Aging in Place with the ASSIST Environment

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Individuals are living longer than ever before, but what is the quality of that life?

Aging Population

- 78,000,000 baby boomers approaching 65
- Cohort >85 is the fastest growing segment of the population
- 80% of elders have at least 1 chronic illness
- 24% are limited in at least one activity of daily living (ADL)

Are elders able to age on their own terms or do lack of support and poor health force decisions regarding living arrangements?

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

Impending Care Crisis

- Rising costs for health care & nursing home care
- Increasing number of elders with health care needs
- Healthcare provider shortages
- Changes in the American family and lifestyle

ASSIST

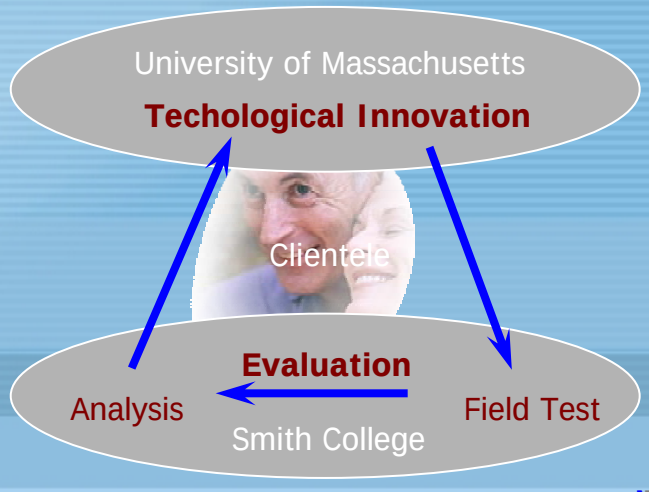
- Collaboration
  - U. Massachusetts
    - Dept. of Computer Science
    - School of Nursing
  - Smith College School of Social Work
- Goals: Using computer technology we seek to enhance the experience of elders in their own homes so that they may:
  - Age in place
  - Maintain independence
  - Self-manage chronic health problems
  - Stay connected to their social networks
  - Avoid nursing home placement

Technical Goals

- Effective interface to the client's environment:
  - Independent Living
  - Social/family
  - Medical
  - Financial
  - Social services
  - Legal
  - .....

Philosophy

- Plug and play for rapid development and deployment
  - Interface driven user interactions
  - System interfaces for elders
  - Nimble, reconfigurable, robust, controllable
  - Minimally intrusive
- Responsive to needs

