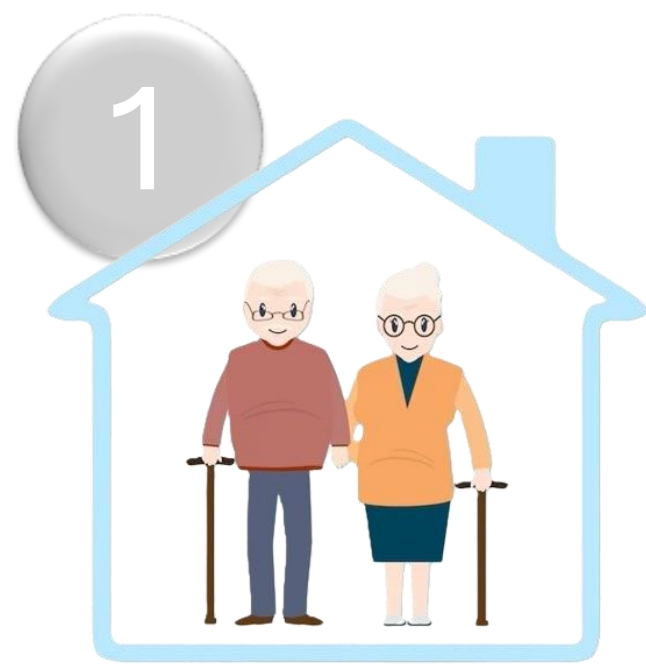


Turning data into safety: A data-driven approach to mitigating fall risks for ageing adults with type 2 diabetes

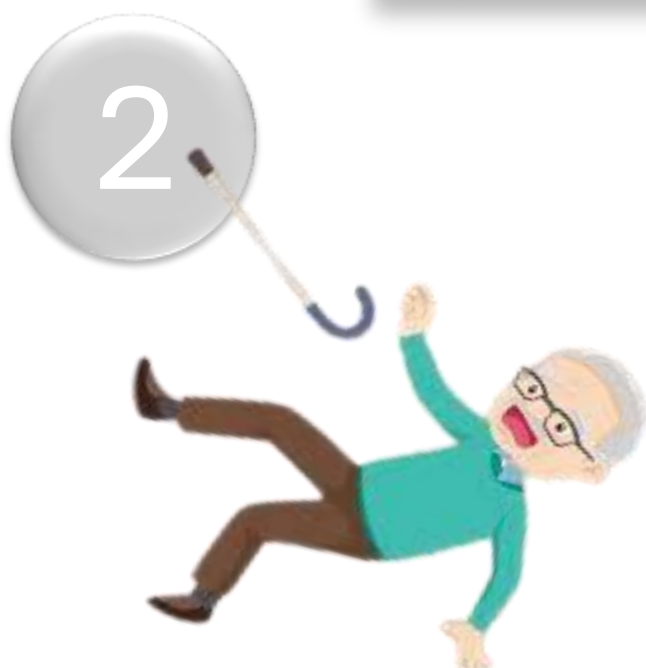
Nida Afzal, Amy D Nguyen, Annie Y S Lau
Australian Institute of Health Innovation, Macquarie University, Sydney

Introduction



Growing need for safe independent living

With rising prevalence of type 2 diabetes (T2D) among ageing adults, the need for safe, independent living environments grows



Challenges of functional decline

Progressive decline associated with T2D increases fall risks and complicates daily activities



Limited research on environmental impact

Despite existing self-management interventions, there is little research on how home environments impact safety and independence



Study objective

This study analyses real-world home data to identify environmental challenges such as poor lighting, clutter, and obstacles in trafficways



Anticipating future declines

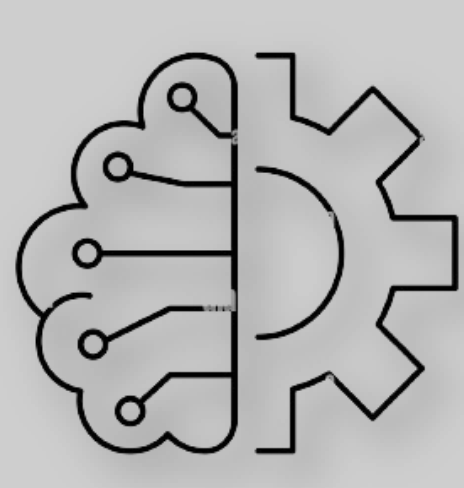
By considering future declines in vision, cognition, and mobility, we aim to mitigate risks before they arise

