Project Summary/Abstract

Alzheimer's disease and related dementias (ADRD) are a growing public health burden, and limited social interaction is a modifiable risk factor for cognitive decline in older adults. The Internet-based Conversational Engagement Clinical Trial (I-CONECT, NCT02871921) demonstrated that semi-structured, high-frequency conversational interactions with cognitive stimulation produced significant cognitive benefits. However, reliance on trained conversational staff limits scalability. This project will develop a Conversational AI with Multimodal Interaction (AIMI-CONECT), an artificial intelligence-driven conversational system designed to deliver the I-CONECT conversation protocol. The long-term objective is to enable scalable, affordable delivery of evidence-based conversational engagement for older adults with limited social interaction and to inform future, larger studies. The **specific aims** of the project are: (1) develop AIMI-CONECT to follow the efficacy-proven I-CONECT conversation protocol using multimodal interaction (including guided reminiscence with voice interaction, collaborative 3D memory scene recreation and visual affective responses), while incorporating methods to maintain protocol compliance and real-time safety monitoring; and (2) conduct a feasibility study with 40 older adults with limited social interaction age 75 years and older with mild cognitive impairment (MCI) or normal cognition, using four 15-minute sessions per week for six weeks and brief weekly staff check-ins, to assess emotional status and potential risks or any technical challenges in using AI. The feasibility will be assessed through collecting recruitment ratio, adherence rate (e.g., the proportion completing $\geq 80\%$ of sessions), participant's engagement level, and acceptability via client satisfactory surveys. Expected outcomes are a validated prototype, evidence supporting feasibility and user acceptance, and a clear path to refinement and large-scale studies. The project addresses a key modifiable risk factor for dementia, a major challenge to public health, through a scalable approach targeting on older adults who lack access to frequent, human-delivered interventions.