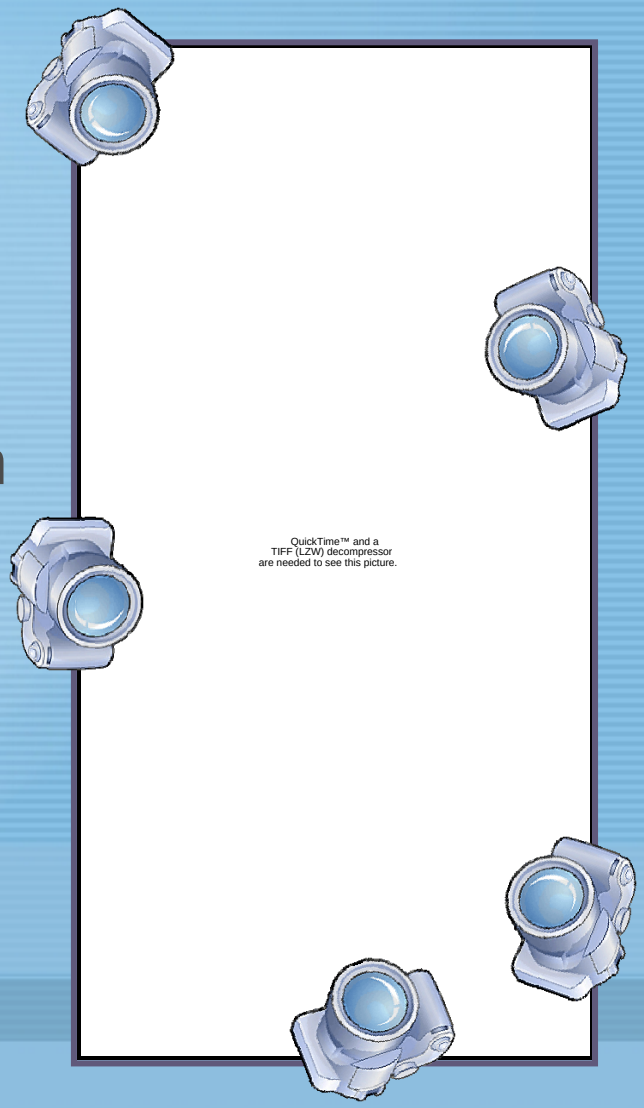


This is not what we wanted..

Core Technology

Vision and Robotics Lab

- Robotics
  - mobile agents,
  - human-machine interfaces
- Vision
  - object detection and recognition
  - human-machine interfaces
- Both - ‘Smart Room’
  - Tracking
  - Activity Analysis



Technology Base

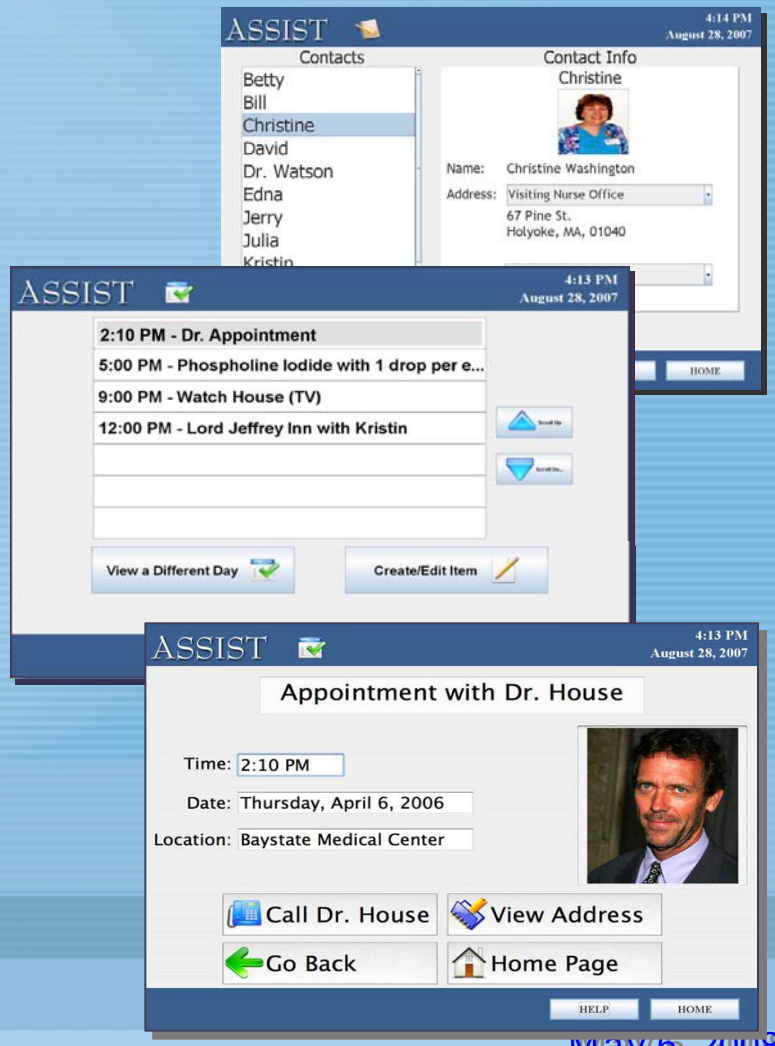
The ASSIST System:

