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Towards robotic assistants in nursing homes: Challenges and results

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Abstract

This paper describes a mobile robotic assistant, developed to assist elderly individuals with mild cognitive and physical impairments, as well as support nurses in their daily activities. We present three software modules relevant to ensure successful humanâ€“robot interaction: an automated reminder system; a people tracking and detection system; and finally a high-level robot controller that performs planning under uncertainty by incorporating knowledge from low-level modules, and selecting appropriate courses of actions. During the course of experiments conducted in an assisted living facility, the robot successfully demonstrated that it could autonomously provide reminders and guidance for elderly residents.

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Keywords

Robot control; Humanâ€“robot interaction; Planning; Scheduling; Probabilistic reasoning

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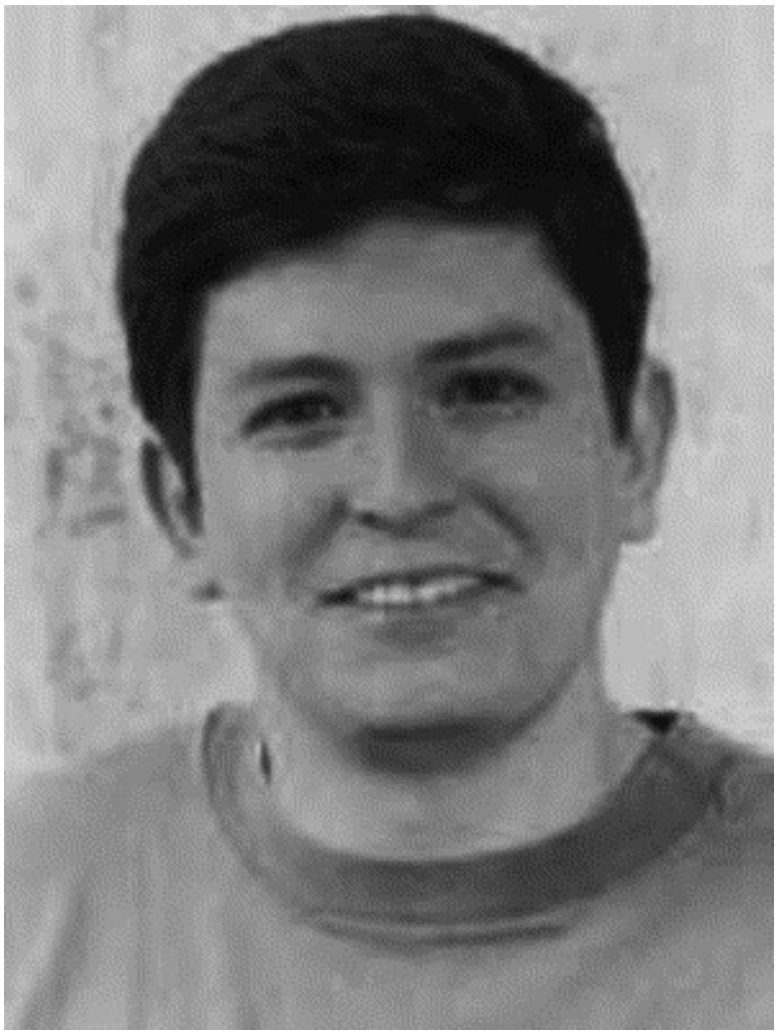
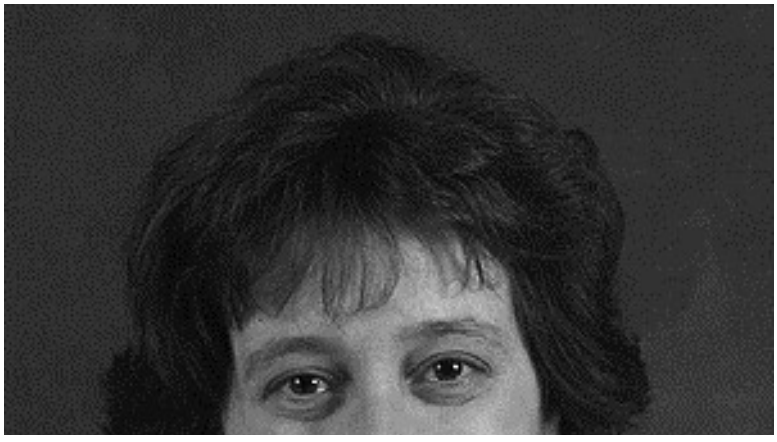
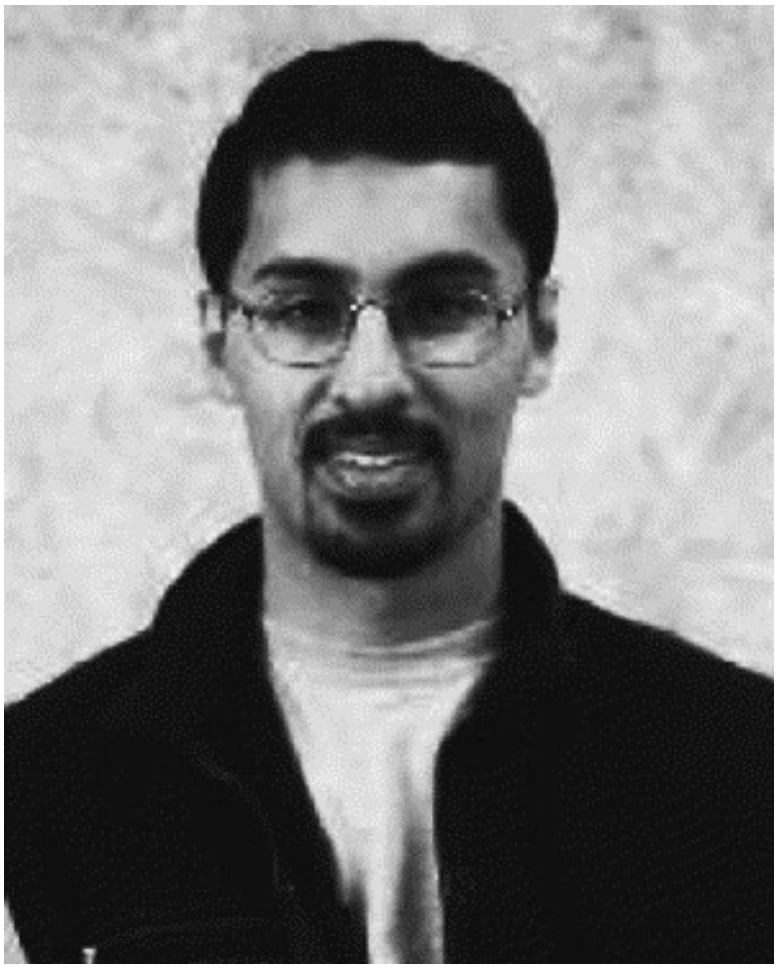


