COMPSCI 705 - SOFTENG 702 Lecture 1

Construction Informatics and HCI
- What is Construction Informatics
- HCI-focused projects
- Devices in Construction Informatics

Overview and Motivation

- How do we create a UI or HCI experience well suited to professionals within a specific domain?
  - Some answers for those with disabilities, young, or elderly
- Professions are treated as 'normal' HCI business
  - Very specific needs in many professions
  - Mass market software not well matched
  - New devices not well matched
- Bespoke software often poorly suited to professions
- We will explore a range of techniques and research approaches which may help address these issues

Example of a Specific Domain: Architecture/Engineering/Construction

- Design and build incredibly complex structures

The Wave in Vejle (T Molvig)

Burj Dubai

A/E/C Characteristics

- 10% of GDP in most Western countries
- Conservative, low risk (?)
- Low profit (2-3%)
- High variability in skills
- Many low paid labourers
  - Unattractive jobs
- A few high paid professionals
- Many bespoke software tools
  - > 4,500 in late 90's

Guggenheim Museum Bilbao

A/E/C Characteristics

- University trained
  - Architect, Structural Engineer, HVAC Engineer
- Polytech trained
  - Project Manager, Site foreman, Plumber, Electrician
- Trades trained
  - Labourer

by Paul Keleher

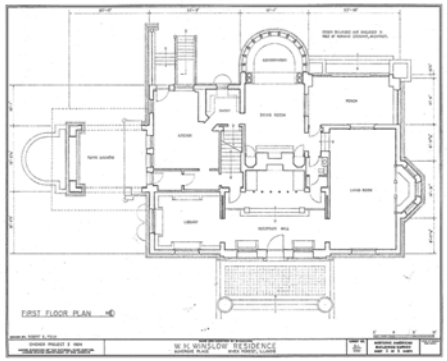
A/E/C Characteristics

- Multi-disciplinary teams
- Complex coordination and collaboration
  - 10,000 or more workers on site in large projects
  - Logistics management challenges

by Jakob Montrasio

A/E/C Characteristics

- Unique terms and language
- Unique symbols
- Country specific nomenclature



U.S. Department of the Interior, National Park Service

Construction Informatics

- Construction informatics is an applied science that studies the construction specific issues related to processing, representation and communication of construction specific information in humans and software.
- HCI traditionally has received very little attention in this field

The new generation is different!

- Email is just too slow, and they seldom if ever use snail mail.
- They have always been able to read books on an electronic screen.
- They have never used a card catalog to find a book.
- Computers have never lacked a CD-ROM disk drive.
- The first home computer they probably touched was an Apple II or Mac II; they are now in a museum.
- They first met Michelangelo when he was just a computer virus.
- Text has always been hyper.
- There has always been a computer in the Oval Office.
- CDs have never been sold in cardboard packaging.

Mindset List, Beloit College, USA

The new generation is different!

- GPS satellite navigation systems have always been available.
- Personal privacy has always been threatened.
- Migration of once independent media like radio, TV, videos and compact discs to the computer has never amazed them.
- Electronic filing of tax returns has always been an option.
- WWW has never stood for World Wide Wrestling.
- IBM has never made typewriters.
- They may have been given a Nintendo Game Boy to play with in the crib.
- Thanks to MySpace and Facebook, autobiography can happen in real time.

Mindset List, Beloit College, USA

The new generation is different!

- Most phone calls have never been private.
- They are wireless, yet always connected.
- Bar codes have always been on everything, from library cards and snail mail to retail items.
- "Google" has always been a verb.
- Virtual reality has always been available when the real thing failed.
- They're always texting 1 n other.
- Avatars have nothing to do with Hindu deities.
- The World Wide Web has been an online tool since they were born.
- Text messaging is their email.

Mindset List, Beloit College, USA

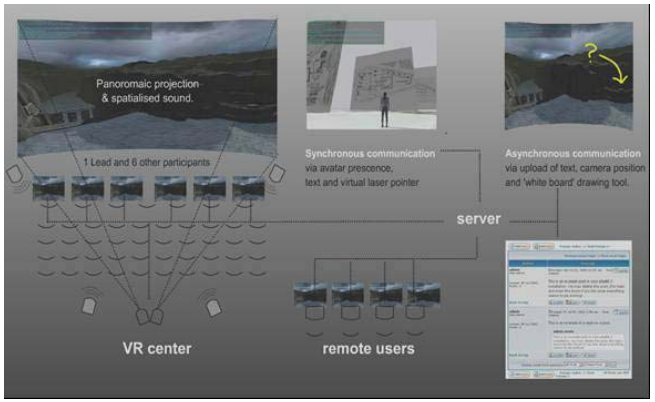
The new generation is different!

