Realtime Obstacle Detection for Visually Impaired People

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Motivation

The Walkassist is a smart shoe developed by an austrian start-up called Tec-Innovation to enhance visually impaired peoples quality of life. The built-in warning system uses ultrasonic distance sensors to warn users of obstacles like steps, curbs or other people. If an obstacle is detected, the user is alerted using acoustic or vibration signals. In this project we try to support the ultrasonic based system by exploiting additional visual information. A camera based system placed on top of the toe-cap in combination with deep learning methods should be used to detect obstacles and segment the walkable area, respectively.

Goals and Tasks

The goal of this master's thesis is to develop a mobile system which is capable to detect the walkable area in realtime.

The main parts of this project are:

- Porting of existing algorithms to a mobile platform like a virtual reality backpack
- Extend and improve parts of the pipeline (real-time capability)
- Measuring the distances to the obstacles
- Visualization of the walkable area and the detected obstacles

This master thesis is offered together with Tec-Innovation and will be paid.

Deliverables

- Project files (zip)
- Documentation (pdf)
- Presentation (pdf)

Prerequisites

- Python/C++ programming
- Interest in machine learning
- GPU programming (optional)

Advisor / Contact

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