

NRI: INT: MiaPURE (Modular, Interactive and Adaptive Personalized Unique Rolling Experience)

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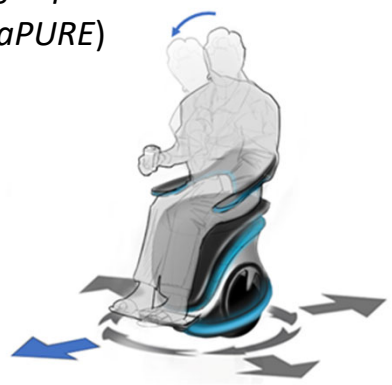
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Challenge:

- Need disruptive approach for wheeled mobility
- Fundamental wheelchair design is same since 1800's
- Manual wheelchairs cause overuse injuries, limit hands for propulsion, constrained in tight spaces and certain terrains, and can tip/fall
- Power wheelchairs are heavy, costly, large, and hard to transport in vehicles

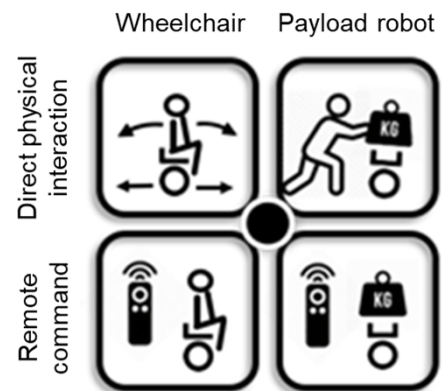
Solution: (PURE) Personalized Unique Rolling Experience

- Modular, interactive, adaptive design (MiaPURE)
- Common drivetrain: Ballbot
- Interchangeable top:
 - Wheelchair with Instrumented Seat
 - Heavy Payload Robot
- Multiple intuitive user interfaces:
 - Direct physical interaction
 - Remote command

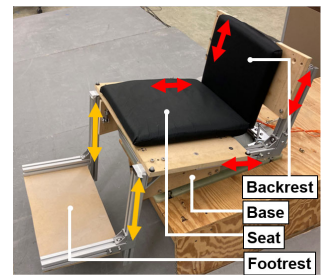


Scientific Impact:

- Family of compact, lightweight, agile, safe ball robots (ballbots)
- Novel human-robot interface (force sensing seat for hands-free control)
- Lower barriers for entry through open-source ballbot drivetrain platform able to support substantial load



Omni-directional motion
 Self-balancing Driver assistance
 Lean-to-steer Hands-free motion
 Lightweight Modules Compact



Force sensing seat prototype



Gen 2 drivetrain prototype

Broader Impacts:

Established new Human Performance Maker Lab in US Paralympic Training Center at UIUC

- 3D scanner. 3D printer, plus more to come!
- Empower students and student-athletes with and without disabilities to create and innovate
- University courses, high school summer camps
- Design thinking focused on design for disability, Use Human Performance Maker Lab

