

COMPSCI 705 / SOFTENG 702
opening lecture

The Expanding Interaction Space

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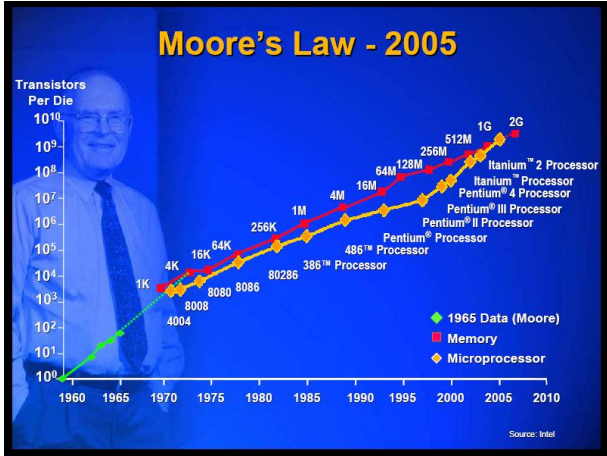
The first electronic computer

<http://www.bletchleypark.org.uk/>



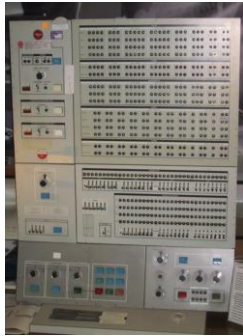
Enablers of HCI expansion

- Changes in computing power
 - Processing
 - Bandwidth and communications infrastructure
 - Storage
 - Power management
- So now we can have powerful, tiny, connected devices with heaps of storage and running on batteries like iPhone and Galaxy that just weren't possible a few years ago, and were virtually unimaginable 20 years ago



- Halfhill, T.R., "The Mythology of Moore's Law," 2006.

1960s/1970



IBM 360
- card/paper tape input
- printed output



1962 – Sutherland's Sketchpad



~1964 – Engelbart's Mouse

1980s



IBM PC 1981

- PC
 - Screen, keyboard and mouse (started to get popular with models like the Apple IIe from 1976)
- These really were personal computers
 - Very limited connectivity
 - Large organizations had networks
 - Home computers generally stand-a-lone



Xerox Star 1981

More recently

- “Moore’s Law” (ish) performance improvement continues, but also....
- Penetration
 - Every sector and nearly everybody (particularly via cell phones)
 - Look at a sector like banking
 - Had computers practically from Day 1, but has over decades brought them forward with ATMs and now online banking
- Connection
 - The Web (accelerating uptake of the Internet that had been progressing throughout 1970s and 1980), wireless LAN, ubiquity of the cellular network

HCI Change

- And so user interfaces change because
 - The capability of the machines keeps changing (as just discussed)
 - The types of users has moved from specialists to everybody
 - We’ve just had more time to accommodate the potential of computing
 - Time for things like Amazon and Facebook and Google Maps to be developed and catch on
 - And for devices like Apple IIes and Macs and iPhones and iPads (and their competitors) to be conceived, implemented and to catch on

HCI static

- Yet in some ways the options have been well understood for ages
 - Text
 - Voice
 - Which never seems to catch on as much as it promises
 - Direct manipulation
 - Can enhance with Tangible (see Rachel's lecture later this week!)
 - 2D and 3D metaphors
 - 'windows' were a big leap forward in 2D interface thinking
 - Web/Hypertext
 - Was suggested in some detail by Vannevar Bush at the dawn of modern computing in 1945!

What does all this mean?

- We can communicate across time and space in ways we have never been able to before
- Digital Natives, Digital Immigrants
 - By Marc Prensky
<http://www.marcprensky.com/writing/>
- New generations are learning/working/communicating differently



2010's

- New things keep coming
 - Social networking
 - Well, there were Usenet news groups since 1980, but the level and impact of social networking is new
 - Multi-touch is everywhere
 - Brain-machine interfaces
 - http://www.ted.com/talks/tan_le_a_headset_that_reads_your_brainwaves.html

As Researchers

- Endless opportunities
 - Exploring how to exploit new technologies (or better utilize long-standing technology) for novel interaction
 - Understanding the sociotechnical side of how people are interacting with this ever-changing world of computers
 - Driving applications deeper into specific domains to improve and transform workflow
 - As banking has done, as healthcare is doing

Diverse research methods

- Engineering
 - Devising ways to meet requirements not previously met (e.g. brain machine interface)
- Experimental (a la Psychology and Medicine)
 - Measure a statistically significant improvement in performance
 - Often considered the best level of evidence
- Action research
 - Changing the 'real world' environment in a purposeful and reflective fashion

Course Plan

- Lectures on nifty stuff
 - From a range of staff on areas close to our research
- Your own investigation into nifty stuff
 - You do individual literature review research for a seminar
 - And get to hear each other's seminar findings
 - You work in a group on a project
 - And get to hear about each other's project achievements
- Exam
 - Consolidate your learning with revision of the semester's lessons (about nifty stuff)

