A Navigation Aid for Blind People with Walking Disabilities

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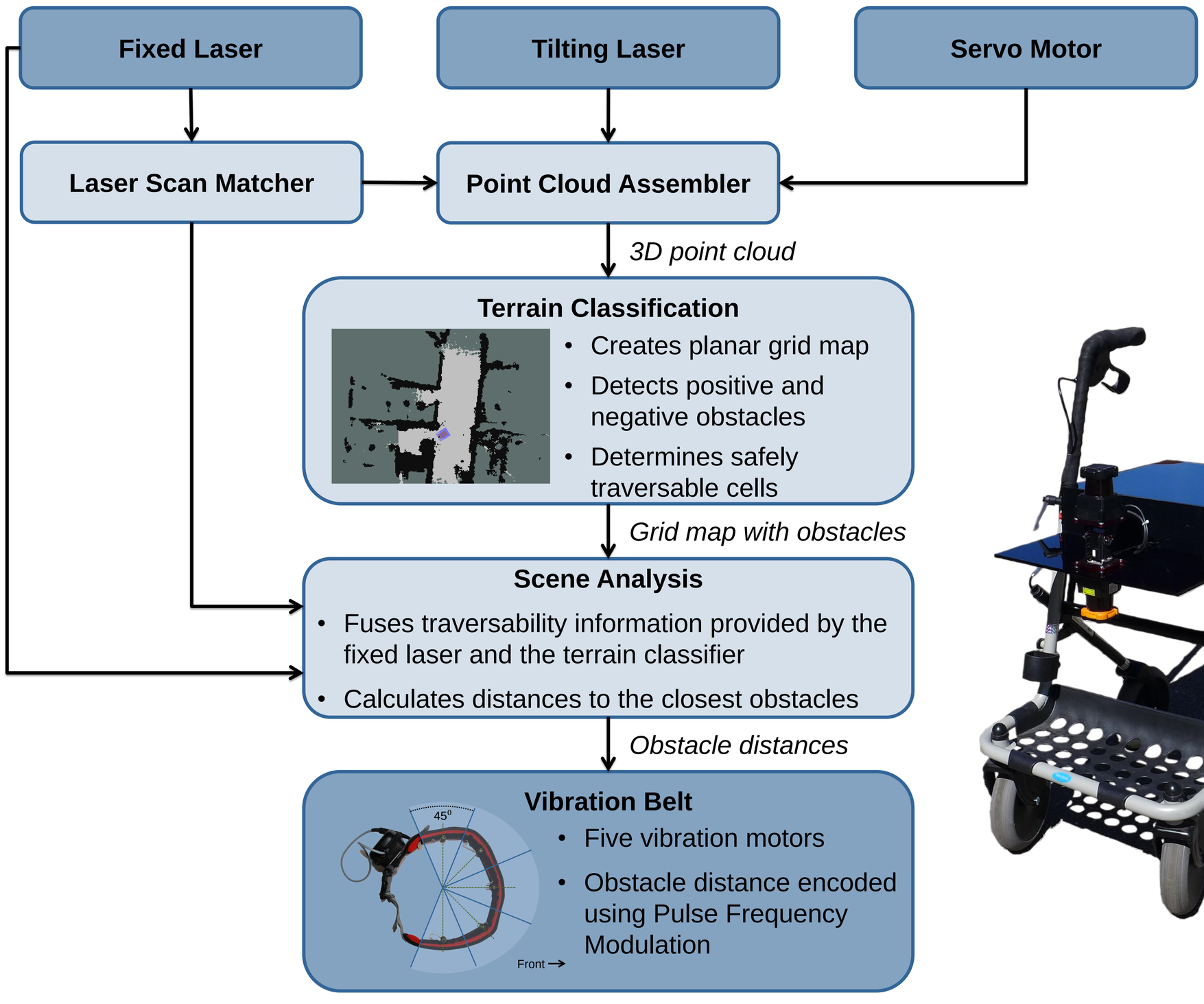
Motivation

- 81.7% of blind people are 50 years and older
- Elderly blind people have an inherent risk towards walking disabilities
- Established navigation aids for the blind provide limited assistance to people with walking disabilities
- Most navigation aids do not detect obstacles above the ground (e.g. tabletops, horizontal bars)

Robotics for Ambient Assisted Living

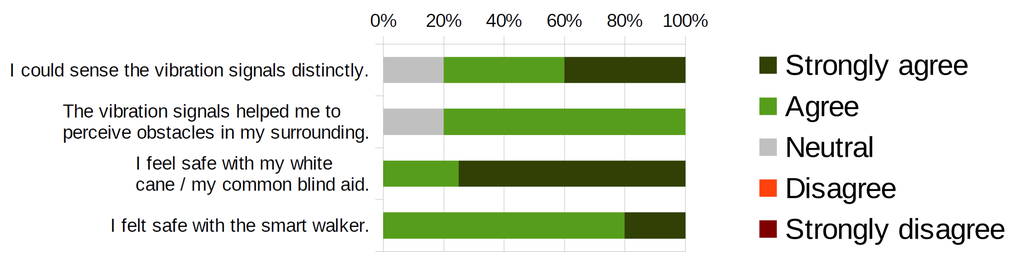
- A novel smart walker for blind people with walking impairments
- Detection of positive and negative obstacles
- Bluetooth-enabled vibro-tactile belt indicates obstacle proximity
- Safe operation in unknown environments
- Software uses open source robotics technologies

Smart Walker Overview

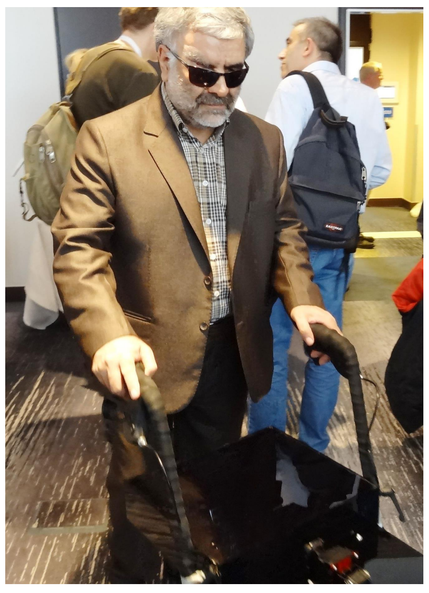


Exploratory Evaluation

- Presentation of the prototype at the largest German exhibition of aids for the blind (SightCity 2014)
- High appreciation of negative obstacle identification
- Visually impaired users successfully avoided obstacles



Feedback from a few visually impaired users



Next Steps

- Large-scale quantitative user study
- Integrate path planning and guided navigation
- Miniaturization of the system
- Semantic encoding of the haptic feedback to allow differentiation between positive and negative obstacles

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