Computer Vision-based Approach to Maintain Independent Living for Seniors

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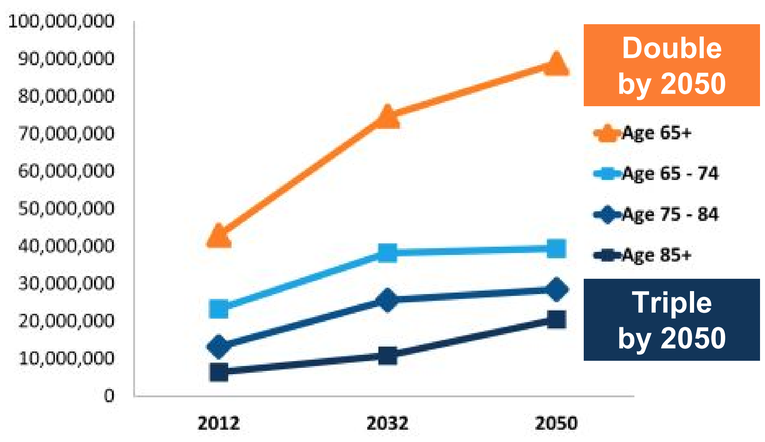
Background

Senior Population

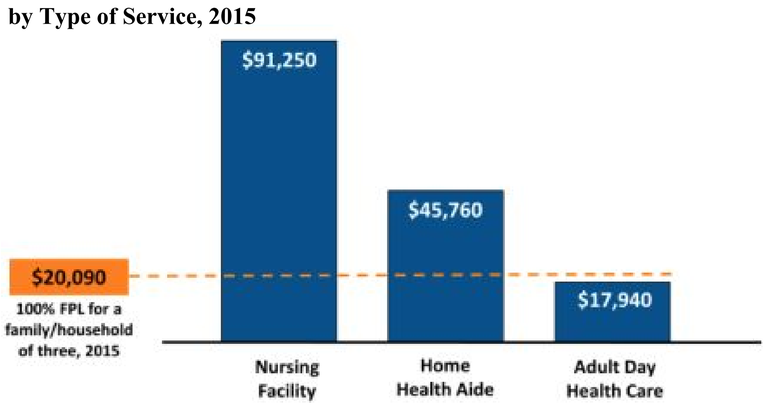


1.3 million people live in seniors homes in the US

83 million will be age 65+ in US by 2050

Median Annual Care Costs

by Type of Service, 2015



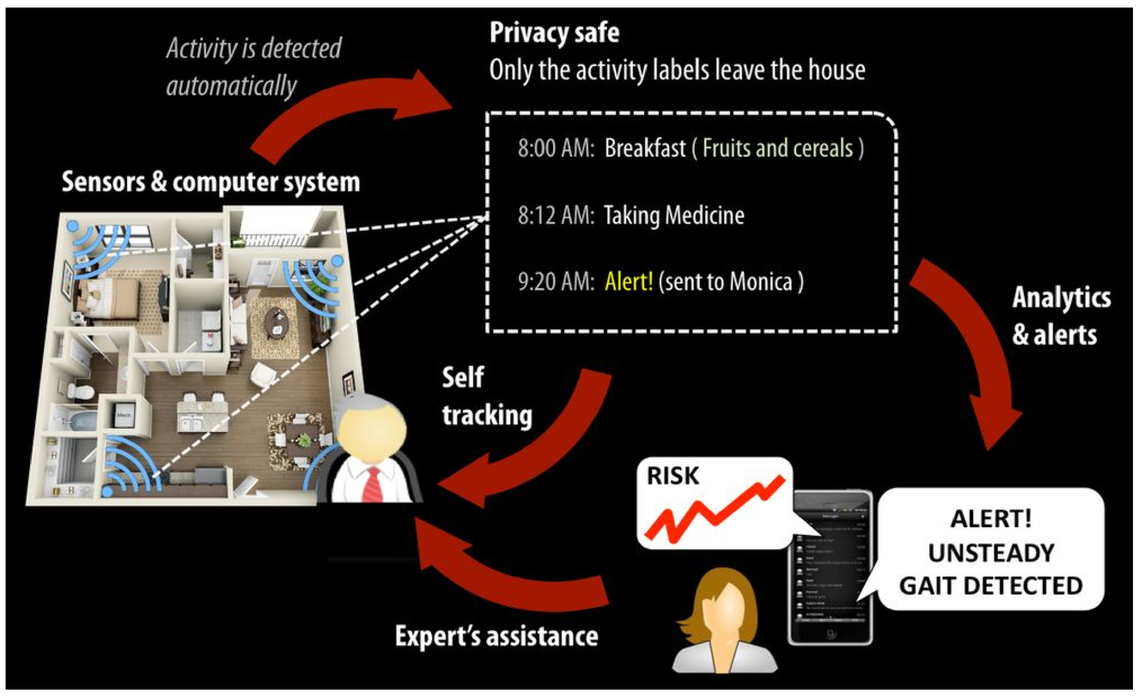
34% of US health spending is on seniors

3% of US GDP is spent on Medicare costs

Objective

A cost-effective solution for monitoring, assessment, and support of

- Seniors at risk for losing independence
- Those already in long-term care



Expert Geriatrician-selected Activities

Mobility	Infection	Sleep	Diet
Falls Slowed movements Unstable transfers Front door loitering Immobility	Fever Urinary frequency Respiratory rate	Sleeping Day/night reversal	Eating Fluid intake Alcohol consumption High salt intake Pill consumption

