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The future of photonics-based process optimization

Roi Mendez Rial, AIMEN, 6 May 2020

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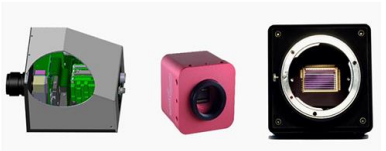
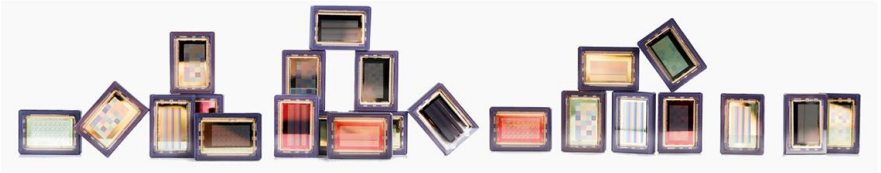
Cost-effective multimodal monitoring solutions

- Hardware:
  - snapshot hyperspectral filters
  - dual-aperture imaging CMOS/InGaAs systems
  - cutting-edge organic-electronics-based sensors





- Hardware and covered spectrum:
  - spectrometers and camera cores in a broad VIS/SWIR range
  - laser-based chemometric sensors in the MWIR
- Monitoring systems:
  - Multimodal, IoT native, by combining with cloud, big data, and deep learning for agile development and orchestration of complex AI-based models
  - Online and onsite

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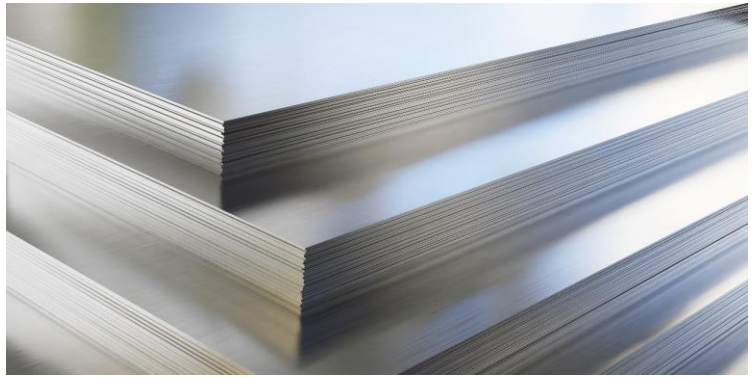
Our focus areas



Steel manufacturing

Optimize furnace combustion, control the furnace temperature and monitor the real temperature of the slab in the rolling mill.

Woodworking

Measure parameters such as humidity, density and the elasticity of the raw input material both before and during the processes.

Food industry

Improve the quality control within the manufacturing process and measure things like viscosity, sugar content, grain size of the sugar and other quality product characteristics.

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Targets and challenges

- Hardware:
  - HSI SWIR (0.9-1.7 µm) camera cores for volume production
  - Hybrid integration between filters and sensors
  - Feasibility of organic-electronics-based sensors
- Software:
  - Scalable and optimized online system
  - Big data management in real time
  - Availability of data for training deep neural models
- Applications:
  - Extend to other potential markets (e.g. sorting for pharmaceutical and agriculture)

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