Methods



Data Collection

~5000 images per patient (26 older people with T2D) using body worn cameras¹



Activity Classification

Use Machine Learning to classify images into 12 activity classes²



Manual Image Coding

Health management activities, technological interactions and environmental context coded using a validated tool³



Risk Identification

Identify areas where future decline might pose challenges by anticipating potential physical, functional and cognitive limitations



Formulating Recommendations

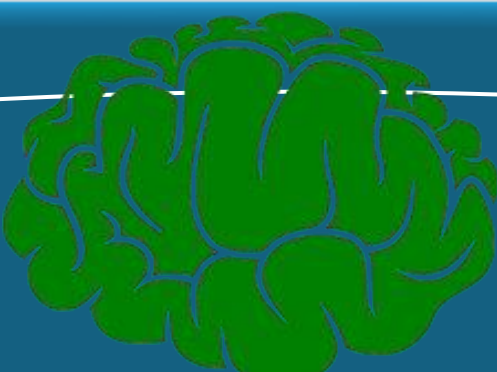
Digital interventions and environmental modifications



Results

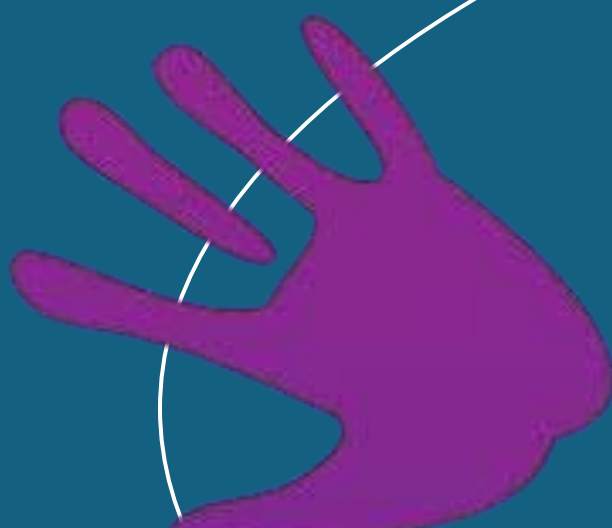
Preliminary Analysis

4 older people with T2D,
22 images



Cognitive Challenges

Confusion or difficulty navigating cluttered environments



Fine Motor Skill Challenges

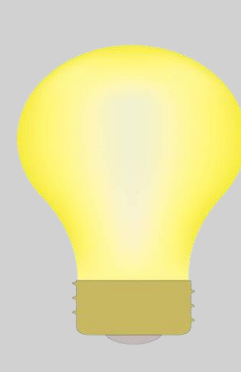
Difficulty administering medication

Environmental Hazards



Clutter

Recurring in several areas (e.g., living rooms, hallways)



Inadequate lighting

Contributing to poor visibility



Visual Challenges

Difficulty navigating due to poor lighting



Mobility Challenges

Accessibility barriers increasing fall/trip risks

Conclusion and Implications



RISK IDENTIFICATION

Image analysis helps foresee risks associated with health decline



DEVELOPING PROACTIVE SOLUTIONS

Smart technology interventions
Environmental modifications



BROADER IMPACT

Well-being enhancement
Reducing assisted living reliance - sustainable, cost-effective healthcare system

References

1. Yin K, Harms et al. Patient work from a context and time use perspective: a mixed-methods study protocol. BMJ Open. 2018
2. Xiong H et al, Identifying daily activities of patient work for type 2 diabetes and co-morbidities: a deep learning and wearable camera approach. Journal of the American Medical Informatics Association. 2022
3. Clemson L et al, Content validity of an assessment tool to identify home fall hazards: The Westmead Home Safety Assessment. British Journal of Occupational Therapy. 1999

To learn more about this study or provide feedback, please feel free to reach out



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