- Task Management ➡ Calendar & Address Book
- Enriched Communications ➡ Videophone
- Safety ➡ Fall Detector
- Life's Annoyances ➡ Object Finder
- Health ➡ Active Cognitive Agents
- Entertainment ➡ Games and Brain Exercises

Task Management

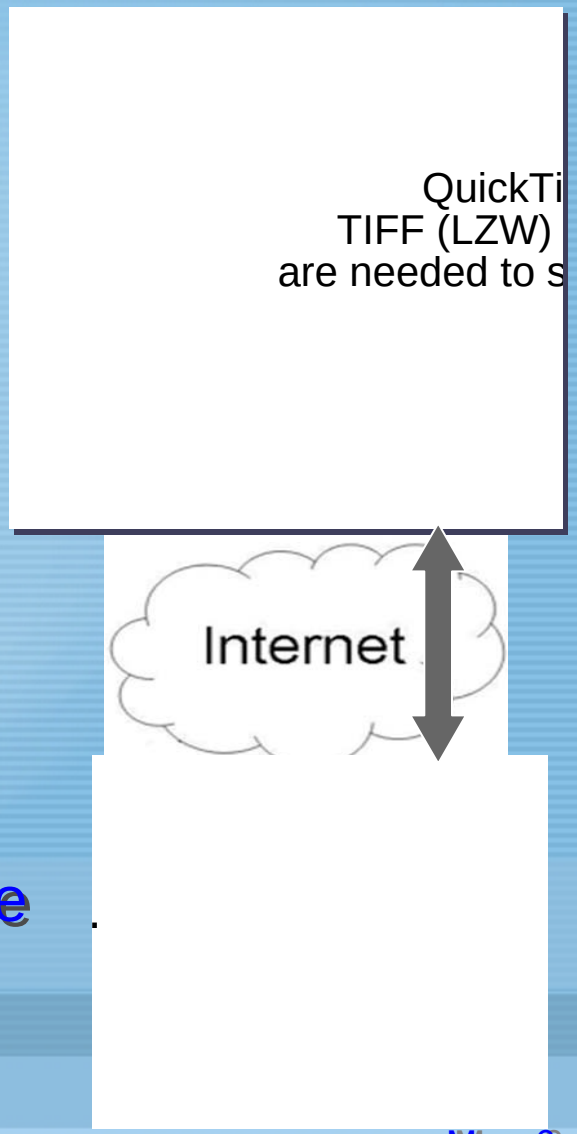
Management of multiple tasks, access to information, and opportunities for leisure

- Information management tuned to the needs of the elderly
- Includes appointment/ medication alerts and reminders
- Clean, simplified interface
- Integration with video phone and address book



Health

Improved monitoring of health status and communication with health care providers through video communications

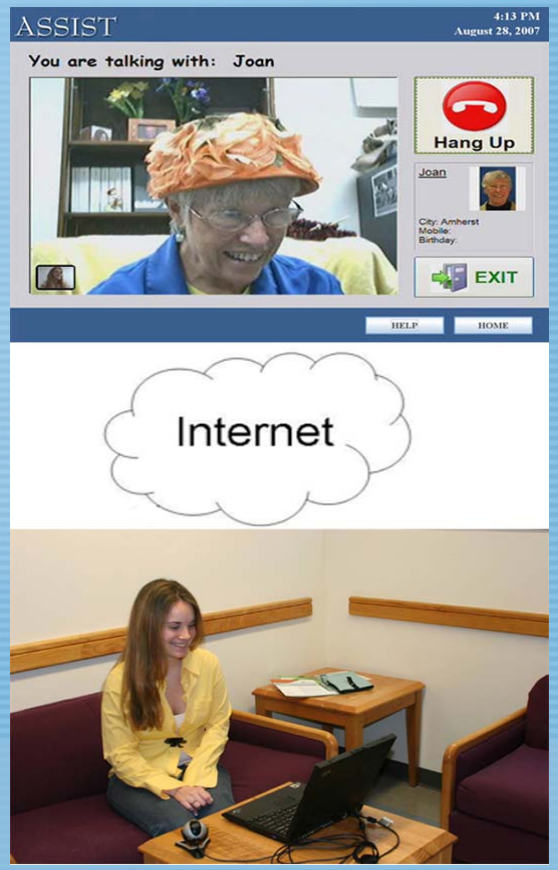


- Reminders for self-management
- Live access to health care providers
- Remote assessment of patient response
- Telemetry of vital signs

