

Goal: Create human-centered robots to provide personalized neurorehabilitation to older adults with mild cognitive impairment.

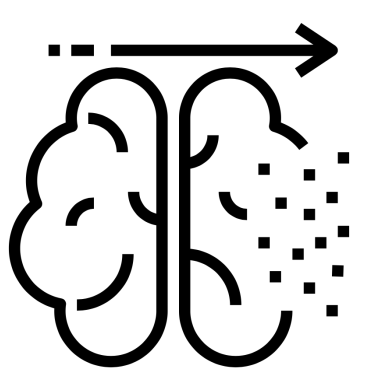
TAILORED: Training for Independent Living through Observant Robots and Design

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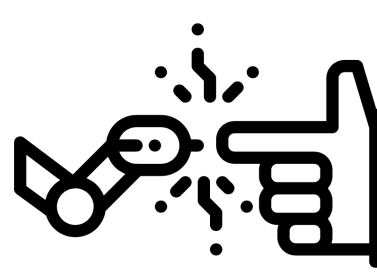


MCI → cognitive function impairments

- Problem Solving
- Scheduling & Planning
- Medication management



- 20% of people >65 have MCI
- 10-15% convert to dementia annually
- 0 pharmacological treatments available
→ Cognitive Neurorehabilitation (CN) can slow progression [2]

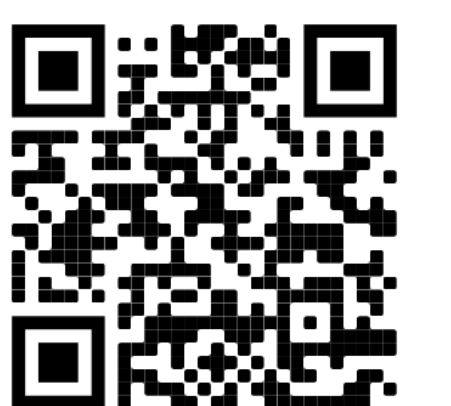


Approach

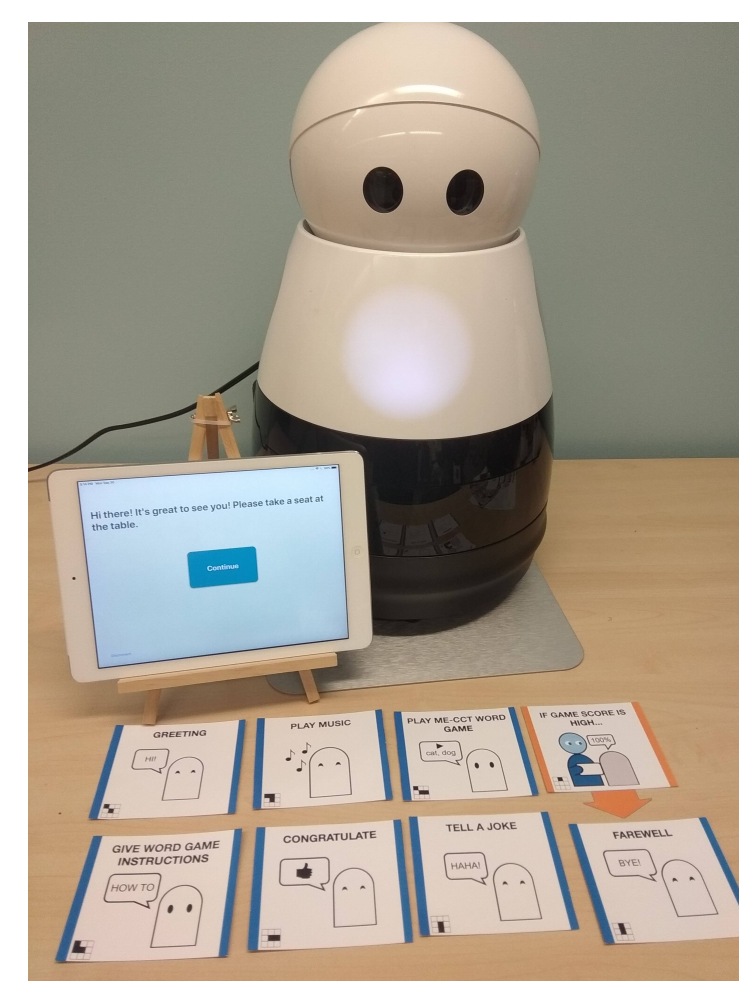
- Hybrid CN via **stakeholder-designed robots**
- New ML methods to support **personalized, longitudinal learning**
- Sustainable interventions in homes

Recent publication highlight & software release [1]

JESSIE (Just Express Specifications, Synthesize, and Interact) is a robotic system that enables novice programmers to program social robots by expressing high-level specifications. We employ control synthesis with a tangible front-end to



allow users to define complex behavior for which we automatically generate control code. We demonstrate JESSIE in the context of enabling clinicians to create personalized treatments for people with MCI on a Kuri robot, in little time and without error. We evaluated JESSIE with neuropsychologists who reported high usability and learnability. They gave suggestions for improvement, including increased support for personalization, multi-party programming, collaborative goal setting, and re-tasking robot role post-deployment, which each raise technical and sociotechnical issues in HRI. We exhibit JESSIE's reproducibility by replicating a clinician-created program on a TurtleBot 2. As an open-source means of accessing control synthesis, JESSIE supports reproducibility, scalability, and accessibility of personalized robots for HRI.



[1] Kubota, A., Peterson, E., Rajendren, V., Kress-Gazit, H., and Riek, L.D. (2020). "JESSIE: Synthesizing social robot behaviors for personalized neurorehabilitation and beyond." In Proc. of the ACM/IEEE Int'l Conference on Human Robot Interaction (HRI). [Acceptance rate: 24%].

[2] Huckans, M., Hutson, L., Twamley, E., Jak, A., Kaye, J., & Storzbach, D. (2013). Efficacy of cognitive rehabilitation therapies for mild cognitive impairment (MCI) in older adults: working toward a theoretical model and evidence-based interventions. *Neuropsychology review*,