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Robotics Enabled In-Home Environment Screening for Fall Risks

Ruixiang Du

Worcester Polytechnic Institute

Et al.

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Title:

Robotics Enabled In-Home Environment Screening for Fall Risks

Authors:

Ruixiang Du, Vinayak Jagtap, Taskin Padir (Robotics Engineering Program, WPI)
Rajani Sadasivam, Thomas Houston, (Department of Quantitative Health Sciences, UMMS)

Contact Information:

Taskin Padir, PhD
Assistant Professor, Robotics Engineering, Electrical and Computer Engineering
Worcester Polytechnic Institute
tpadir@wpi.edu
Office Phone: +(508) 831-6427
Fax: +(508) 831-5491,
Mailing Address: 100 Institute Rd., Worcester, MA 01609

Abstract:

Our overarching goal is to investigate, design, create and validate the fundamental scientific and engineering framework for intelligent, networked mobile robots to semi-autonomously perform environmental fall risk assessment in the home. Motivated by the facts that (1) aging in place improves the overall health and well-being of individuals, (2) falls are the leading cause of mortality in older adults, (3) home environmental fall risk assessment is an effective preventive strategy, and (4) extreme costs and shortage of trained personnel are huge barriers for effective and efficient delivery of fall risk home assessments by health care providers, we are iteratively developing user-centric designs for a new class of robotic systems that can be assembled easily and cost-effectively to detect environmental hazards and, as a result, preventively and proactively minimize falls in the home. The tight integration of the research thrusts in robot design and control, task and motion planning under uncertainty, and human-on-the-mesh control of networked robots is aimed at advancing the theory and practice of robotics and lead to the demonstration of innovative approaches to transform healthcare delivery with a focus on wellbeing.

In this poster presentation, we will present our preliminary results from developing this framework. We present the communication and control framework for a semi-autonomous mobile robot that can be controlled over an internet connection via a web interface. We will discuss the opportunities and challenges associated with a human-robot team completing the HEROS (http://www.temple.edu/older_adult/) environment safety checklist. Our preliminary results demonstrate that this technology can be helpful to effectively prevent the in-home falls among elderly.