Project Maverick: An Omni-Directional Robotic Mobility System

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Nearly 40% of people age 65 and older have at least one disability; of those, two-thirds have difficulty walking. Wheelchairs can help people who have a hard time walking, but they are difficult to operate in tight spaces and, although they can provide physical respite, their users can develop muscular atrophy over time. Project Maverick is an omni-directional robotic system designed to offer a mobility solution for people with disabilities. By having the capability to move in any direction, Project Maverick mimics the movement patterns of humans. The drive system uses 4 wheels and 8 motors. Each wheel module has 2 independently-controlled motors – one for steering and one for driving – to provide maximum maneuverability. The system is simple and modular, built out of 4 identical wheels, and feasible to be mass produced. All 8 motors are controlled using a Linux-based controller programmed in Java. The main user input device is a 6-axis 3D controller, providing a simple and intuitive driving system. The robot is also equipped with 2 intelligent safety features: collision detection and autopilot through doorways and narrow hallways. To detect possible collisions the system is using an array of infrared distance sensors (single beam and 2 dimensional). To demonstrate the feasibility of the robotic system, I designed, built and tested a full size prototype, demonstrating the functionality of the drive and control systems as well as the collision detection and autopilot systems. I was able to validate that this new design concept can be used to build a mobility solution that is feasible and cost effective. Based on the feedback received from potential users, Project Maverick proved its purpose – to improve the quality of life for people with walking disabilities.

Awards Won:

Second Award of $2,000