Enriched Communications

Improved family and other long distance relationships

- Provides live, face-to-face video and voice communication
- Based on Skype internet telephone services
- Accessible interface customized for elderly needs



Videophone

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H.264 decompressor
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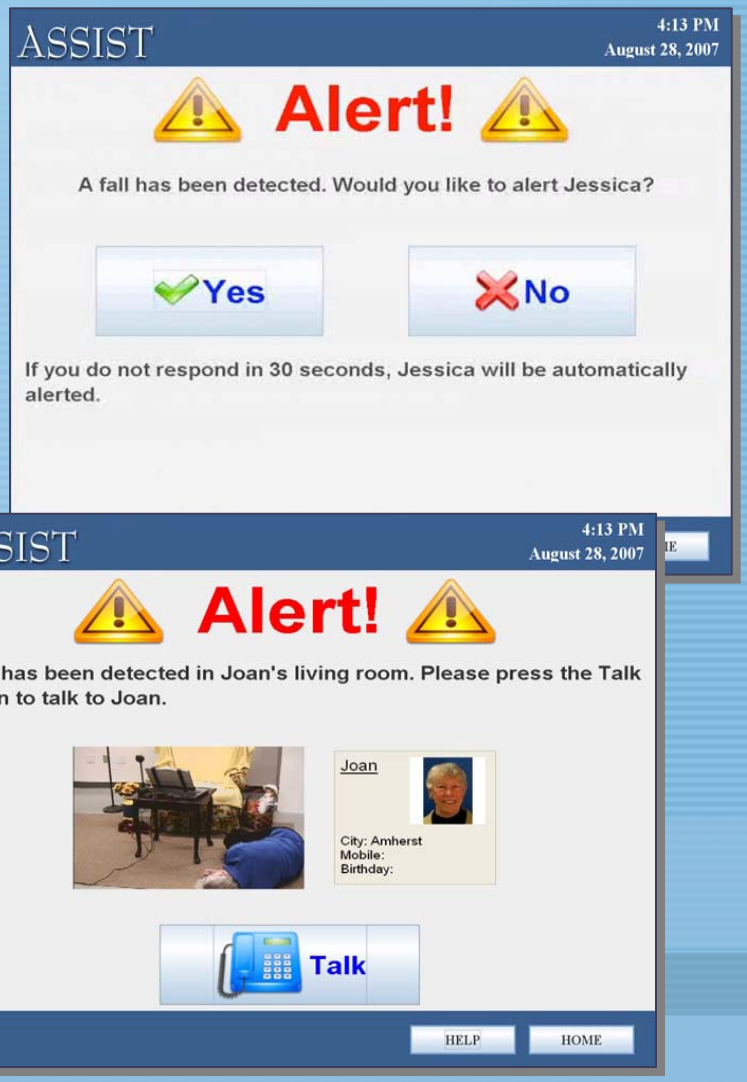
Safety

Monitoring safety in the home with communication about falls

- Distributed sensor network within home except in sensitive areas
- Privacy guards at user's discretion
- Automatic tie to videophone through prioritized list of contacts



