Independent LifeStyle Assistant

An advanced technology research program

- Sponsored by National Institute for Standards and Technology’s Advanced Technology Program
- 2.5 years
- 5 million dollars (60% Honeywell/40% NIST)
- Honeywell, U of M, Evercare, SIFT

Objectives

- enable elderly to live and function safely at home
- provide peace-of-mind to caregivers and family
- cost savings for Medicare/Medicaid and industry
- market growth for in-home product producers
ILSA Motivators
Elder Preferences

30% of elders prefer to remain in home until death
   - Health Care Financing Administration

Decreasing number of caregivers
   - families are more distributed
   - families are smaller

Nursing home capacity limited
   - 43% of those over 65 enter a nursing home
ILSA’s "Customers"

- Installation
- Emergency Services
- Professional Care Givers
- Care Recipient(s)
- Family
- Assisted Living Facilities
- Monitoring Services

- Customers
  - Insurance (commercial)
  - Gov't (Medicaid)

- Users

- Honeywell
  - Homes & Buildings Controls

- High Risk
  - Etc.

- Low Risk
  - Advance SOA, Productize

- ILSA Research

- American Business and Consumers

- NIST

- American Business and Consumers

Chris Miller, International Association of Gerontology, 1-6 July 2001
Honeywell and ILSA 5-21-01
What will ILSA do

- listen to the home and talk to devices
- understand what activities are going on
- look for unusual events
- interact with elder
  - alert
  - query
  - instruct
  - guide

What will ILSA look like

- invisible network of sensors and devices
- no central computer workstation needed
- use existing devices to communicate with elders
- remote access for caregivers
ILSA Vision
Current State: Smart Devices

Smart devices...

Current temperature is 84 degrees

The stove has been left on for 46.3 minutes!

Linda is calling.

You need more milk.

It's time to take your medicine!

I've fallen, and I can't get up!

...that don't talk to each other

Ö and can behave inappropriately
ILSA Vision
State of Art: Networked Smart Devices

Networked smart devices...

Okay. I'll turn up the air conditioning.

You need more milk.

Linda is calling.

So?

Current temp. is 84 degrees

The Stove is been left on for 46.3 minutes!

It's time to take your medicine!

I've fallen, and I can't get up!

So?

...that don't understand each other

Ö and can behave inappropriately
I’ve fallen, and I can’t get up!

Thermostat, be quiet for now.

Phone, disconnect Linda and dial emergency support. Now!! I’ll talk when you connect.

Stove, turn yourself off.

Fridge, we’ll take care of the milk later.

[via speaker] Lois, are you all right?

Ö for appropriate, coordinated behavior in context
It’s time to take your medicine!

Lois ate breakfast in the kitchen at 8:20.

Lois is fine.

Mom’s having a good day!

Lois is in the living room.

Caregiver

Lois is doing fine. I’ll check on her again this afternoon.
Tentative Architecture

Communications
- Notifications
- Subscriptions
- Requests

Interaction Design System

Log
Client Model
Home Model
CG Model

Infrastructure
- Home Controller
- Sensors
- Actuators

Adaptor

Reasoning Modules
- Locator
- Activity Mon.
- Security
- Emergency
- Falls
- Stove Mon.
- Reminders
- Diabetes Mgr.
- Diet Mgr.
- Cog. Skills Pkg.
- Bathroom Mon.
- Etc.
- Etc.

Caregivers

Client

Honeywell and ILSA 5-21-01
ILSA User Studies

Identified precipitating factors for elder institutionalization
  ï literature reviews
  ï interviews with caregivers
  ï discussions with geriatric and gerontology specialists

Identified assistance needs
  ï what activities do elders and their caregivers need assistance with

Identified technology opportunities
  ï how might ILSA assist with these activities
Assistance Needs

**Level 1**
- Medication Management
- Eating (incl. Food Prep. and Diet Mgmt.
- Mobility (incl. Falls)
- Cognitive Disorders
- Safety (incl. Fire & Burglary)
- Caregiver Burnout
- Isolation
- Transportation
- Money Management

**Level 2 & 3**
- Incontinence
- Housework and Laundry
- Shopping
- Remote Control Usage
- Pressure Sore Prevention
- Alcohol Abuse
- Wandering
- Hallucinations and Delusions
### Assistance Opportunities

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ADLs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In/Out Chairs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dressing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bathing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toileting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Mobility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IADLs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shopping</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>House chores</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meal Prep.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mng. Finances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Chris Miller, International Association of Gerontology, 1-6 July 2001
Honeywell and ILSA 5-21-01
Technical advances offer the promise of an improved quality of life for elders desiring to live independently in their own homes, increased peace of mind for their families and friends, and potential cost savings for caregiver agencies.
Smart Homes: The Challenge?

- Vastly diverse needs, capabilities, contexts
- Good Cost/Benefit Ratio
- Population can’t always be relied on to correct technology mistakes
- **Enhance** independence and Quality of Life

Versatility
Affordability
Reliability
Usefulness
Home Comfort Solutions

Electro-Mechanical Thermostats
- The Round™

Electronic Thermostats
- Non-programmable
- Programmable
  - Good
  - Better
  - Best

Zone Control Solutions
- Trol-A-Temp® Systems
- Network Zoning featuring low-cost communications
- Telephone Access Module

The Most Comprehensive Comfort Solution Portfolio
A Look at the Home of the Future

Entertaining
Safe and Secure
Convenient

Comfortable

Healthier

Multiple Services

Networked

Internet Enabled

Integrated Connected Solutions

Honeywell Laboratories
ILSA User Studies

Elders
Informal caregivers
Formal caregivers
Formal care institutions
Insurance companies
Government agencies
NIST
Honeywell
et al