- Digital cameras have always existed.
- Being techno-savvy has always been inversely proportional to age.
- They have always been able to watch wars and revolutions live on television.
- Bad behavior has always been getting captured on amateur videos.
- They learned to count with Lotus 1-2-3.
- Voice mail has always been available.
- Libraries have always been the best centers for computer technology and access to good software.

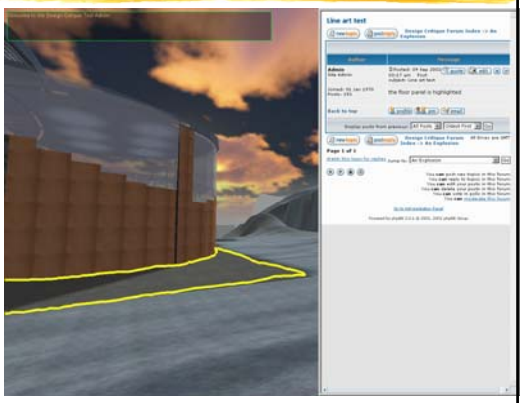
Mindset List, Beloit College, USA

Collaborative Approaches

Collaborative Approaches



Collaborative Approaches



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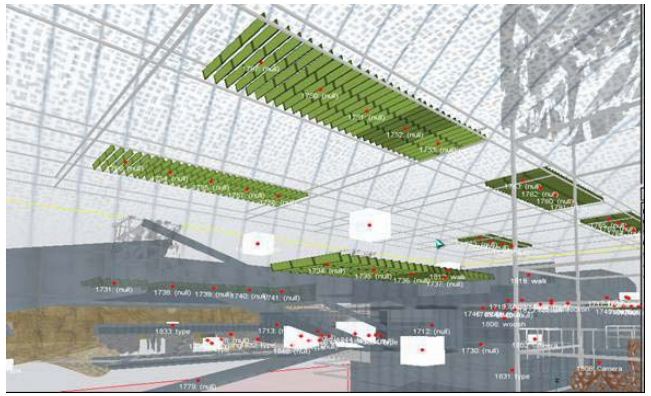
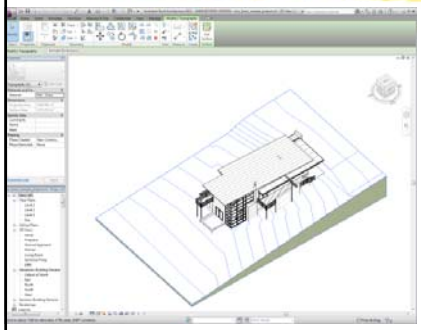
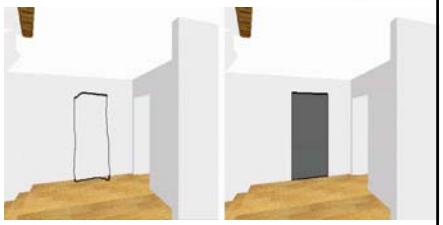


