Neuromorphic Vision Sensors

Neuromorphic Processing and Applications

Vision sensing systems

Dynamic Vision Sensor

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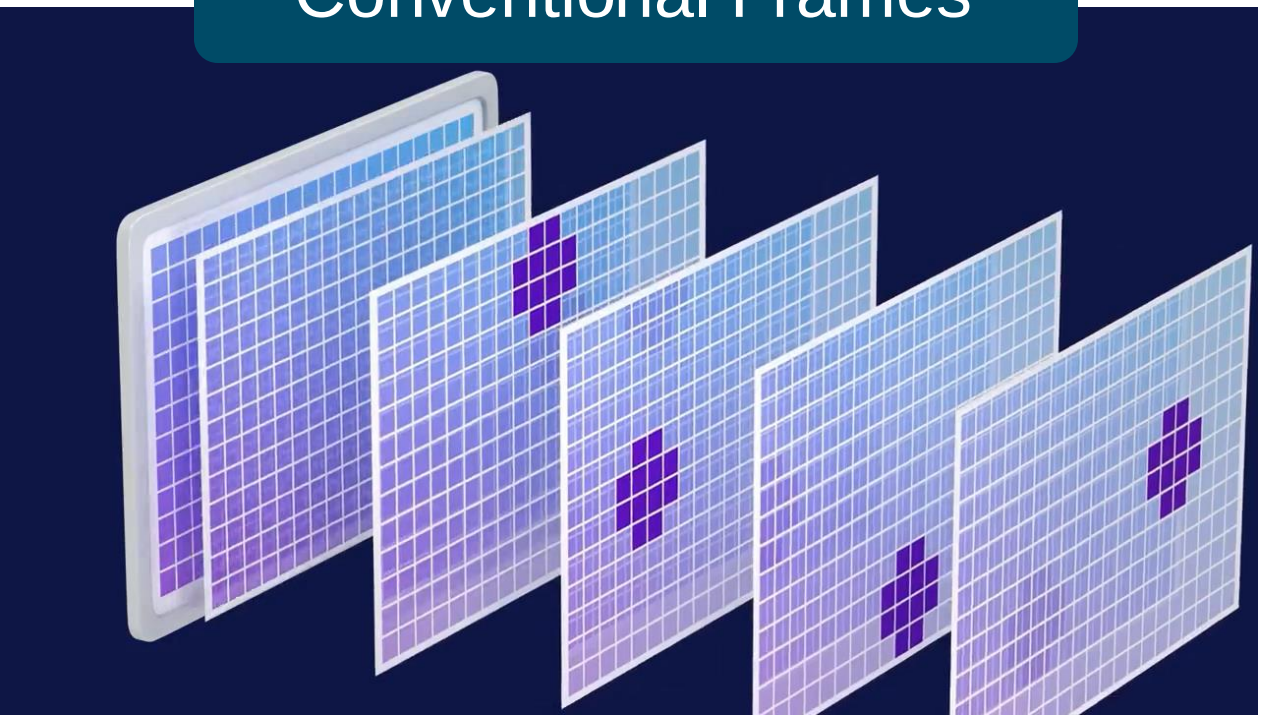
Conventional Frames



- Highly redundant output
- Slow, high data rate

DVS: Pixel Change Events

- Sparse data
- Very fast, low latency & power
- High dynamic range

Vision Products

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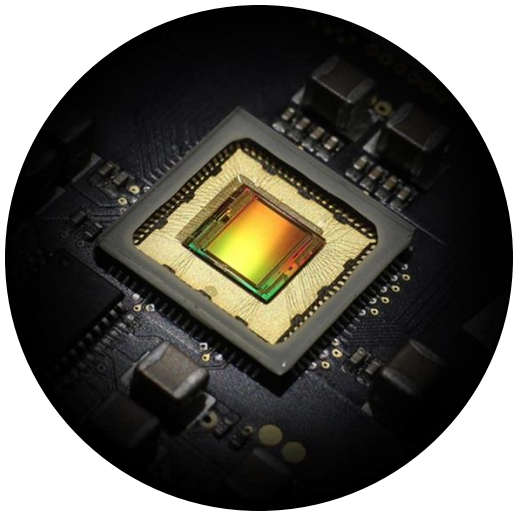
Sensors

