

Integrated Design of SPARC Smart Wheelchair

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Résumé (800 mots maxi) : This poster demonstrates the integrated design of the SPARC smart wheelchair, an assistive mobility solution that enhances the mobility of disabled and elderly individuals. Inspired by innovative commercial smart wheelchairs such as the Path Fynder W2000 [1], the ROBINT [2], and the Abbychair [3], as well as RD smart wheelchairs such as the Vulcan 2.0 [4], the Co-Nav Chair [5], and the IMASEN wheelchair [6], we have developed the SPARC smart wheelchair from a conventional electric wheelchair by integrating four LiDARs, an RGBD camera, two inductive encoders on each motorised wheel, and an IMU. These sensors are connected to an embedded PC via USB cables. The PC then commands the DC motors by sending CAN messages via the USB-CAN driver. This instrumentation system enables real-time data acquisition for smart functionalities such as visual servoing for QR code-based navigation using the VISP controller and RGBD camera and lidar-based tracking for target following. This modular architecture could support other smart functionalities in the future, such as obstacle avoidance and AI-driven path planning. This SW could enhance autonomy and mobility in the healthcare field.

Références :

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