



Challenges in Developing Remote Monitoring Technologies for Aging with and into Disabilities

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Outline

- What are the Healthcare Needs of the Aging Population?
- A Solution for Aging into Disabilities that Affect Mobility
 - Point-of-Care Mobility Monitoring Systems (PoCM-MS)
- Addressing the Challenges through Staged Prototype Development
- A Sneak Peak



Aging

Our great success of the 20th Century

The Longevity Dividend

- Refers to the economic benefits of ending aging and eliminating the associated health care costs.
- The Longevity Dividend has been defined as "the sum of health, social and economic benefits that result from slower aging."

Disability



Our challenge for the 21st Century

- Disability is a progressive process
 - The process is dynamic
- The disability state can be modified
 - Targeted simple, low-cost prevention, health maintenance, or continued functional recovery programs
 - Psychological, physiological, and environmental factors

Crimmins et al., 1994

What are the Healthcare Needs of the Aging Population?



- One in 6 adult Americans lives with a disability
- Higher risk for multiple chronic conditions
- People with disabilities are more likely to:
 - Report their health to be fair/poor
 - Have unmet health care needs than non-disabled peers.
- \$400 billion is spent annually on disability-related health expenditures.

Eileen Crimmins, USC Davis School of Gerontology; Public Health Grand Rounds, Dec 18th, 2012

Societal Goal: Aging in Place



- Keep people in their homes longer
- Close the gap between evidence and practice
- What worries Seniors about the future?
 - Frustration at being immobile
 - Overall effects of frailty
 - Isolation
 - Autonomy

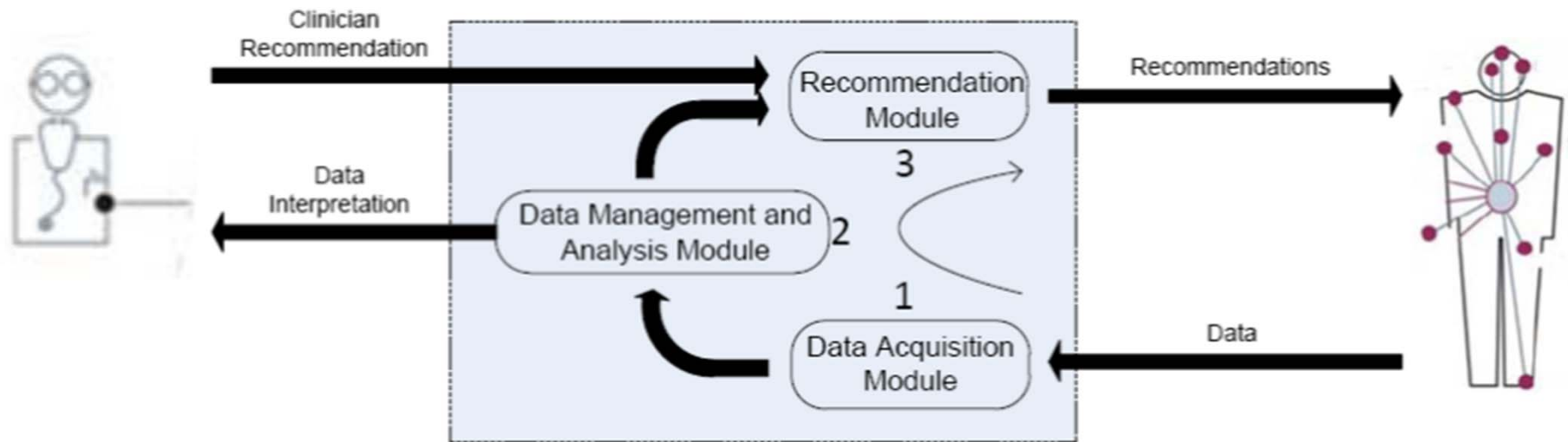
Independent for Life, *Homes and Neighborhoods for an Aging America*, H. Cisneros, M. Dyer-Chamberlain, J. Hickie (Eds.). University of Texas Press, Austin. 2012

A Solution for Aging with Disabilities that Affect Mobility



- Develop a prototype Point-of-Care Mobility Monitoring System (PoCM-MS)
- Use smart phones, tablets, bluetooth devices and computer gaming technologies to create technology platforms for monitoring and rehabilitation
 - Personalized medicine

Schematic of a PoCM-MS



First Prototype to be developed for monitoring patients with Parkinson's Disease

Parkinson's Disease



- Approx. 500,000 cases in the US
 - 50,000 new cases per year
- Progressive neural degenerative disorder leading to the loss of dopaminergic neurons in the midbrain
- Symptoms include mobility disorders
 - Slowness of movement, tremor, rigidity and postural instability
- Pharmaceutical intervention to ameliorate symptoms
 - Serious adverse effects: nausea, dizziness, postural hypotension, etc
 - Long term use of L-DOPA results in motor complication including dyskinesias
- Deep Brain stimulation

