Alfred: Autonomous Elderly Care Robot

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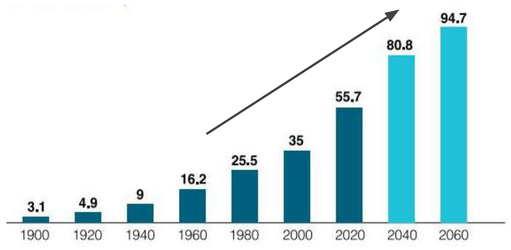
AUXILIO ROBOTICS

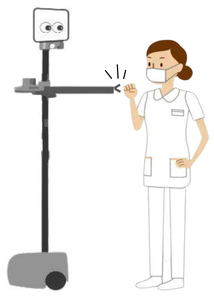
SCAN ME

THE ROBOTICS INSTITUTE

Problem Statement

- Huge labour shortage in Assisted Living
- Elderly are fastest growing population





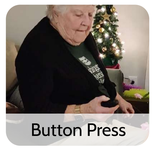
Assist elders with low-risk tasks

- Improve independence
- Empower caretakers
- Bring family members closer

- Build an automated solution that augments elderly caregiving.

Use Case

Inputs


Button Press

or


Voice

Tasks


Autonomous Navigation


Autonomous Pick


Autonomous Place


Video Call & Teleoperation

Once triggered, mix and match tasks!

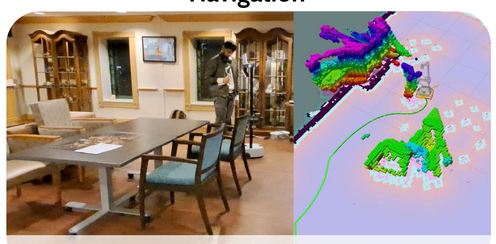
System Design

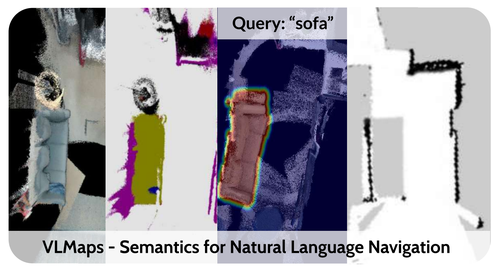
Button Task Input


Handheld remote
Task input modality


Room Ground Station
Raspberry Pi

Navigation

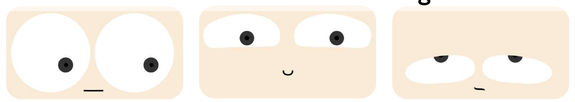

3D Navigation



VLMaps - Semantics for Natural Language Navigation

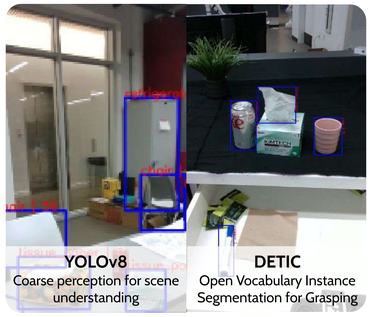
Robust pick & place
Deployment in ALF

Emotion Engine

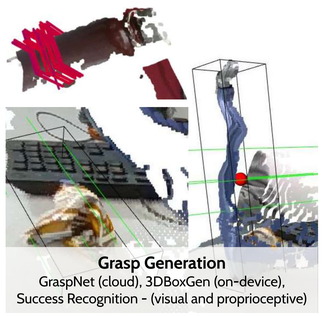


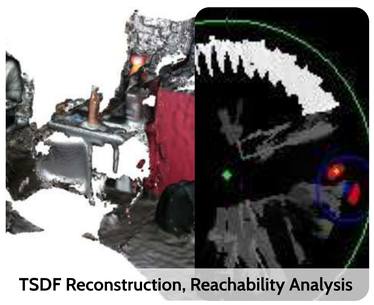
Complex transition functions modelled on the human eye

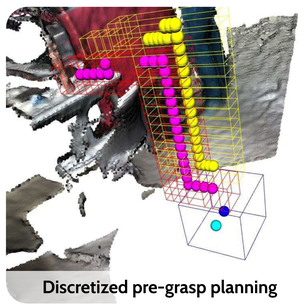
Manipulation


YOLOv8
Coarse perception for scene understanding

DETIC
Open Vocabulary Instance Segmentation for Grasping


Grasp Generation
GraspNet (cloud), 3DBoxGen (on-device), Success Recognition - (visual and proprioceptive)


TSDF Reconstruction, Reachability Analysis


Discretized pre-grasp planning

Results & Conclusion

CMU Team Explores Future of Caregiving With Assistive Robot

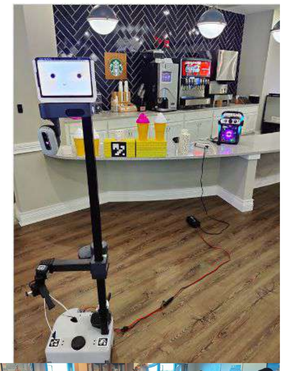
Carnegie Mellon University students recently gave residents of a senior living community a taste of robot-delivered ice cream while demonstrating the potential future of caregiving.

A team of graduate students in the Robotics Institute took a robot named Alfred to Vitalia North Olmsted, a senior living community outside Cleveland. Designed to assist the elderly with daily activities like fetching and delivering objects, Alfred consists of a rolling base not much larger than a robotic vacuum and a long pole-like body with an arm and gripper.

After the residents ate lunch, it was showtime for Alfred. For dessert, the CMU team set up cups of ice cream. Residents approached Alfred, requested a flavor, and watched as the robot navigated to the appropriate cup and handed them the ice cream.

“The residents were overwhelmingly excited about the robot,” said Zackory Erickson, an assistant professor in the Robotics Institute and co-advisor of the students working on Alfred.

After delivering dessert, Alfred mingled with the crowd, showing off its social



VITALIA vincentian Schenley Gardens Comfort Keepers Baptist SENIOR FAMILY