Required knowledge

- **Be experienced programmers.** In general students should have completed 6 or more programming courses. They should have competence in at least two programming languages and experience in some user interface programming framework – e.g. Java Swing, Windows Forms, Windows Presentation Foundation or Silverlight
- **Have completed an undergraduate course in HCI.** If you have studied here that would be CS345/SE350, or an equivalent course somewhere else. We expect students will understand user interface design and usability testing and have had some exposure to the range of interaction modalities
- **Have a high level of English reading and writing competence (a minimum of IELTS 6.5).** For the coursework you are required to read multiple academic papers and write two 10 page reports. The examination also requires that you can read and write English at a high level

Lecturers

- Prof Jim Warren
 - Course Coordinator
 - jim@cs.auckland.ac.nz
 - Ext: 86422
 - Room Tamaki 723.318
 - Research: Health informatics, decision support
- Assoc Prof Beryl Plimmer
 - beryl@cs.auckland.ac.nz
 - Ext: 82285
 - Room 303.483
 - Research: HCI, Pen-based computing
- Prof Robert Amor
 - trebor@cs.auckland.ac.nz
 - Ext: 83068
 - Room: HoD's office, 303 level 3
 - Research: Architecture and construction informatics



Lecture Plan

- First half of the semester
 - Beryl Plimmer and Rachel Blagojevic
 - Research and concepts around sketch, annotation, haptic and tangible interfaces
 - Robert Amor
 - Construction informatics, VR, gesture
 - Other guests
 - E.g. HCI in education
 - Jim Warren (your host!)
 - Visualisation and agents (heavily oriented toward health IT research)
 - And supporting lectures, including evaluation
- (see the website for schedule)

Exam

- About half of the marks on a couple of questions based out of the lecture material from first half of the course
- Balance of marks on
 - A question to be answered based on an aspect of your project experience
 - A question based on one of the literature review presentations other than your own (you'll have a list to choose from)

Presentation Plan

- Second half of semester
 - You-all take over the podium!
 - Seminars of leading edge topics
 - Presentations of projects (often aligned to leading edge research groups)

Class Representative

- There can only be one!
- Once elected, attend one AUSA Class Rep Information Session
 - Monday 18th Mar, 9-10am Old Choral Hall, Lecture Room 2
 - Tuesday 19th Mar, 10-11am SLT1
 - Wednesday 20th Mar, 1-2pm OCH2
 - Thursday 21st Mar, 2-3pm OCH1
 - Friday 22nd Mar, 3-4pm OCH1
- Contact classreps@ausa.org.nz, 09 923 7385 or visit Old Choral Hall G15

Literature Review Seminar – start thinking about it!

- I will survey you on your topic choice next week
- There are some resources on literature reviews on line
 - http://www.cs.auckland.ac.nz/courses/compsc_i705s1c/lectures/literature-review.pdf
 - <http://www.jstor.org.ezproxy.auckland.ac.nz/stable/4132319>

Deriving the social network

- Notice the sources
 - Author name and his/her organisation
 - Do they have a current web site?
 - Usually the professor/supervisor will continue in the topic, postgrads – esp. masters – may've moved out of the field
 - So look at 2nd and last authors in list
 - Are there particular departments/labs that specialise in this thing?
 - Journal or conference proceedings
 - Is this a place for your topic? Look out for special theme issues of journals and for workshops
 - And who edited the special issue? They're probably a well-known expert in the area!

Finding the literature

- Start with the academic portals
 - From www.library.auckland.ac.nz/databases
 - ACM Digital Library and IEEEExplore
 - You know that the things you find are the 'right' kinds of things (quality, format and general topic)
- Use Google Scholar to search forward in time
 - Found something from 1997? Who cited it? They're obviously into something related and did it more recently!

Refine your scope

- Decide the boundaries of your review
 - Practically, let how much you're finding help dictate this (lots of sources = narrower review)
- Look out for existing reviews
 - *ACM Computing Surveys* specialise in this
 - Might be hard to avoid plagiarising an existing review if it's right on your intended topic
 - Then again, if it's a little old in an active field, you might be fine to 'refresh' the review and/or take a different angle

Synthesizing the findings

- If you really want an “A”, read the MISQ article thoroughly
- Move from authors/labs to *concepts*
 - Requires further refinement of the notion of just what your topic is
- If you can... develop a model and/or theory about the research area
 - A simple model could be a taxonomy of the approaches taken by the researchers
 - E.g., see figures 1 and 2 of <http://www.csee.umbc.edu/~finin/papers/kass88.pdf>

Summary

- HCI is an amazing and ever-changing field
 - Technology is changing society, and HCI research is right on the edge of this!
- This course introduces topics at the leading edge and gives you practice examining that edge for yourself