Addressing the Challenges through Staged Prototype Development



1a,b

3-D Motion Sensing System for Interactive Gaming (MS Kinect)

2

Wireless Communication Device

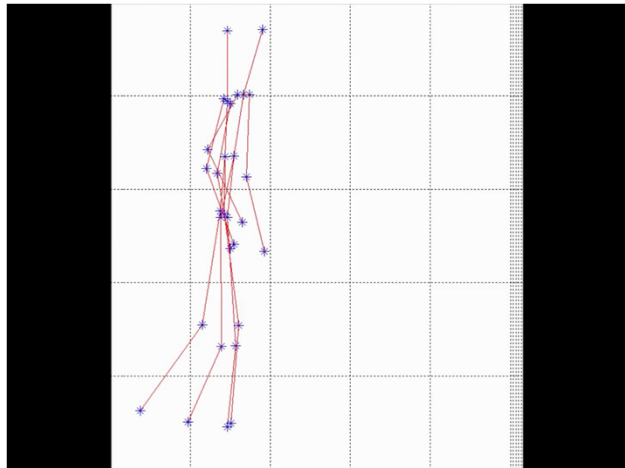
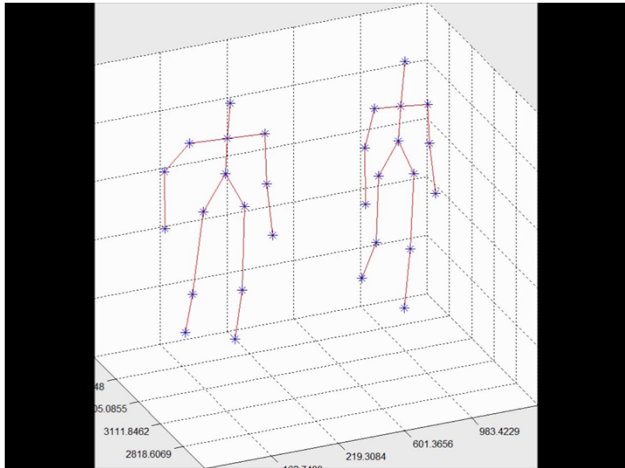
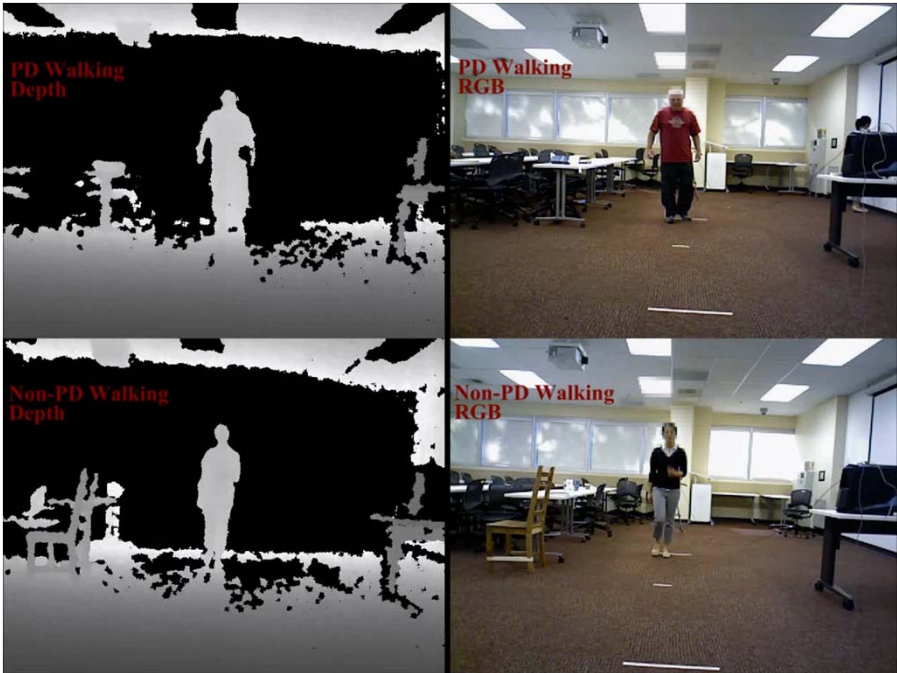
Body Sensors

Use accepted clinical mobility performance tests to create tools for assessment in the clinical^{1a}, home^{1b,2} and natural environments²



A Sneak Peak

(Prototype Stage 1a)





Thank You

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