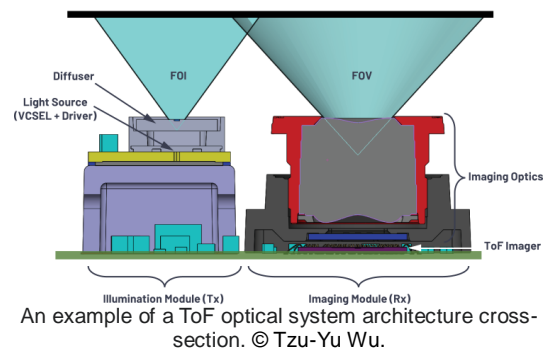


Master-Thesis

Design and Testing of a NIR Illumination System Applied to Very High-Resolution Time-of-Flight imaging

Unlike traditional RGB cameras, which capture only color and intensity information to produce 2D images, Time-of-Flight (ToF) sensors offer an approach to depth perception. Amplitude Modulated Continuous Wave (AMCW) ToF sensors are a specialized type of ToF technology that utilize continuous wave modulation to measure distances. Instead of emitting discrete light pulses, AMCW ToF sensors emit a modulated continuous wave of near-infrared light. By calculating the phase shift of the reflected light, these sensors are able to retrieve the distance to objects with exceptional accuracy. ToF imaging is used in a wide range of applications, from industrial automation and robotics to consumer electronics like smartphones and gaming consoles.



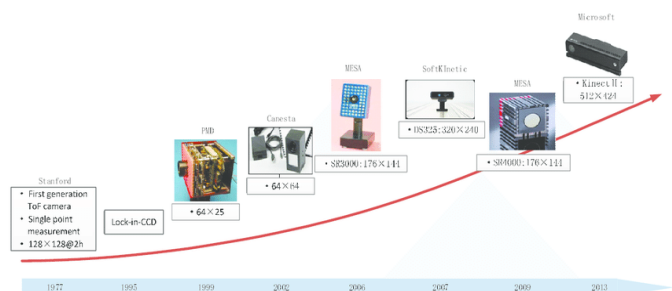
A near-infrared illumination system is an indispensable component of the ToF imaging system. Within this project, an illumination system capable of high-frequency modulation (tens of MHz) will be designed and tested. A suitable near-infrared light source (which must match the lens system and imaging sensor) needs to be selected first. Software simulation, PCB fabrication, and performance testing of the whole illumination system are the key aspects of this project.

Requirements:

- Experience in circuit design
- Familiar with LTSpice, Altium or other tools
- Good English

After completing this work, there are good career prospects in the following fields:

- Circuit design
- LTSpice simulation
- 3D imaging



Evolution of the resolution of ToF cameras. © He, Ying & Liang, Bin & Zou, Yu & He, Jin & Yang, Jun. (2017).

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