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Adaptive Navigation System for Wheelchair Users in Urban Environments

Social inclusion targets various factors like age, gender, disability, ethnicity, and economic status. Yet, urban landscapes often pose significant challenges for those with mobility impairments. To bridge this gap, this research proposes an adaptive navigation system tailored for wheelchair users, with a focus on enhancing urban "walkability."

The envisioned system incorporates several key features to facilitate safe and accessible navigation. Real-time user orientation, continuous instructions, and adaptable actions ensure seamless interaction and aid in overcoming obstacles encountered during travel. Additionally, the system integrates user preferences, such as desired destinations and points of interest, allowing for personalised route planning.

Despite notable advancements in navigation technology, outdoor implementation remains relatively underexplored. Thus, this research adopts a human-centric approach, considering users' input and perceptions to assess walkability. Through a comprehensive evaluation of essential criteria like pleasurability, comfort, safety, accessibility, and feasibility, the system aims to provide tailored navigation solutions that meet users' specific needs. Moreover, the system leverages real-time data integration, incorporating factors, like weather conditions and live traffic updates to optimise route planning. Visual aids, such as interactive maps and street view functionalities, empower users to make informed decisions about their travel routes. Furthermore, the inclusion of a user feedback feature facilitates system's refinement and improvement, ensuring its responsiveness to changing user requirements and expectations. Ultimately, through the integration of Deep Learning techniques, real-time data integration, and User Engagement, this navigation system holds the potential to enhance the mobility and inclusivity of wheelchair users in urban settings, fostering a more accessible and inclusive society.