Bachelor/Master thesis

High speed sensor data processing for autonomous driving applications

Background

LiDAR technology acquires 3D point clouds of the environment. For this, short infrared laser pulses are fired and the delay of the reflections is measured. Other technologies conventionally employed for ranging – such as RADAR or ultrasonic sensors – cannot compete in almost all figures of merit including range and resolution. If compared to passive imaging systems relying on stereoscopic cameras, LiDAR can operate in complete darkness and does not suffer from ambiguous data.
Scanning LiDAR sensors supplement ranging with lateral resolution. For this, subsequent laser pulses are aimed at different, yet well-defined directions. Often, a scanning mirror is deflected accordingly. Scanning LiDAR is needed to map out the environment in a truly 3D manner.
While the research and military use of high-end LiDAR systems is well-established, the market of consumer-grade scanning LiDAR sensors is still in its infancy. Today, this market suffers from the unavailability of reasonably priced, lightweight systems. This severely limits the applications in which scanning LiDAR sensors are employed today.
This master thesis is part of the development of a revolutionary new image acquisition sensor, that will transform future applications in the field of autonomous driving and operation of unmanned aerial vehicles.

Team

You will be working in a very dedicated and highly motivated team of experts from the field of optical sensors, robotic engineering, software engineering.

Details

The work will be conducted at the institute for measurement systems and sensor technology (MST) at the Technische Universität München.

Fields of work and expertise

- Real Time Data Processing
- Programming signal processing on FPGA
- System and software tests
- Data and result visualization

Requirements

- FPGA experience
- Software development
- Interest in electronics
- Software engineering
- Team work

Internal reference: 2

Technische Universität München

EI MST

Fakultät für
Elektro- und Informationstechnik
Lehrstuhl für
Messsystem- und Sensortechnik

Univ.-Professor Dr.- Ing.
Alexander W. Koch
Ordinarius

Dr.-Ing. Mathias Müller

Briefanschrift:
TUM - MST
80290 München

Warensendung:
TUM - MST
Theresienstr. 90 / N5
80333 München

Tel +49.89.289.23351
Fax +49.89.289.23348

m.s.mueller@tum.de
www.mst.ei.tum.de