

Towards Agentic AI-based Personalized Coaching for Social Health: A Focus on Older Adults Living Alone with Early Cognitive Decline

An AIM-AHEAD Hub-Specific Project

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OBJECTIVE/PURPOSE

- **Fostering social connection to reduce trajectories of cognitive decline**
 - Loneliness has a profound negative impact on cognitive health and overall well-being
 - Social systems and social connection bolster neurophysiological processes crucial for health
- **Innovating personalized, responsive AI**
 - Recognize behavior and emotion patterns in older adults and provide dynamic responses that can promote social connection
 - Develop community-engaged, participatory agentic AI research benefiting older adults

METHODOLOGY

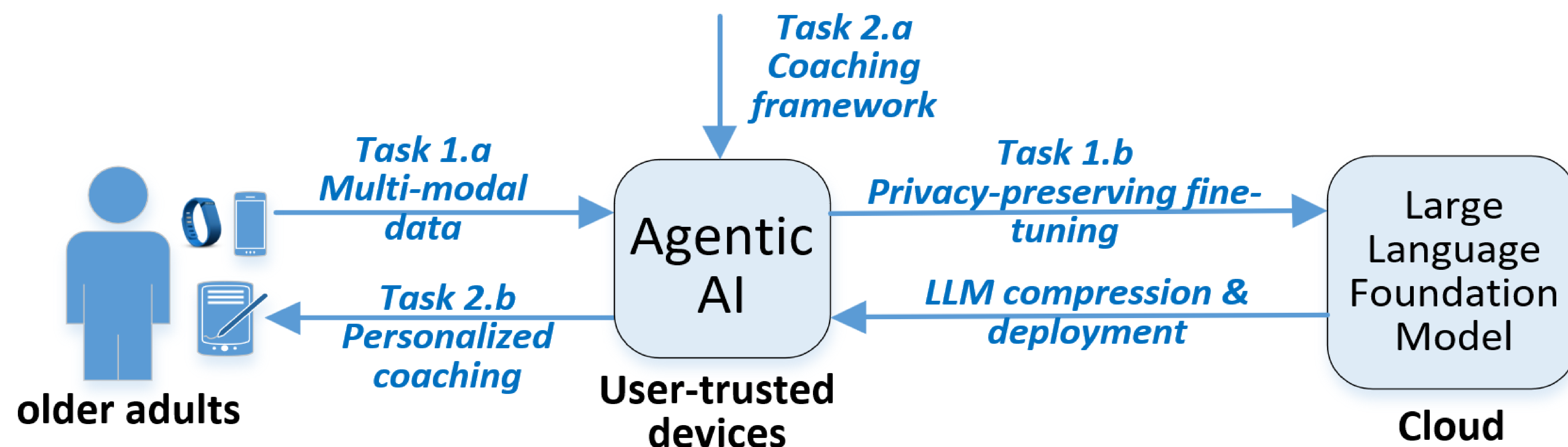
- Participants: ~50 adults aged 50+ years (to capture transition from mid-age) living alone with signs or experiences of early cognitive decline
- Procedure: Iterative pilot-testing and feedback sessions (individually and via focus groups)
- Measures: Sensor data, ecological momentary assessment ratings (e.g., of social contact, sleep, mood, physical activity, cognitive performance).
- Analyses: Identify predictive indicators of social isolation and loneliness
- Develop privacy-preserving fine-tuning of foundation AI models for loneliness prediction
- Establish a responsive AI coaching framework
- Develop agentic AI personalization to deliver coaching that can benefit individual participants' social health and in turn cognitive health

RESULTS

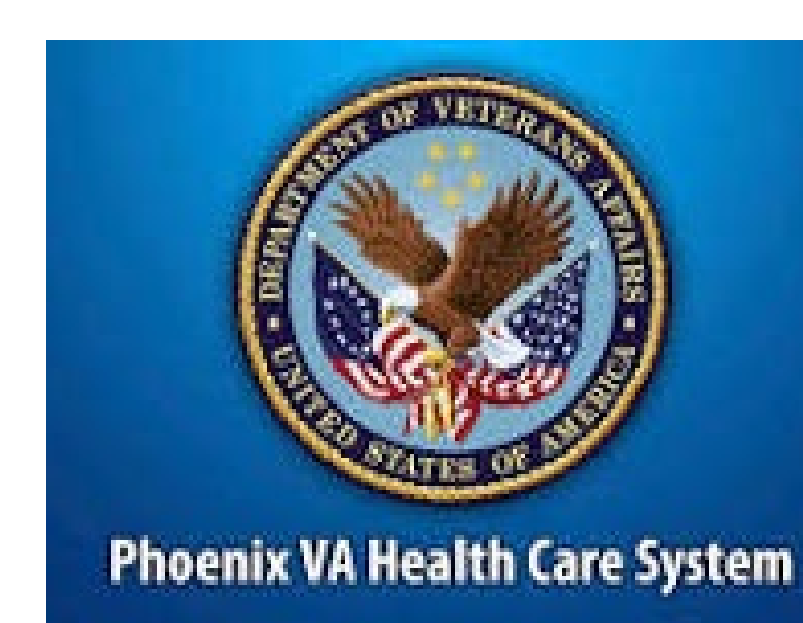
- Developed an initial multi-agent AI prototype for social health coaching
 - Analyzed behavioral trends, retrieved longitudinal context, co-constructed goals with users
- Evaluated the AI coach using public datasets
 - Developed a coding system and methodology using LLM-as-Judge, human expert judges
- Developed a mobile app to collect data from older adults living alone with early cognitive decline
 - Passive sensing, daily Ecological Momentary Assessment
- Established an advisory board of key community stakeholders actively participating in the project

CONCLUSIONS & ONGOING WORK

- **Promising initial results**
 - Established the feasibility of agentic AI based social health coaching through internal tests
 - Created the tools and infrastructure for data collection and research with real users
 - Established key community partnerships for developing AI research benefiting older adults
- **Active ongoing work**
 - Data collection from real older adult users
 - Privacy-preserving LLM fine-tuning and agentic AI personalization for effective coaching
 - Continuous engagement of community partners



COMMUNITY PARTNERS



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