Intelligent image sensing

Based on in-sensor computing using CMOS technology

Positive Impact

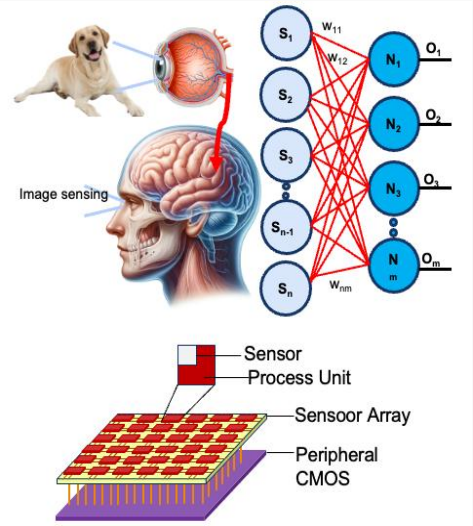
- Leverages existing fabs and CMOS compatible.
- Energy efficient, lower e-waste, and high yield potential.

Initial Validation

Laboratory fabrication of the device has been completed, and its image-sensing capabilities have been demonstrated.

Problem

Modern sensors (cameras, LiDAR, IoT devices) continuously generate massive volumes of data. Transmitting this raw data to external processors or cloud servers demands substantial bandwidth and energy, while the physical separation between sensing and processing introduces latency that can hinder real-time responsiveness in intelligent systems.



Solution

The solution lies in in-sensor computing, which efficiently handles the growing flood of sensor data, delivering faster more power-efficient and secure data processing at the source.

The intelligent sensor combines sensing and memory in a single device, enabling real-time detection and processing.

Technology

→ Silicon-on-Insulator (SOI) technology integrates silicon-based photodetectors with single-transistor memory or an SOI ferroelectric transistor (FeFET), creating light-sensitive devices with non-volatile storage capabilities. Its high scalability enables dense integration, while the combined image sensing and memory functions allow detection, amplification, and direct on-sensor storage of optical signals. This fusion facilitates in-sensor computing, enabling real-time data processing and on-chip memory retention, thereby reducing power consumption and latency in applications such as neuromorphic computing, optical memory, and advanced imaging systems.

Call to Action !!!

Do you have a passion for the CMOS industry and a background in photonics, electrical engineering, and nanofabrication? We want to hear from you! Please reach out at:

entrepreneur@hightechxl.com

Potential Markets

Several markets will be benefitted from this technology such as:

- Smartphones & wearables
- Automotive
- Robotics
- Security and surveillance
- Internet of Things (IoT)
- Augmented reality & virtual reality
- Agriculture & environmental monitoring

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