Bachelor/Master thesis/IDP

Development of a data interface and protocol for a point-cloud sensor

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
- Programming in C++
- Realtime 3D object recognition and tracking
- Simultaneous Localisation and Mapping at the Level of Objects
- Generation of an object level scene description
- Programming in Python and visualization in Paraview

Requirements
- Good programming skills
- Interested in software development and image/point cloud data processing
- Team working capabilities

Internal reference: 7