

Smart Aging: Connecting Communities Using Low-Cost and Secure Sensing Technologies

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Community Identified Problem

- Large and growing percentages of 65+ older adults aging in Suffolk County, NY and the nation (25% and 13%) create a “Silver Tsunami”
- 80+% of older adults want to live independently at home with quality of life, autonomy and dignity, causing a social and economic crisis, overwhelming care providers, facilities and hospitals

Intellectual Merits

- Robust, secure, affordable sensing technologies for longitudinal monitoring of vital signs, physical activities and social interactions, combined with analytics for detection of emergencies, and early indicators of health changes in a privacy-preserving, nonintrusive manner
- Social solutions to foster positive perceptions and greater adoption of technologies, effective data representation and delivery means to stakeholders, and quantitative, data-driven measures for social determinants of health

Project Activities and Outcome

Informed by needs of older adults in vital signs and physical activities monitoring with privacy protection, we have developed

- A non-touch sensing prototype using a UWB radio and depth camera for heart and respiration rate estimation
- Validated the prototype in an engineering lab for stationary human subjects, secured IRB approvals and further evaluated on patients undergoing cardio-pulmonary exercise testing

Informed by perceptions and obstacles in technology adoption learned from 7 discussion groups with 73 older adults, we

- Created 5 patient-case vignettes to help facilitate technology adoption discussions that are customized and relatable to audiences of different cultural and educational backgrounds
- Presented to different audiences (industry, community and academia) of our discoveries and technology development
- Developed and are teaching undergrad and grad course/lectures on aging and technology, recruited and will get more students from multiple disciplines to work on the project
- Are expanding community partnerships to reach older adults with low vision, minority and underserved communities

Immediate Impact

- Change the conversation among stakeholders (e.g., older adults, caregivers, care providers) on technology adoption to facilitate aging in place with quality of life, autonomy and dignity
- Low cost, secure sensing technology requiring zero physical or cognitive efforts for home-based longitudinal data collection and monitoring

Lasting Impact

- Change the practice of care delivery through technology adoption to sustain independent living of older adults utilizing continuous home-based sensing data while preserving privacy
- Alleviate the burden of family caregivers, care providers, and the general health system to address the “Silver Tsunami”

Next Steps

- Validate and further improve the suitability and maturity of sensing hardware using a simulated home environment, develop guidelines for sensor installation and usage
- Obtain a comprehensive understanding of attitudes and perception obstacles to sensing technology adoption using customized vignettes of fictional personalities, engaging multiple stakeholder groups (e.g., older adults, care givers, and providers)
- Invite select students from our courses to join our research group to create a more diversified study team