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Affordable Robotic Intelligence for Elderly Support

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Supported by: 

Interdisciplinary Team

Behavioral Science and Design

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Computer Science and Robotics

- Michael Littman, CS Brown, Peter Haas, HCRI Brown

Psychiatry and Clinical Psychology

- Gary Epstein-Lubow, Hebrew Senior Life, Boston, MA
- Michael Armey, Butler Hospital, Providence, RI

Ageless Innovation (⇐ Hasbro)

- Andrew Jeas
- Ted Fischer

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Aims

- Not an intervention to combat dementia

An intervention to support individuals with the challenges of aging, with or without dementia.

- Not to replace health-care professionals or family members

A technology that helps lighten the burden on family members and the healthcare system.

Affordable assistance with small but challenging tasks of daily living; connecting with friends and family; and relieving agitation and loneliness.

- Not a robot server, therapist, entertainer

But a comforting and understandable robot companion.

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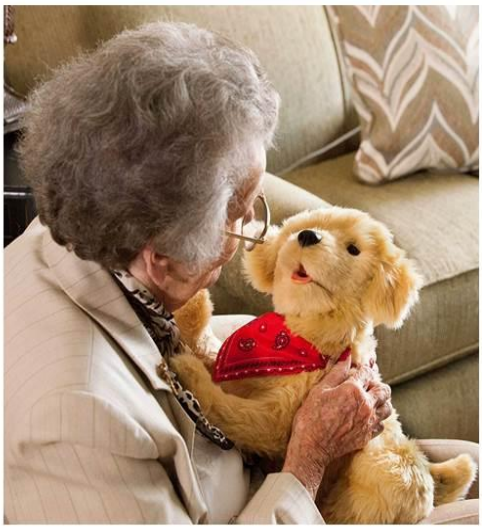
Starting Point:

Joy for All COMPANION PETS

Ageless Innovation

Dementia SMART Award Winner

2017 CAREGIVER FRIENDLY AWARD CAREGIVER.COM



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Existing Strengths

Comforting, familiar, non-threatening
Creating limited expectations
Affordable (~$100)

New Intelligence

Perception, memory, nonverbal communication
→ tracking of lost objects, helping find them
→ fall detection, medication reminders, social contact reminders, vitals or other behavioral data...

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Project Components

- Use behavioral science methods

To assess older adults' major challenges of daily living with which a small, affordable robotic system can assist.

- Apply inclusive design principles and cutting-edge computer science

To alleviate help some of these challenges.

- Use a systematic, longitudinal assessment of the developed system

To establish safety, efficacy, and acceptability for older people with or without cognitive impairments.

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Challenges Assessment

- In-person standardized interviews
  Independent living facilities; starting in memory care facility
- Online survey with representative samples
- Small-sample longitudinal study

With care recipients as well as for informal caregivers

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Preliminary Results (50 healthy adults > 65)

Top 5 Challenges

Difficulties with **technology** (e.g., cell phone, computer, TV remote)
Difficulties with **misplacing** or losing things (e.g., glasses, keys, phone, wallet).
Difficulties moving myself from seated to standing position or getting in/out bed
Difficulties with my **moods**, with keeping a positive outlook
Difficulties with speech and language (e.g., speaking clearly, finding the right words, holding a conversation)

Top 6 Adoption Reasons

Measuring **vitals** (e.g., heart rate, blood pressure)
Locating **lost objects** (e.g., keys, reading glasses, wallet)
Detecting falls and calling for help in medical emergencies
Playing cognitive games for cognitive health
Reminders of medication, appointments, exercise, etc.
Connecting with friends and family

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Technical Elements

Detailed analysis of existing pet companion

Enhancing sensors, information processing and storage

→ Infrared +

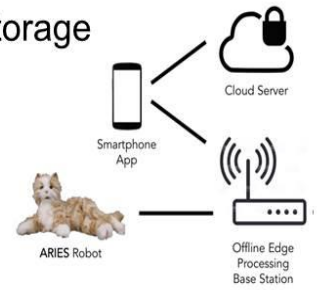
→ Edge processing (smart phone, hub)

Enhancing movement for communication

- Test possible "vocabularies" (paw, head, sounds...)

Software development

- Learning objects and locations through encounters
- Respond to inquiry ("where are my glasses?")
- Locate objects
- Guide care recipient to lost object



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