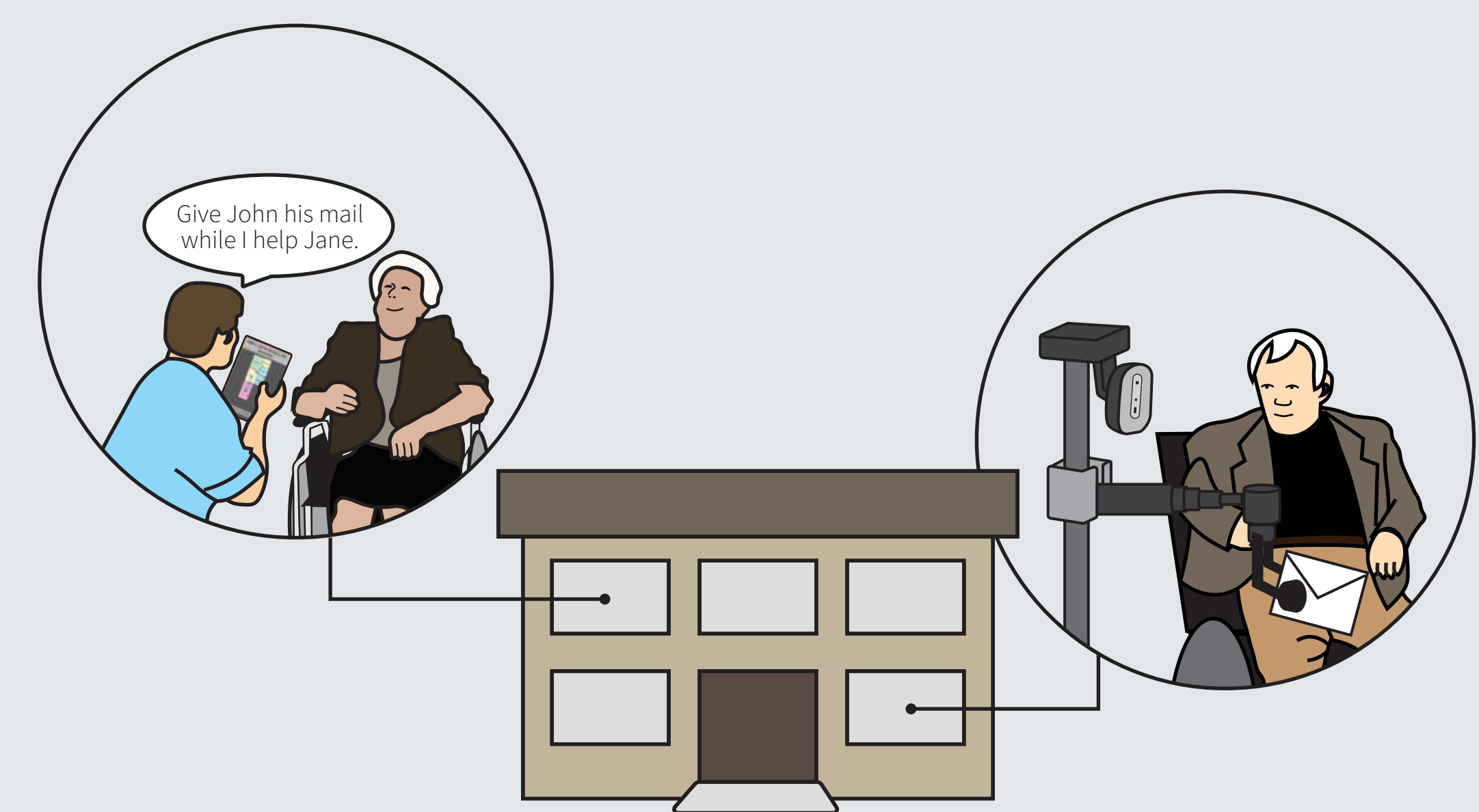


# End-User Development for Personalized Care Robots

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My goal is to design, develop, and evaluate **end-user development (EUD) solutions** that support **personalized robots** in the **care ecosystem**.

## Understanding the Care Ecosystem

Working directly with **older adults and caregivers** of a local assisted living facility, we conducted a series of **design studies** [1, 2] to **understand** each stakeholders’ needs and **envision** what systems are necessary to successfully integrate a robot into **existing workflows and habits**.



### Key Findings:

**1** Based on **existing caregiver workflows**, the system needs to **support quick, on-the-fly inputs**, and it must also guarantee safe and appropriate robot actions.

**2** Both the caregivers and older adults indicated the robot should **learn and incorporate individual preferences**, without requiring repeated specification.

**3** To accommodate a variety of **physical and cognitive abilities of older adults**, daily interactions with the robot should **support simple, natural inputs**.

**4** Because **care environments can change rapidly**, the robot must exhibit **context awareness to act appropriately**, even if it must modify the original task.

## Future Work: Building & Evaluating Solutions

Based on my foundational work, I propose that **end-user development (EUD)** could be a tool to give stakeholders the necessary control to **personalize a care robot’s behaviors and actions**. These tools will use a combination of **interfaces, AI, and formal methods**. This work builds on our previous research on sketching robot programs [3]:

**Step #1** Users provide a recording of both **speech and touch input** via a tablet interface.

**Step #2** The recording is then **processed** into a command and a sketch using the robot’s domain.

**Step #3** A trace is **created** considering one iteration of the loop expressed in the sketch.

**Step #4** The trace is **assembled** into a full program and **displayed** on the tablet for the user to see.

References:  
[1] **L. Stegner** and B. Mutlu. *Designing for Caregiving: Integrating Robotic Assistance in Senior Living Communities*. DIS ‘22. <https://doi.org/10.1145/3532106.3533536>  
[2] **L. Stegner**, E. Senft, and B. Mutlu. *Situated Participatory Design: A Method for In Situ Design of Robotic Interaction with Older Adults*. CHI ‘23. <https://doi.org/10.1145/3544548.3580893>  
[3] D. Porfrio, **L. Stegner**, M. Cakmak, A. Sauppé, A. Albarghouthi, and B. Mutlu. *Sketching Robot Programs On the Fly*. HRI ‘23. <https://doi.org/10.1145/3568162.3576991>