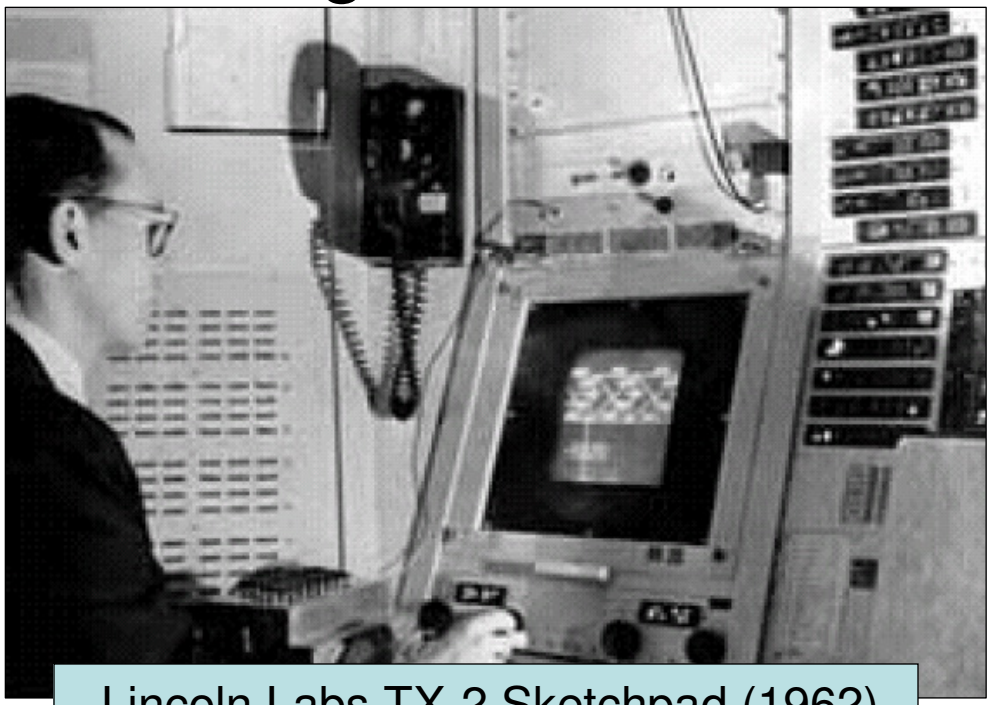
- Key characteristics – focussed more on computation/number crunching
  - Ability for a mechanism to follow a sequence of operations according to preprogrammed instructions.
  - Digital encoding of information into bits and transmission of this digital information.

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

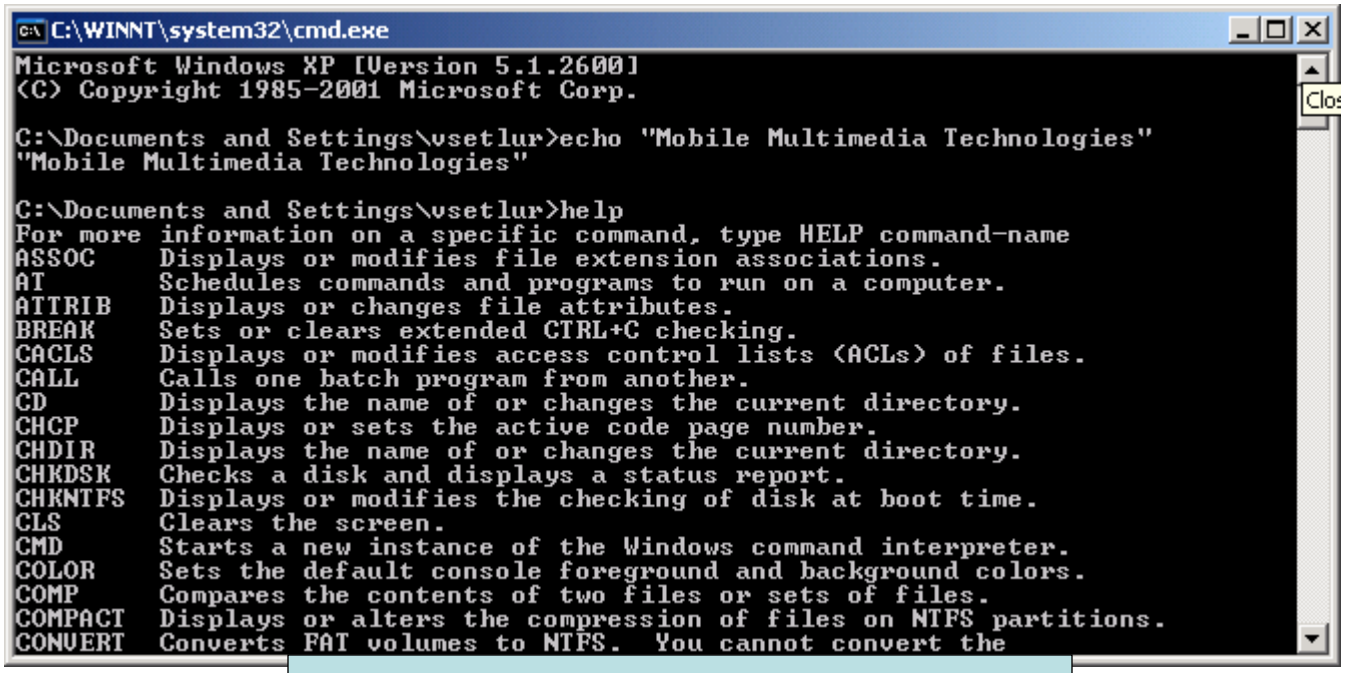
- Key advances
  - Real-time interactive systems
  - First interactive computer games
  - Graphical interaction

