

Towards a pervasive prompting system for older adults with dementia: Improving and expanding the COACH

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March 4, 2011



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TORONTO



IATSL

Intelligent Assistive Technology and Systems Lab

Who we are

- Intelligent Assistive Technology and Systems Lab (IATSL)
 - Engineers
 - Computer Scientists
 - Speech and language pathologists
 - Rehabilitation Specialists



Our Goal

To develop *intelligent* assistive technology that can promote *wellness* and *independence*, without extra burden to the users



Examples of Our Research

- Aging-in-place
 - Personal Emergency Response System (PERS)
 - Unsafe stair use detection
- Rehabilitation Support
 - Stroke rehabilitation
 - Conscious control of autonomic physiological signals
- Older adults with dementia
 - Anti-collision wheel chairs
 - *COACH*
- Children with Autism



Dementia

- The world's population is aging, causing a significant increase in the proportion of elderly people (60+)
- Age is the leading risk factor associated with dementia
- Estimated worldwide cost of dementia:\$604B or 1% of the worlds GDP
 - Informal care (personal expense) contributes nearly half this cost (42%)
- High costs and limited formal caregiving resources are driving the necessity to support aging in place
 - **Technology** to **support** people with dementia is one potential solution



Cognitive Orthosis for Assisting Activities in the Home

- COACH is intelligent technology that is able to assist with ADL completion
 - Increase quality of life for older adults with dementia and their caregivers
 - Reduce caregiver burden
 - Promote aging-in-place

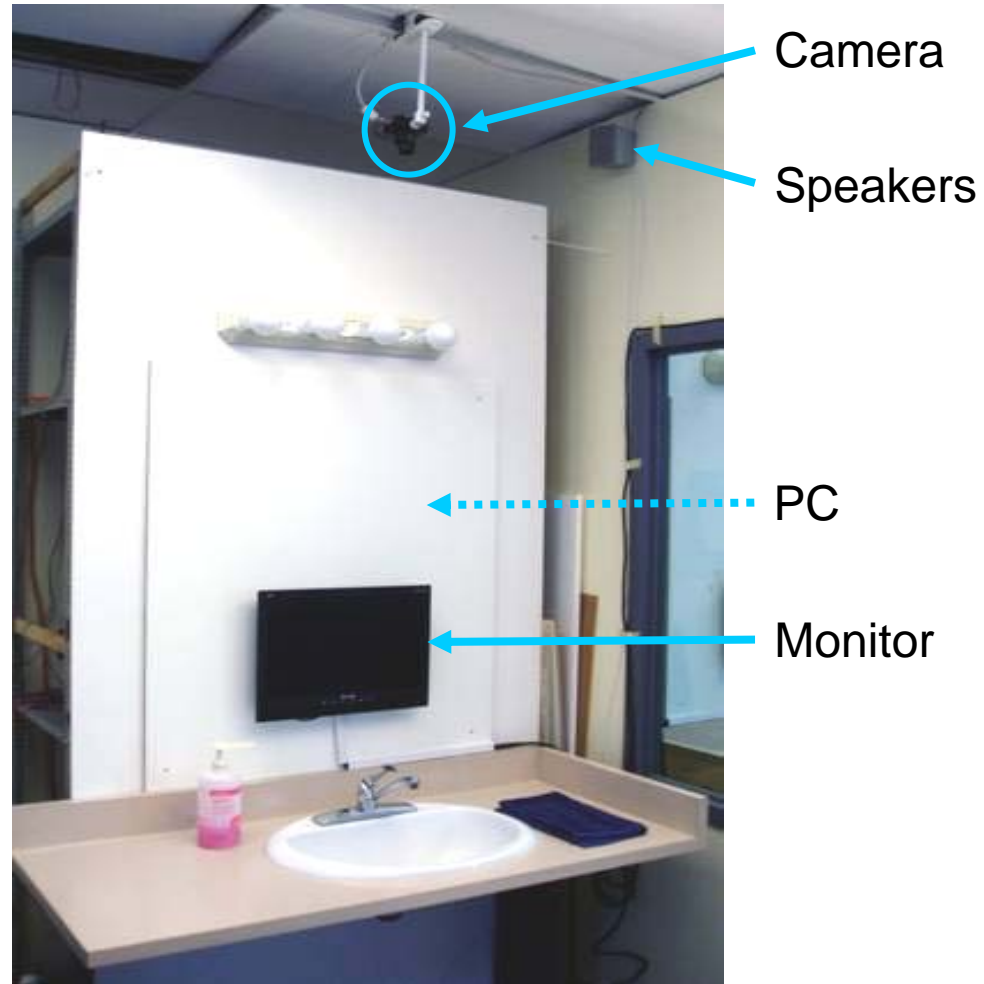


The COACH

- The current COACH :
 - Assists with the task of handwashing only
 - Has undergone extensive laboratory and clinical trials
- Several years of development in three main areas:
 - Sensing/tracking
 - Planning
 - Prompting strategies



The COACH



COACH in Action



COACH in Action



The Next Step...

Get COACH working in a home...
...as a product!



Participatory Design

- In participatory design end-users work with researchers and developers during an innovation process.
- Potentially, they participate during several stages of an innovation process:
 - Initial exploration and problem definition
 - Idea/solution generation
 - Development
 - Evaluation of proposed solutions.

Identifying User Needs

- Family Caregiver Questionnaire
 - Completed online by family caregivers of people with dementia
 - Activities of Daily Living from three perspectives
 1. Independent completion of ADL by a person with dementia
 2. Caregivers assisting completion of ADL
 3. Supporting ADL with Assistive Technology
 - Three categories for features & functions
 1. Physical appearance
 2. Functionality
 3. Cost

Identifying User Needs

- Caregiver focus group
 - Focus group guide created from emergent themes in survey data
 - Explored ADL in more detail
 - We challenged participants to “design” the technology:
 - Aesthetics – look, feel, shape, size
 - Features/functions – user interface, level of autonomy, interaction types
 - Installation – where, how



Preliminary Results

- Additional daily tasks
 1. Personal Activities: showering, bathing, getting dressed, using the bathroom
 2. Daily Hygiene Activities: washing hands, brushing teeth

- Features and functions
 - Device Visibility
 - Caregiver's Technical Competence
 - Caregiver's Available Time
 - Device Accessibility
 - Device Capability
 - Device Cost



Future Work

- How do we make the COACH flexible and expandable?
 - Able to support multiple ADL
 - Able to handle different abilities of users
- How do we reduce the front-end development time?



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