

An Artificial Intelligence Powered Dementia Care-Support Platform For Improving Functionality And Reducing Falls

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Background & Aims

There are over 57 million people living with dementia world-wide¹ with countries in the middle-east facing a tidal wave of dementia cases by 2050 with the expected number of cases predicted to grow by 367% from ~3 million to ~14 million. As per data published in The Lancet Public Health, dementia cases are expected to rise by 1926% in Qatar, by 1795% in UAE and by 1085% in Bahrain by 2050.²

Dementia is one of the major causes of disability and dependency among older people globally costing economies ~\$1.3 trillion globally. ~50% of these costs are attributable to informal caregiving by family members & friends, who provide on average 5 hours of care everyday. ¹The cost of caregiving for people living with dementia in the US is expected to grow from \$230 billion in 2019 to \$404 billion per year by 2050.³ Friends and family supporting as carers have to cut back on work and activities of daily living to help people with dementia adding economic costs and impacting the carer's quality of life. As highlighted by the 2025 World Alzheimer Report, challenges to functioning in Dementia requires a 'whole-person' rehabilitation, also referred to as 'Reablement' that considers all aspects of functioning – mental, social, physical, and environmental.⁴ Changes in functioning can have direct effect such as difficulty looking after oneself or losing ability to participate in meaningful activities, and indirect effects, such as loss of confidence or anxiety. Understanding this problem early-on and the economic impact, we designed an integrated novel artificial intelligence (AI) digital health care-support system to help improve all aspects of functionality and quality of life for people living with Dementia. As we initiate the development of this patent pending human-in-loop digital dementia care-support AI system, this represents globally the first ever AI powered reablement platform real-world clinical study initiative with patients.

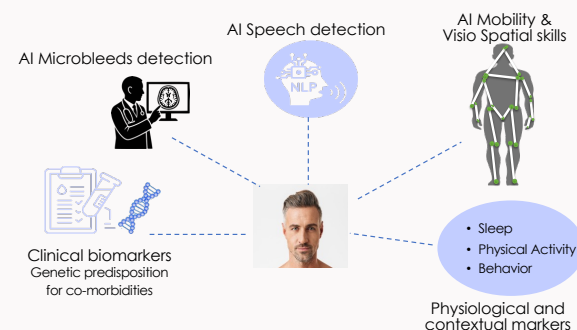
Methods

AI powered Dementia Care-Support Platform Architecture

The AI powered digital health reablement platform data architecture has four neural networks in the system for neuropsychological and functional assessment of a person living with dementia. Speech signals to assess neurodegeneration in language and information processing; body-motion data to generate visuospatial skills & mobility impairment scores; brain scans for microbleed detection with precision and a fourth neural network to generate sleep, behavior impairment scores integrated with clinical biomarkers via blood tests to understand genetic predisposition to comorbidities. Human-in-loop health advocate will evaluate the AI's assessment and with assistance from system's AI reinforcement models will set specific goals for the patient to help relearn lost information and skills related to specific aspects of neurodegeneration while helping support the person living with dementia in real-time with changing needs and situations. Task performance signals are monitored and reinforcement learning metrics are updated to improve functional independence over time.

Framework of AI powered Dementia Care-support Platform

* Patent Pending



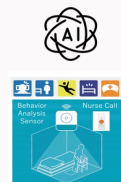
Mild cognitive impairment (MCI)

1. AI to improve speech, reminders and help with daily functioning
2. Human assisted personalized support to improve mobility and daily task planning
3. Nutritional coaching to improve cognitive function



Advanced Dementia Care In nursing homes

Real-time AI monitoring via environmental sensors for fall alerts



A real-world AI digital health reablement platform development and validation clinical study

A real-world Dementia Care-support AI System clinical development study is being initiated in collaboration with the Los Angeles General Medical Center in people living with MCI and dementia. Phase 1 of the study will involve collection of speech, brain scans, EHR data, physiological & behavioral data (sleep, physical activity, social) and spatial body mapping data for developing the neural network models and conducting focus group & in-depth interviews to better understand contextual experiences of people living with dementia in the US. The interviews will also gain feedback and input on the complementary integrative behavioral intervention approaches (cognitive and speech training, anxiety and depression monitoring, healthy diet & nutrition plan, arts, music, meditation, physical activities, social support) me planned to help improve everyday living and quality of life. Phase 2 study will entail AI platform validation in patients with MCI and dementia to evaluate improvement in quality of life and functional independence.

Los Angeles General Medical Center

Results, conclusion and Futurework

This is the world's first real-world AI powered reablement digital health platform development & validation study with people living with dementia to improve all aspects of functioning including physical, mental, social and environmental well-being. This platform is expected to improve and extend quality of life of people with dementia and help them be independent for longer period of time. This also has very high potential of achieving healthcare cost-savings associated with unpaid caregiving in the US.

References

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Contact - for Partnerships and Collaborations

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