

Meta-optic sensor design Project example

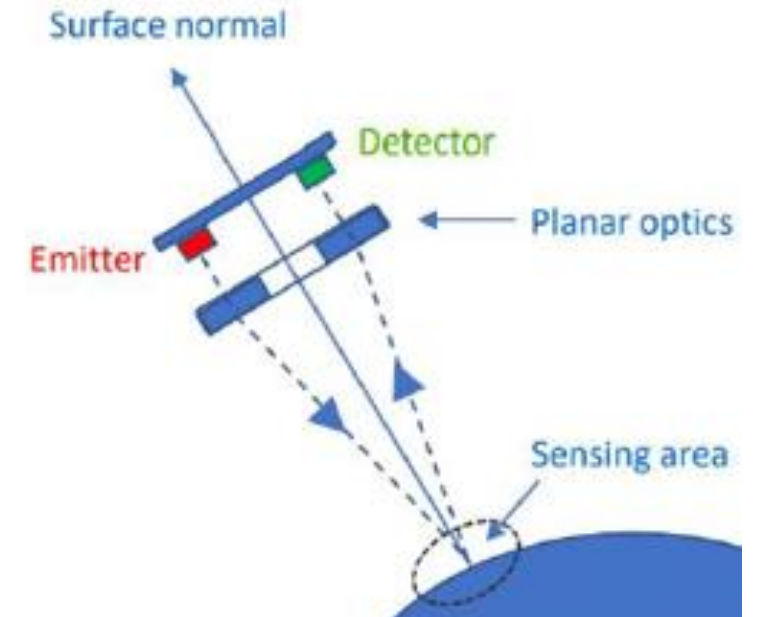
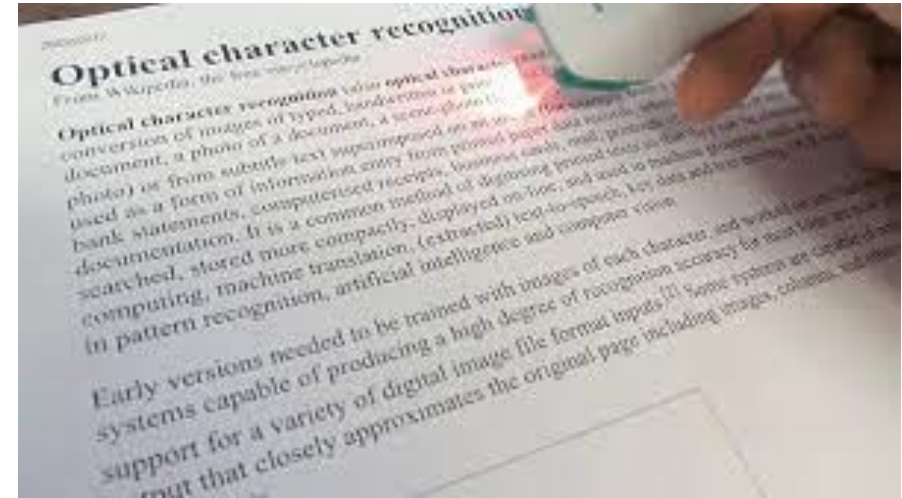
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PlanOpSim

Enlightened Planar Optics
WWW.PLANOPSIM.COM

- ❖ **Optical character recognition (OCR)** is used for scanning, quality control, consumer device etc. **sensors need to be miniaturized**
- ❖ OCR sensors consist of:
 - Laser source
 - Photo-detector
 - Emitting optic
 - Receiving optic
- ❖ Technical requirements for OCR detectors:
 - **Sensitivity** to small contrasts
 - **Miniaturized** system
 - Discriminate signal from environment light
- ❖ **PlanOpSims task** was to **design a miniature meta-optic** for a VCSEL + photodiode array



1. Concept identification & feasibility
 - a. Solutions concepts: multi-zone lens, single lens solution
 - b. Determine physical limits, power budget figure of merit
2. System definition and optimization
 - a. Sequential and non-sequential ray tracing model
 - b. Lens optimization
3. Tolerance and alignment improvements

Project result:

- ❖ System contrast near sample contrast
- ❖ Single meta-optic solution
- ❖ Optic size $150 \times 150 \mu\text{m}$ array