Contact Information

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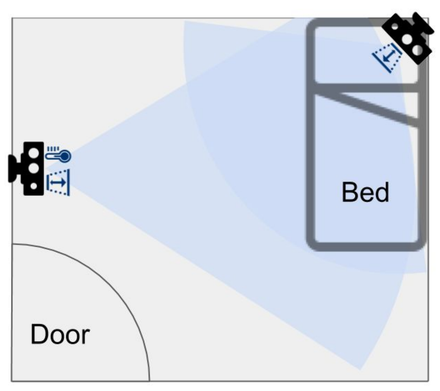
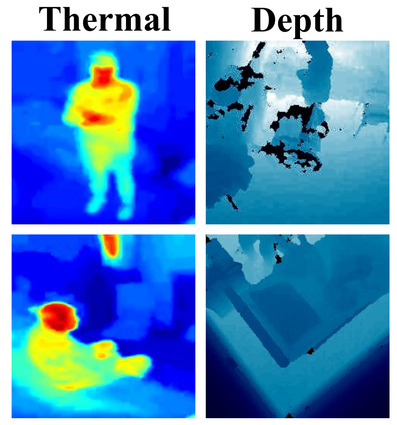
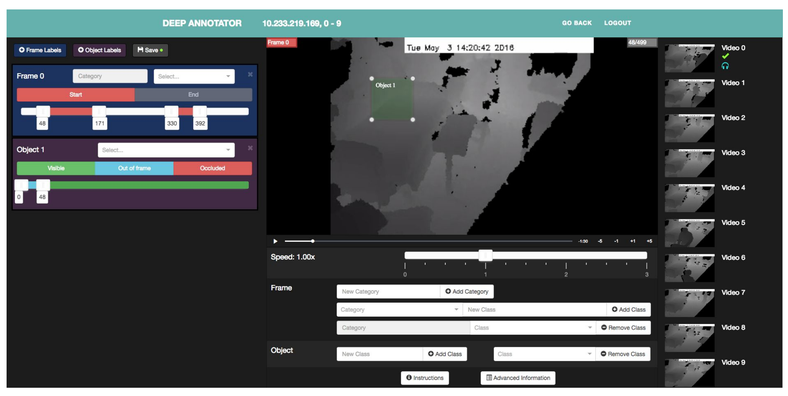
Research Design

1. Video data collected via **privacy-safe** sensors (depth and thermal)

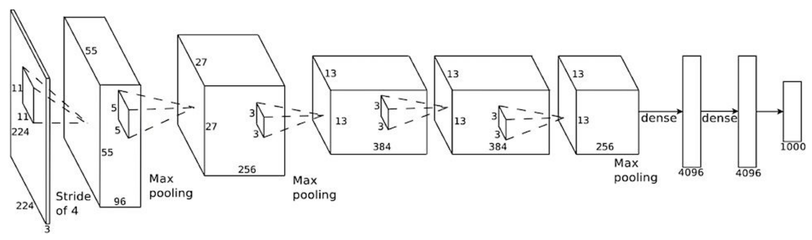




2. Combination of automated and manual data annotation

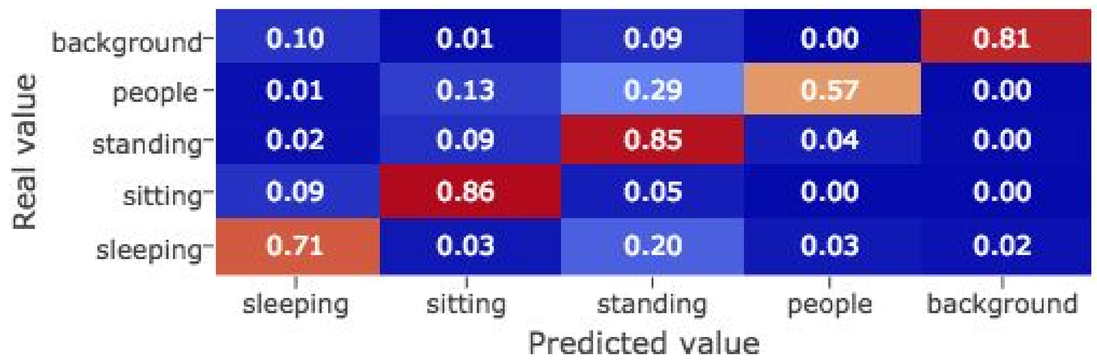


3. Train **Convolutional Neural Networks (CNNs)** on the annotated data to classify these activities



Preliminary Results

71-86% accuracy on detecting fundamental activities on **Thermset** (214 hours of thermal video).



Conclusion

- It is viable to use privacy-safe sensors for monitoring elderly citizen, and can potentially allow for them to receive the care that they require from the comfort of home.
- We aim to identify elder patients who are at risk for requiring long-term care, and to provide feedback to caregivers that would support their safe and independent living.

Reference

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[4] G. Pusiol, F. Polacov, and P. Pusiol. 2017. Thermset: A thermal database of seniors living independently and in nursing homes. https://github.com/activityrecognition/ARTraining