Display for driving assistance using backward looking camera

NXP Semiconductors Research

Subject: Master thesis assignment
Place: High-tech campus, Eindhoven, The Netherlands
Period: 6-9 months, 2009-2010, start as soon as possible

Contact:
Dr. Zoran Zivkovic
Dr. Paul Hofman
Email: zoran.zivkovic@nxp.com

NXP Semiconductors Research, HTC32 – 1.20
Eindhoven 5656EA, The Netherlands
Tel: +31 40 27 26960
Fax: +31 40 27 28504

Project description

Many modern cars have a display used for general information and GPS navigation. Showing the view of a backward looking camera is often used to help driver with parking maneuvers. Ultrasound sensors are used to detect the close objects as additional help. The driver could be further assisted if the close objects in the image are detected and highlighted. Furthermore, a 3D representation of the scene would be useful such that it could be viewed from a different viewing angle. To do so, camera images need to be analyzed and possibly combined with the ultrasound sensors. Reliable depth estimates could be further used to improve current automatic parking systems (e.g in Toyota Lexus or VW Touran).

Goal

Simultaneous localization and mapping (SLAM) is a technique used by autonomous vehicles to build up a map within an unknown environment while at the same time keeping track of their current position. It also provides a framework for combining input from different sensors. The goal of the assignment is to design a system for obtaining an accurate depth map of the environment behind a vehicle using the backward looking camera and possibly other sensors. How such information could be used to assist the driver, needs also to be investigated further.

Requires

- programming skills (C/Matlab)
- good mathematical skills
- followed courses related to image processing and/or probabilistic reasoning
- ready to explore and set-up own experiments in a car

Cost coverage scheme

Living costs covered according to the standard NXP student scheme. Part of the accommodation and travel cost are also covered.