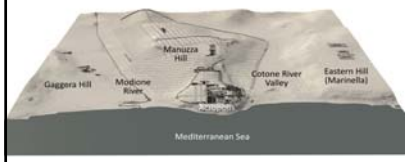
Appropriate Interactions

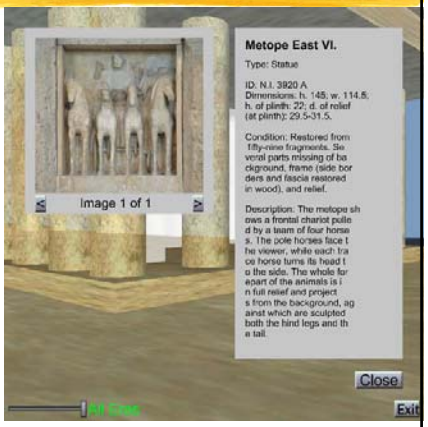




Appropriate Interactions

Level of Detail and Information space navigation





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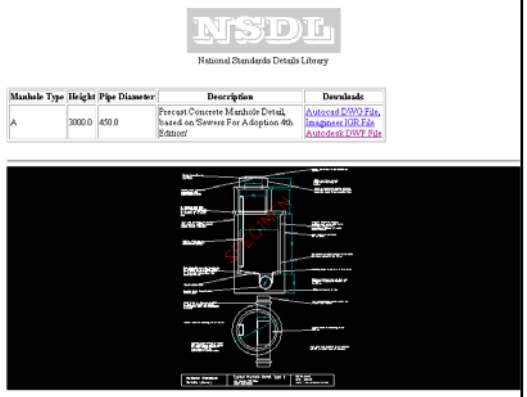

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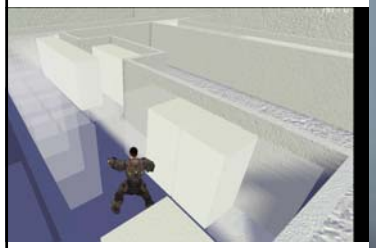
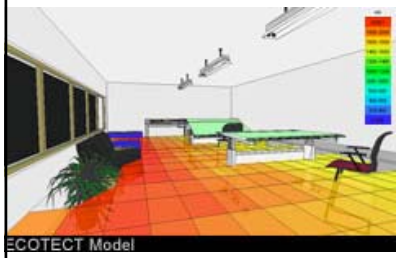
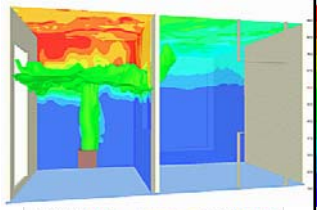
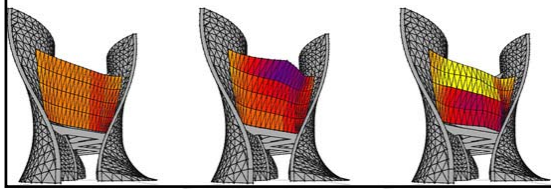


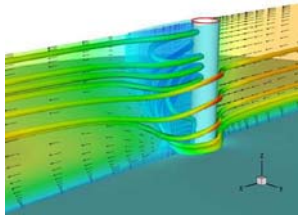
Multi-criteria decision making

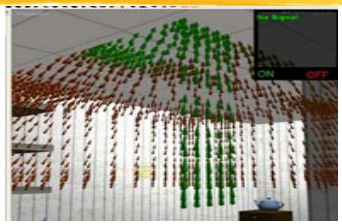


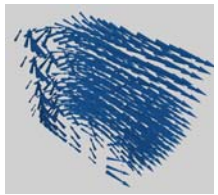


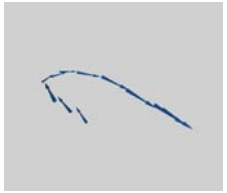


Multi-criteria decision making



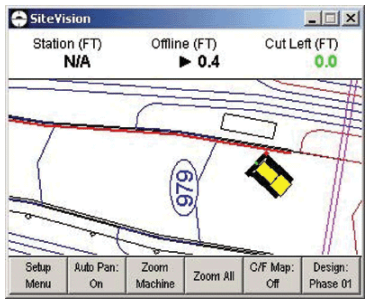




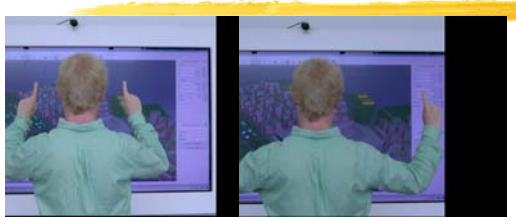


Augmented Reality

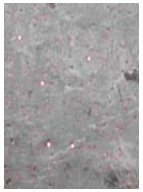
Devices on site!



Devices on site?



CICC 1998



Zhu and Brilakis 2008

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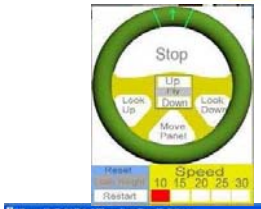

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