Information and Computer Science in the 20th and 21st Century

Michael J. Pazzani, Chair
Information and Computer Science
University of California, Irvine

Overview

• ICS in the 90s
• A brief history of Information and Computer Science
  – Moore’s Law and Exponential Growth
  – Computer Architecture
  – Human Computer Interfaces
  – Communication
• Where are we going?
The University of California, Irvine

- Current size: 18,000 students 1400 faculty
- Anticipates 4 percent annual growth for next 10 years
- Recent Rankings
  - 9th in US News and World Reports ranking of public universities

Information and Computer Science

- Largest Computing Major at any UC Campus
  - 775 Undergraduate Majors
  - 125 Ph.D. Students
  - Undergraduate Minor in ICS started in 1996
    - MS Degree will start in the Fall of 1998
  - 3500 Alumni

- ICS Undergraduates
  - 1235 Average SAT
  - High School GPA 3.8
  - Clubs & Outreach: Women In Computer Science, Undergraduate Computing Facility, ACM, American Indian Summer School in Computer Science
Information and Computer Science
Required Curriculum

Digital Circuits
Computer Architecture
Algorithms and Data Structures
System Software

Software Specification, Toolkits and Testing
Hardware Specification and Simulation
Project Teams

Flexibility in ICS Curriculum

• ICS Specializations
  Artificial Intelligence
  Computer Systems
  Implementation and Analysis of Algorithms
  Software Systems
  Information Systems (& Human Computer Interaction)
  Networks and Distributed Systems

• Minors
  Digital Arts
  Mathematics
  Management
  Global Sustainability (Earth & Life Sciences)
  Foreign Languages, etc.

\[ I(M) = \sum_{i} p(m_i) \log_2 \left( \frac{1}{p(m_i)} \right) \]
ICS Research Strengths

• Automated reasoning (Bayesian Networks)
• Biomedical computing & computational biology
• Computing, organizations, policy and society
• Computer networks and distributed computing
• Embedded Systems
• Human-computer interfaces
• Machine learning and knowledge discovery in databases
• Parallel processing
• Programming languages and compilers
• Software environments, metrics and testing
• Software/hardware co-design
• Theoretical computer science

ENIAC - 1947
Moore’s Law
Transistors per chip doubles every 2 years

Internet Hosts
Doubling Every 18 months
Lines of Code

Doubling time 866 days

Doubling time 216 days

Value of Microsoft Stock:
Doubling Time 694 days
1968 Computer Architecture

1997 Computer Architecture
Human Computer Interface (1968)

Card readers will peak at 1500 cards per minute by 1974
Navy Delphi Panel 1969

Human Computer Interface (1985)

C:> date
Wed Jul 23 2:18
Computer Interfaces 1997

Scholarly Communication Before the Internet

REQUEST-PRINT
3/24/87

Lutz Slomianka

Dear Dr. Granger:

Please send me a copy of your article:

"Distinct memory circuits controlling the hippocampal region" published in Hippocampus 6(1) 1996, p. 569-578

Lutz Slomianka

Lutz Slomianka

ANATOMY & HUMAN BIOLOGY
THE UNIVERISITY OF WA
WA 6907
AUSTRALIA

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E-mail: Scholarly Communication and the Internet 1975-1987

From: mooney@cs.utexas.edu
To: pazzani@ics.uci.edu
Subject: MLC88 Paper
Date: Wed, 28 Jan 88 23:07:14 EST

Can you send me a copy of your paper that will appear in the 1988 Machine Learning Conference.
Thanks

Raymond Mooney
Department of Computer Sciences
The University of Texas at Austin
Austin, Texas 78718
Postscript: Scholarly Communication and the Internet ~1987 to ~1992

From: pazzani@ics.uci.edu
To: mooney@cs.utexas.edu
Subject: MLC92 Paper
Date: Wed, 29 Jan 92 01:07:14 PST

Ray-
Here’s a postscript copy of the paper you requested...

Anonymous ftp: Communication and the Internet ~1990 to ~1995

From: pazzani@ics.uci.edu
To: mooney@cs.utexas.edu
Subject: MLC94 Paper
Date: Wed, 26 Jan 94 02:19:20 PST

Ray-
My papers are in a ftp archive, here’s the README file
1. ftp to ftp.ics.uci.edu
   Use anonymous as the login name
   and your email as the password
2. cd to /pub/pazzani/papers
3. ls (to see file names)
4. bin (make sure you use binary mode)
5. get paper.ps.Z
6. uncompress paper.ps.Z
7. lpr paper.ps
WWW: Scholarly Communication and the Internet ~1993-Present

Publications

Staski & Webert: Identifying Interesting Web Sites
Michael Pazzani, Jack Muranatsu, Daniel Billsus
in Proceedings of the National Conference on Artificial Intelligence (AAAI'96), Portland, OR.

Revising User Profiles: The Search for Interesting Web Sites
Daniel Billsus, Michael Pazzani

Electronic Journals: ~1994-Present


- Abstract
- PostScript article cook94a.ps (795K)
- Compressed PostScript article cook94a.ps.Z (309K)
- Online appendix cook94a appendix.tar.Z (30K) containing SUBDUE source code


- Abstract
- PostScript article murphy94a.ps (368K)
- Compressed PostScript article murphy94a.ps.Z (215K)
The Internet in its Adolescence

Commercialization of the Internet
Supporting ICS via the Web

Predicting the Future

- “Computers in the future may weigh no more than 1.5 tons.” - Popular Mechanics 1949.
- “I think there is a world market for maybe five computers.” - Thomas Watson, chairman of IBM in 1943.
- “There is no reason anyone would want a computer in their home.” - Ken Olson, president, chairman and founder of Digital Equipment Corp., 1977.
- “640K ought to be enough for anybody.” - Bill Gates in 1981.
Where is the Field Going

- Convergence of computing and communication: IP on everything
- Quantum Computing
- The Future of the Internet
  - Archival of Electronic Information
  - Security, Privacy, Intellectual Property
  - Avoided by Intellectuals as a Waste of Time
- Software: Reliability- Platform Independence
- Realistic Computer Graphics and Animation
- Bioinformatics- Understanding the Genome

Where is ICS Going?

- Mission
  The innovation of new information and computing technology.
  The influence of this technology in areas of economic, commercial, and social significance.
  The application of this technology to a broad set of problems including the arts, education, engineering, humanities management, medicine, science and social sciences.

- Organization
  Short term- No change in Organization-
  Growth in “foundational” areas and “interface areas”
  Expand Course and Degree Offerings
  Improve External Stature of ICS Department
  Long Term- School of Information and Computer Science
Stay Connected with ICS
http://www.ics.uci.edu

- Join ICS Alumni Organization
- Attend Curriculum Advisory Board Meetings as a representative of your company
- Recruit at UCI as a representative of your company
- Move your company to UCI
- Enroll in MS program
- Attend Distinguished Speaker Series
- Attend Jan. 9, 1998 Research Symposium