Human Centered Systems

CIC R&D SubcommitteeWorking Group

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February 27, 1997

Evolving Opportunities in IT

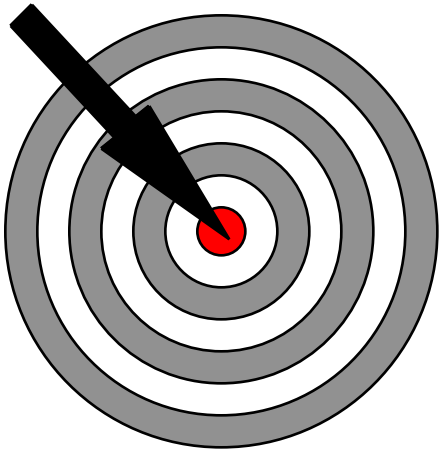
The PAST:

- Solutions from complete specifications
- Machine understanding
- Automation of tasks

The FUTURE:

- Content creation, store, distribution, manipulation, & use
- Information infrastructures
- Augmentation of human skills

The GOAL



- To benefit the diverse activities of ordinary citizens, as well as specialists, by the synergistic combination of human skills and information technology.

The Means

- Foundational Research
  - modeling human cognition and intelligent behavior
  - understanding human communication
  - developing data capture, store, transport, and access techniques
  - developing theories and models of coordination and collaboration
- Experimental Research
  - validating theoretical results
  - evaluating the performance of integrated systems
  - system prototyping and testbed demonstration
- Infrastructure Support
  - sharing data, repositories, and tools
  - forming partnerships with new industries, new disciplines

Human-centered Parameters for High-performance Computing

- Scale
  - Speed, bandwidth, storage
  - Users, Uses, Information
- Heterogeneity
  - Machines, software tools, services
  - Knowledge sources, data types, media
  - Communication modalities
- Evolution
  - User needs
  - Contents, applications

Research & Development Areas

- Collaboratories
- Knowledge repositories & processing
- HCI - speech, language, gesture, multi-modal
- Multi-media, multi-lingual technologies
- Intelligent agents
- Human cognition & group behavior
- Universal Access: IT for every citizen
- Virtual systems and environments
- Visualization/information presentation algorithms and tools
- Interdisciplinary research for innovative education/training
- Missions and applications

Some On-Going HuCS Programs

Interagency:

- Digital Library Initiative (NSF, DARPA, NASA)
- Human Language Resources (LDC - NSF, DARPA)
- STIMULATE (NSF, NSA, CIA, DARPA)

Agency Specific:

- Visible Human Project (NLM)
- High Performance Knowledge Base Systems (DARPA)
- Collaboration Technology (DARPA, DOE)

Needed for Further Progress

- New ingredients and thrusts to encourage cross-discipline, data-intensive research (e.g., NIH Human Genome; NLM Visible Humans; NASA's EOS/DIS; NSF KDI/ Knowledge Networking)
- New joint-agency R&D initiatives (e.g., Digital Libraries, II; Universal Access)
- New infrastructures and resources (e.g., collaboration testbeds; virtual laboratories; new partnerships with private sectors)

Relationships to Other WG's

- HECC:
  - For virtual environments; remote collaboration; peta-computing on desktops
- LSN:
  - For penetration to ordinary citizen end-users; content on the net; NGI partnership
- HCS:
  - For security and privacy requirements as universality is achieved
- ETHR:
  - For large-scale educational testbeds; new ways of learning

Working Group Activities

- Virtual organization
- Cross-agency planning & coordination
- Joint initiatives
- Collaborative management
- Supporting CIC/NCO
- Regular meetings
- Public forums; planning workshops
- R&D Agenda
- Partnerships with non-federal organizations
- Liaison w/ other gov't branches

The Augmentation System

(Adapted from Doug Engelbart)

Human Systems

- Paradigm
- Organization
- Language
- Knowledge
- Skills
- Training
- Customs
- Attitude

AUGMENTATION

Tool Systems

- Machineries
- Vehicles
- Facilities
- Libraries
- Telephones
- Media
- Computers
- Networks

CIC/HuCS: Collective Impact