Michael Montemerlo is a doctoral student at the Robotics Institute, Carnegie Mellon University. He received his B.S. and M.S. in electrical/computer engineering in 1997 from Carnegie Mellon University. His research interests include simultaneous localization and mapping and people tracking.



Martha Pollack is Professor of Computer Science and Engineering at the University of Michigan. She was previously on the Faculty of the University of Pittsburgh and the research staff of the Artificial Intelligence Center, SRI International. Pollack, who received her Ph.D. from the University of Pennsylvania in 1986, is a fellow of the American Association for Artificial Intelligence, and a recipient of an NSF Young Investigatorâ€™s Award, the Computers and Thought Award, and the University of Pittsburgh Chancellorâ€™s Distinguished Research Award. She is currently the executive editor of the â€œJournal of Artificial Intelligence Researchâ€. Her research interests are in automated plan management, constraint-based temporal reasoning, and the design of cognitive orthotic systems.



Nicholas Roy is a Ph.D. candidate in robotics at Carnegie Mellon University. He received his B.Sc. in physics and M.Sc. in computer science from McGill University. His research interests include mobile robot navigation and exploration, humanâ€“robot interaction, speech dialogue management, probabilistic reasoning and machine learning.

Sebastian Thrun is the Finmeccanica Associate Professor of Computer Science and Robotics at Carnegie Mellon University, and one of the founders of the Nursebot project. Thrun pursues research in artificial intelligence, machine learning, and robotics.

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