Technology in Support of Healthy Aging

Innovations in the Design of Electronic Cognitive Prostheses

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Research Framework and Design Space

What cognitive process?
- Reminding, reminiscing, recognizing, finding, communicating, ...

For whom?
- Individuals with Alzheimer's Disease (AD), or Mild Cognitive Impairment (MCI)
- "Normally aging" senior citizens

Who is actually the "user"?
- Person with cognitive impairment
- Caregiver
- Family member

What design approach is to be used?
- User-centered design (UCD), design *for* users
- Participatory design (PD), design *with* users
- Patient-centered design, design *for* individual

What technology to employ?
- Desktop or laptop computers
- Mobile phones
- Streaming media
- Ubiquitous computing devices

Goals for Technology?

Diagnostic
- Detecting cognitive decline

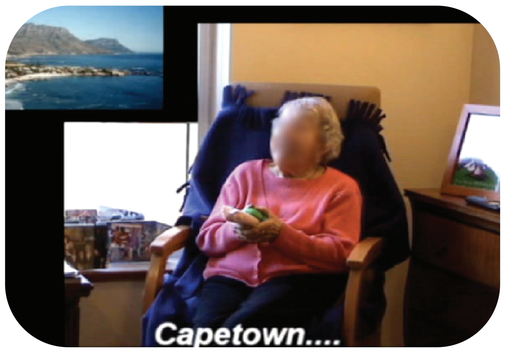
Prosthetic
- Compensating for loss

Rehabilitative
- Improving cognition

Preventative
- Delaying cognitive decline

Ask about our newest project:

Technology to support individuals who feel isolated



Multimedia Biographies

Challenge: Facilitate reminiscing and social interactions for individuals with AD or MCI
Technology: DVD-based multimedia biographies
Participants: 6 AD and 6 MCI patients + family members and caregivers
Outcomes: Engagement, reminiscing, enjoyment, family interaction, legacy for family, understanding/empathy by third party caregivers
INSIGHT: "Cognitive prosthetics" also profoundly psychosocial interventions — identity, personhood, communication, social stimulation

Sponsor: Alzheimer's Association and Intel Corporation

Lifelogging and Digital Storytelling

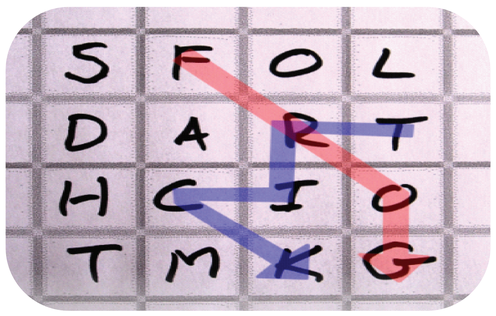
Challenge: Recall recent experiences
Technology: For a series of special outings, compare & contrast the use of SenseCam (passive capture camera from Microsoft Research) image streams to authored SenseCam narratives produced by caregivers
Participants: 12 patients with AD or MCI + caregivers
Conjectured Outcomes: Improved re-experiencing of personal events, family interactions

Sponsor: Microsoft Research

Mobile Phone Software for Name Recall

Challenge: Recalling names
Technology: Mobile phones with location-sensing inference engine – elicit social network, use tags to compute a list of people most likely to be encountered by the user
Participants: "Normally aging seniors" and MCI patients
Conjectured Outcomes: Improved ability to recall names, more confidence in one's abilities in social situations

Sponsor: Bell University Labs



Cognitive Gaming Website

Challenge: Improving cognitive performance
Technology: Website for cognitive and social stimulation via individual, competitive, and collaborative gaming. Also a tool for cognitive research studies
Participants: "Normally aging seniors"
Conjectured Outcomes: Increased cognitive reserve, decreased rate of mental aging, stimulation of online social interactions

Sponsor: NSERC

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