

Hamburg, 08.10. 2026

project work at The Institute of Logistics Engineering

Title: Evaluation of an AI-Enabled 3D ToF Camera for Mobile Robots

(Project work)

An industrial prototype camera from ifm is available for evaluation in mobile robotics. The camera uses PMD-based 3D Time-of-Flight technology and provides onboard processing capabilities for AI-based perception functions. The aim of this project is to investigate whether the ifm camera can replace the currently used Intel RealSense camera and to identify potential advantages and limitations. PMD ToF cameras provide pixel-wise depth information based on the measurement of reflected infrared light.

The evaluation shall consider both the quality of the 3D data and the performance of the camera's integrated AI features. Different application and test scenarios will be developed and conducted to assess the camera under realistic conditions relevant to mobile robots.

Task description:

- Review the scientific and technical state of the art in 3D cameras, depth sensing, and AI-based perception for mobile robots
- Familiarize yourself with the ifm camera, its software, interfaces, and available AI features
- Develop a systematic evaluation and testing methodology to compare the ifm camera with the Intel RealSense regarding relevant test scenarios
- Document, evaluate, and critically discuss the results

Requirements:

- Prerequisite knowledge or willingness to independently familiarize yourself:
 - 3D sensing, computer vision, and depth cameras
 - Python, C++, or a comparable programming language
 - Experimental design and data analysis
 - Scientific writing and technical documentation
- Independent and meticulous way of working