Falls

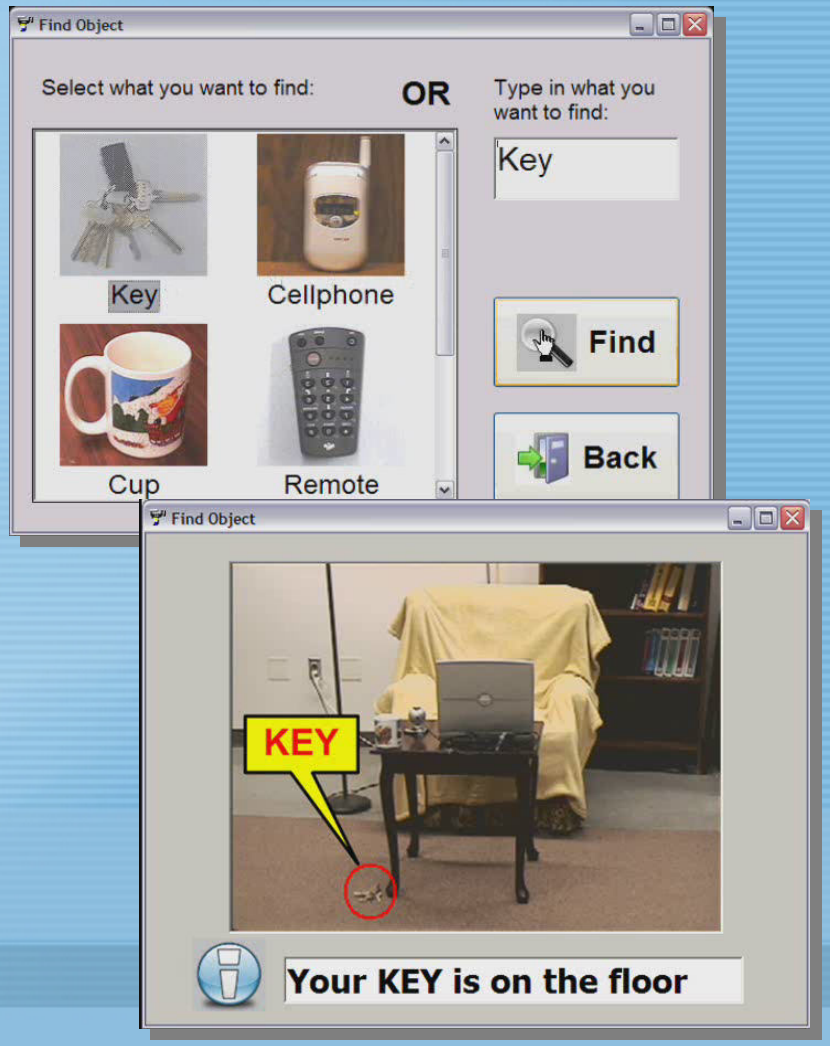
- For adults ages 65 and older, falls at home cause an average of more than
  - 4,700 deaths and
  - 1.1 million medical visits each year.
- Or: every two hours
  - one older adult dies and
  - 250 are treated in ERs for fall-related injuries.

Detecting and Responding to Falls

Life's Little Annoyances

Keep track of and find lost objects: keys, cups, cell phones, etc.

- Utilizes distributed sensor network within home except in sensitive areas
- Allows user to train system
- Identifies objects using distinctive features



Object Finding

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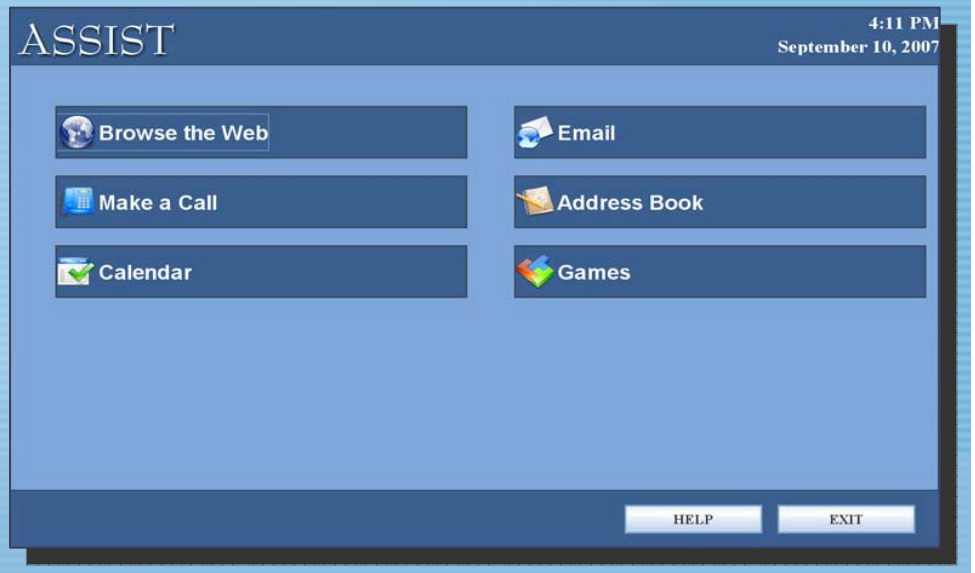
Entertainment