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



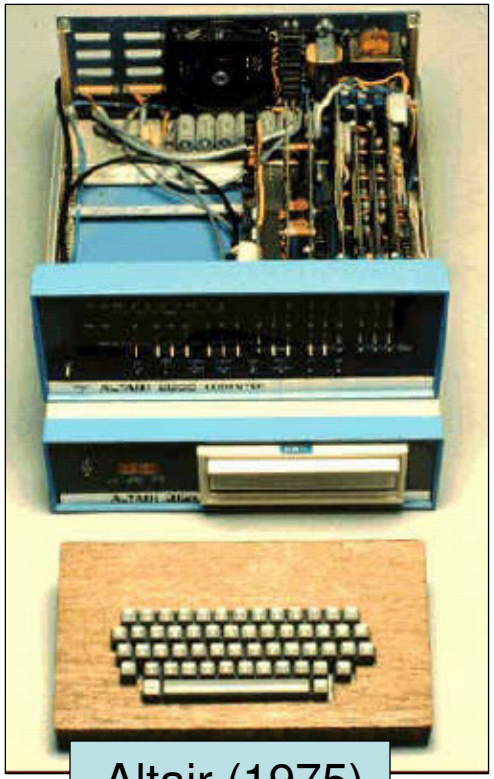
Time Sharing – Command Dialog

Traditional

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

Modern

- Personal Computers
- GUI



Altair (1975)

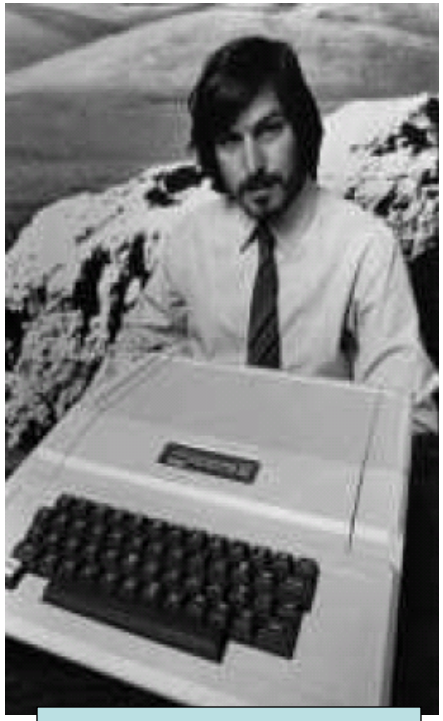
Apple I

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
- WYSYWIG (What You See is What You Get)
- WIMP (Windows, Icons, Menus, and Pointing)

orkstations

Introduced windows commercially, $17K
Integrated networked document environment, WYSYWIG
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…

