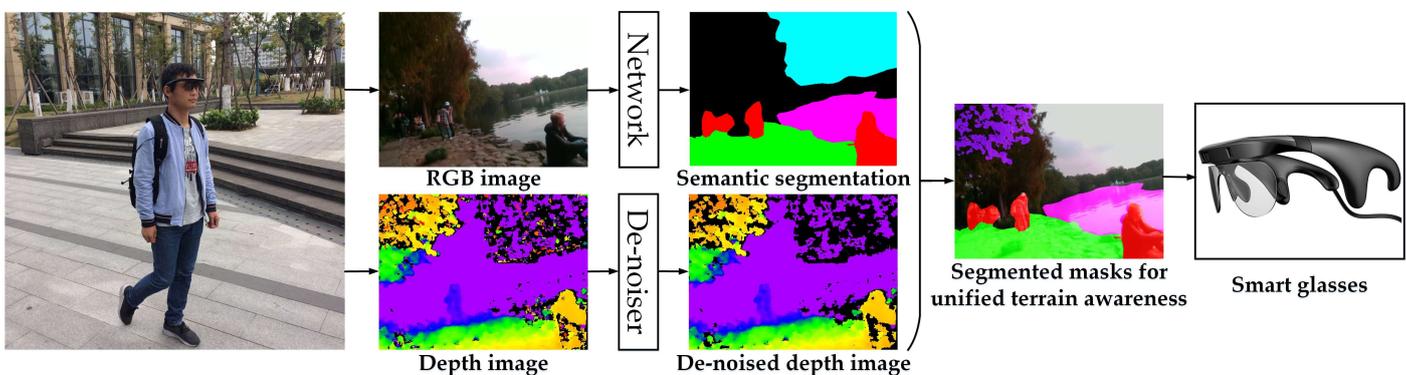


Master Thesis:

Computer Vision Based Navigation Assistance for People with Visual Impairments



According to the world health organization, at least 2.2 billion people have a vision impairment or blindness. The majority of people with visual impairments still use simple and conventional assistive tools, e.g., white canes. Navigational assistance aims to help visually impaired to reach their destinations safely and independently. This topic becomes increasingly challenging, as it requires detecting a wide variety of scene elements to provide higher-level assistive awareness. In addition to environment perception, localization is a critical session of both indoor and outdoor navigation. In this project, we aim to use computer vision to help navigate visually impaired people with wearable cameras and portable processors. This project will involve cutting-edge technologies like deep learning-based semantic segmentation or panoptic segmentation to sense visually impaired people's surroundings accurately and efficiently, to provide them with unified scene perception. This project will also look into visual localization and odometry algorithms to render visually impaired people aware of their positions and ambient environments.

In this project, we offer several master theses under the topics including but not limited to object detection, efficient semantic segmentation, panoptic segmentation, visual odometry, SLAM, visual localization, path planning, egocentric future localization, sonification of semantic segmentation, image captioning. These theses will implement and research these computer vision technologies to support perception, orientation and navigation of visually impaired people. It will provide an exciting opportunity to learn and develop vision and sensor-based technologies in real-world safety-critical autonomous navigation applications.

Python/C++ programming skills and knowledge of PyTorch/Tensorflow are desirable.

For more information and details, please contact:

Dr. Kailun Yang (kailun.yang@kit.edu).