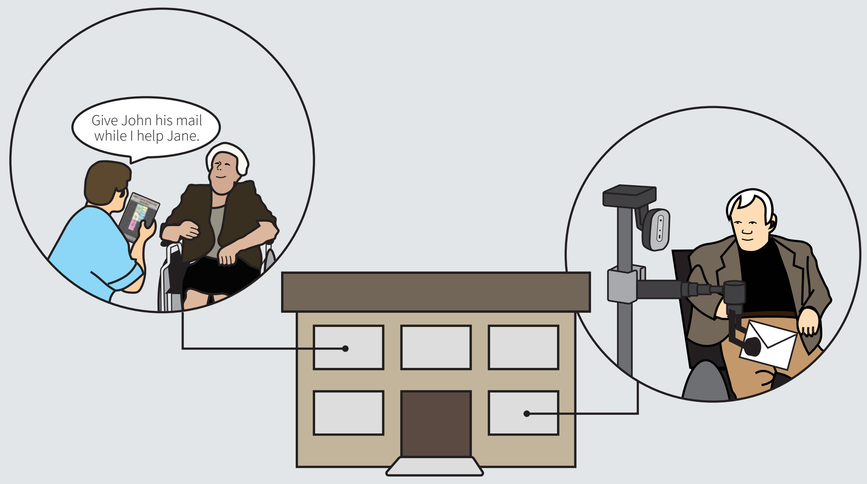
End-User Development for Personalized Care Robots

Laura Stegner
University of Wisconsin–Madison



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**.

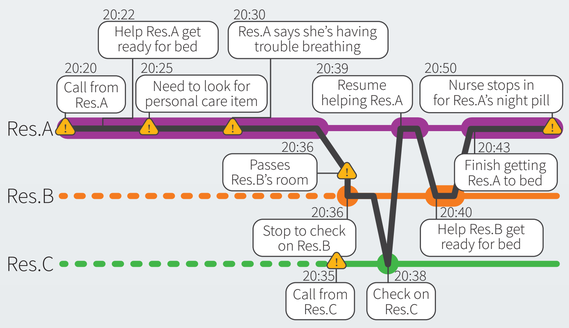
Observations

Interviews

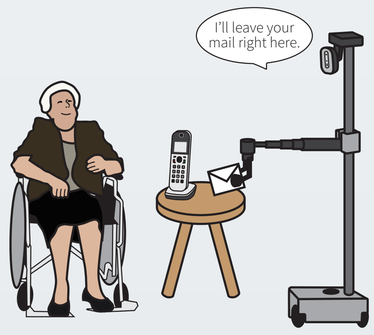
Participatory Design

Key Findings:

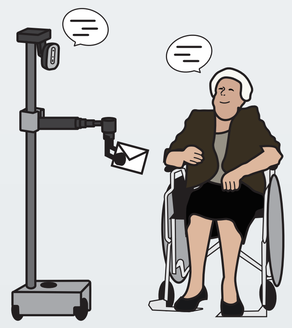
1 Based on **existing caregiver workflows**, the system needs to **support quick, on-the-fly inputs**, and it must also guarantee safe and appropriate robot actions.



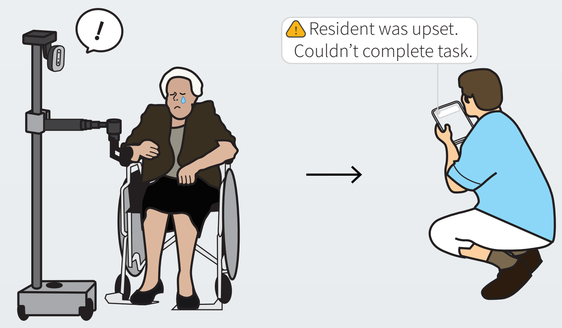
2 Both the caregivers and older adults indicated the robot should **learn and incorporate individual preferences**, without requiring repeated specification.



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



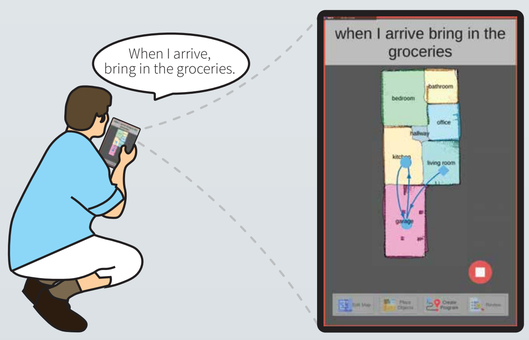
4 Because **care enviornments can change rapidly**, the robot must exhibit **context awareness to act appropriately**, even if it must modify the original task.



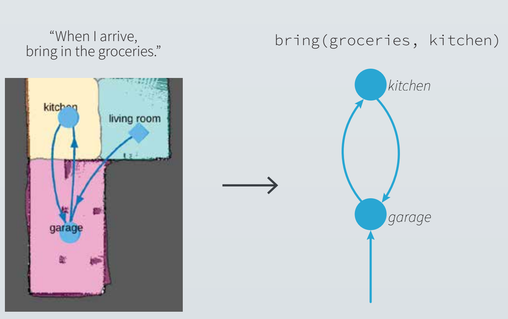
Future Work: Building & Evaluating Solutions

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]:

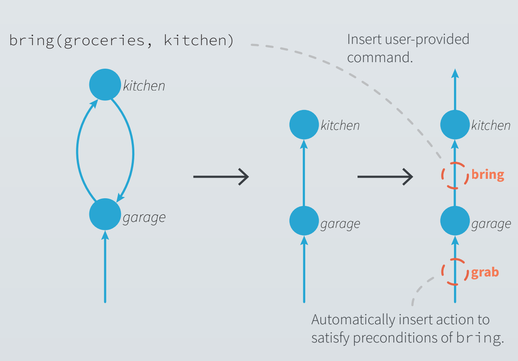
Step #1 Users provide a recording of both **speech and touch input** via a tablet interface.



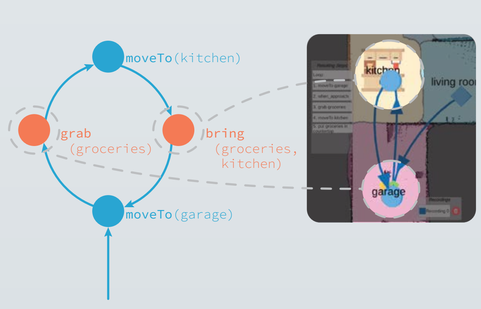
Step #2 The recording is then **processed** into a command and a sketch using the robot's domain.



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:/oi.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

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