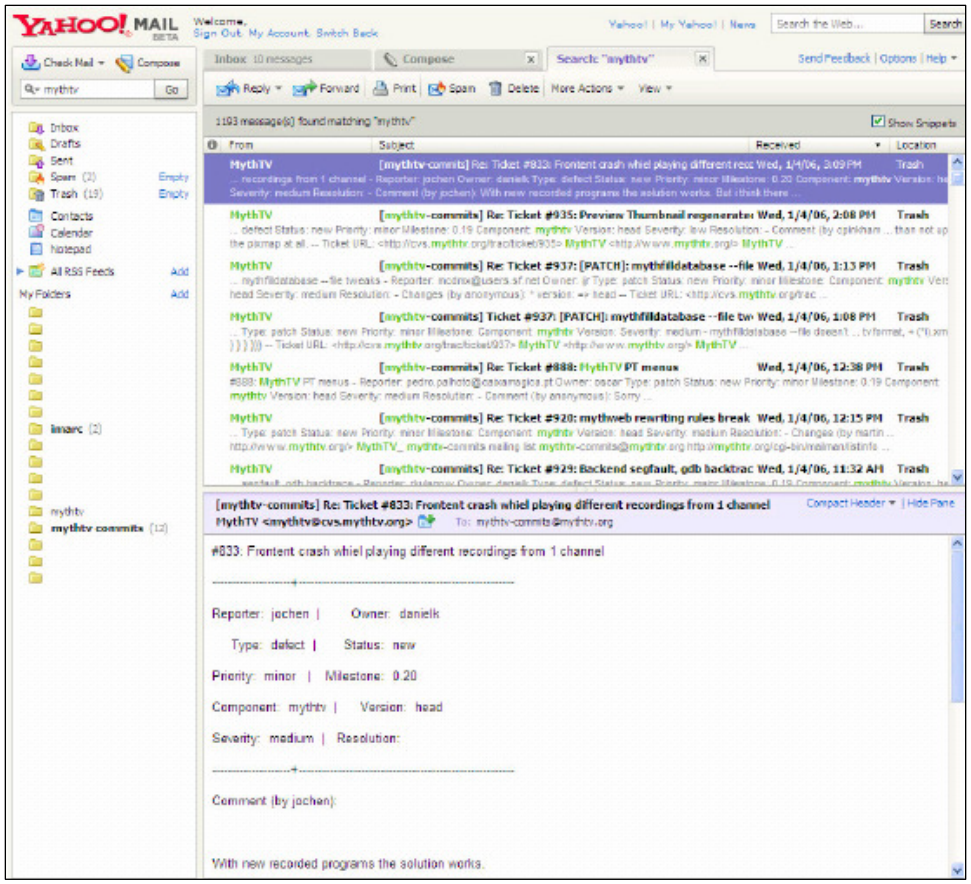
  Brought GUIs to the mass market
- Macintosh OS7,8,9, OSX, Cheetah, Puma, etc.
- …

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

Web Interfaces



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 ++

Palm Pilot

Apple Newton

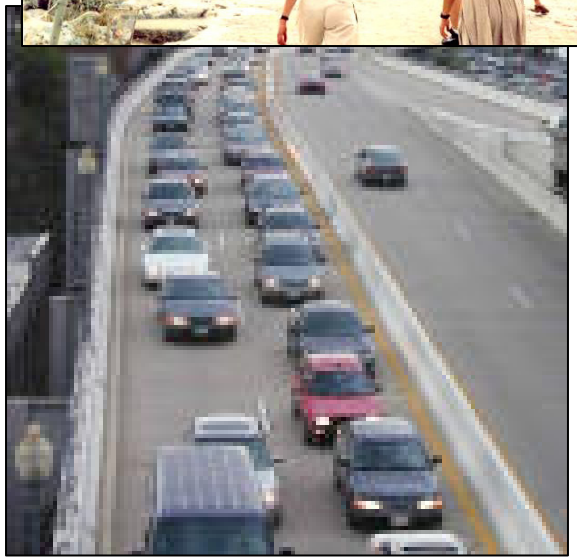
Mobile Devices and Smartphones

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.