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Robotics Enabled In-Home Environment Screening for Fall Risks

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Title:
Robotics Enabled In-Home Environment Screening for Fall Risks

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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.