Maintain healthy brain function while having fun.

- Access to on-line games
- Exercise cognitive skills and build social networks
- Recently installed in Bang's Center system
- Very popular
- http://games.aarp.org/

Technology

- Developed with respect to
  - HCI guidelines for older audiences
  - Feedback from focus groups
- Designed to be:
  - Easy to use
  - Flexible
  - Adaptable
  - Easy to Extend
- Field Testing at the Amherst Senior Center



System Issues

Privacy
Access
Client control

Social Issues

- How does living with ASSIST affect:
  - Dignity
  - Autonomy and functional ability
  - General and specific Sense of Control
  - Self-management of chronic health problems

Preliminary Testing Amherst Senior Center

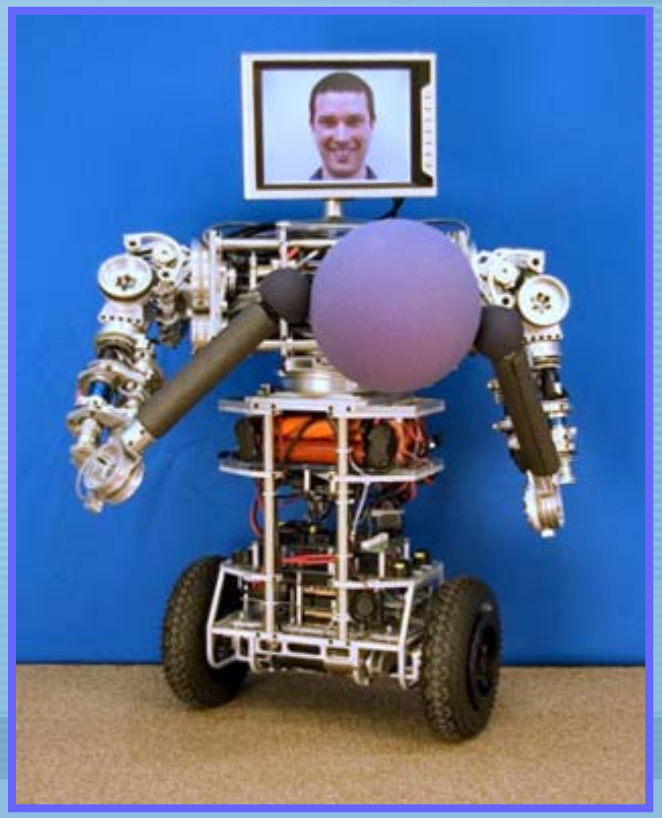
- Installation at Bang's Center
  - No sensor network
- Focus group of about 18 people
- Testing about 2/3 completed
- Several modifications to system
- Very successful

Next Steps

- Installation at Jewish Geriatric Services, Longmeadow, MA
  - "Real world" testing of ASSIST
  - Full version with sensor network
- ASSIST Extension to caregivers
- Robot development

The Future

- Active Cognitive Agents in the Home
  - Customizable
  - Trainable
  - Social
  - Worker



Comments? Questions?

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http://vis-www.cs.umass.edu/projects/hsd/hsdweb/