19 patents



Cameras

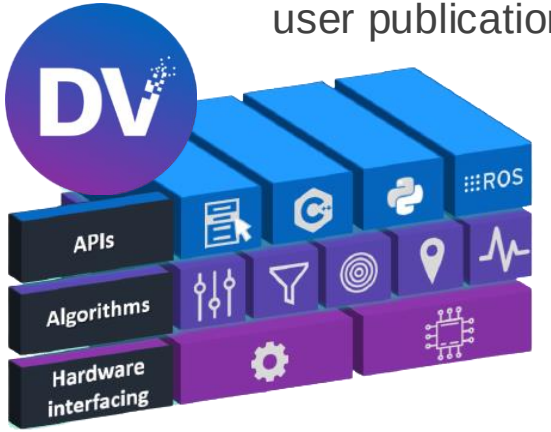
Robust,
application-ready

Software

Most advanced,
largest user community

80,000+
downloads

2300+
user publications



Market leader

800+
customers

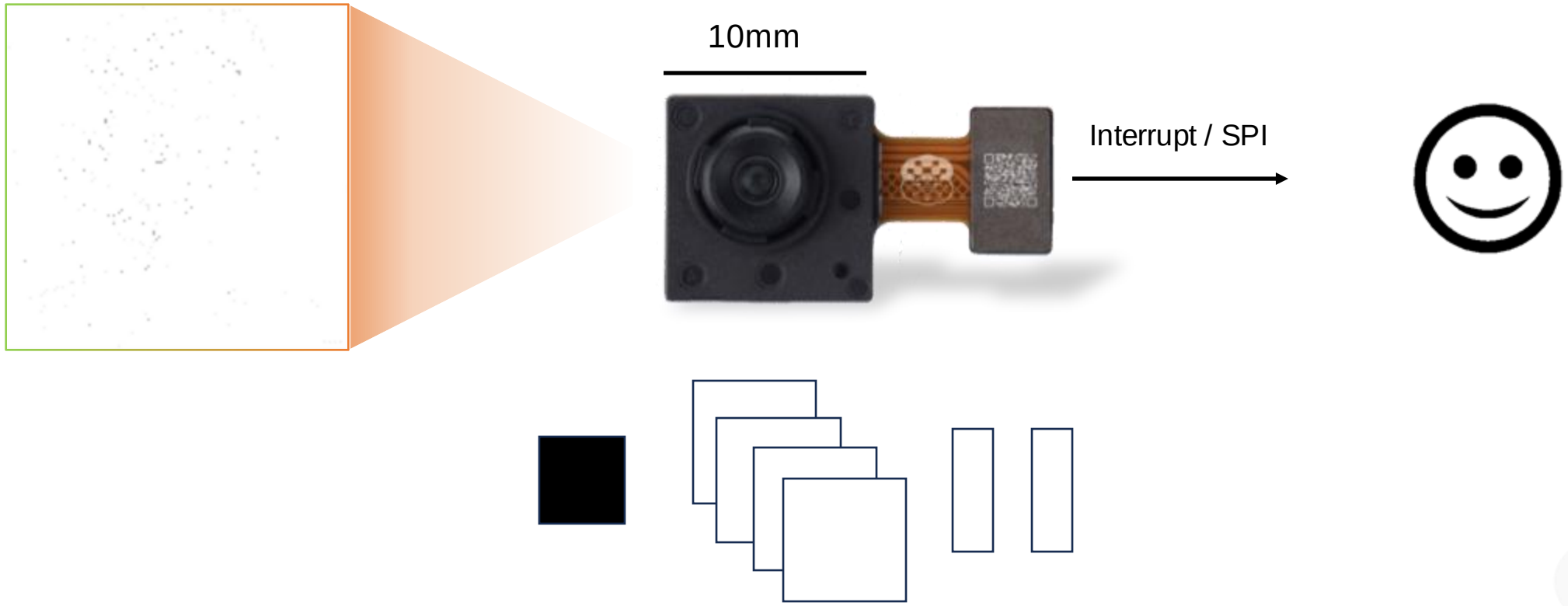
35+
countries

MIT Google Meta
SONY HONDA HUAWEI
Qualcomm LOCKHEED MARTIN
Raytheon Technologies

reddot winner 2022
best of the best

CES INNOVATION AWARDS 2020 BEST OF INNOVATION

Speck™ Ultra-low-power vision



On-chip vision sensor
Event-based vision
Ultra-low latency

Vision pre-processing
9 reconfigurable convolutional cores
On-chip SRAM
Straightforward system interfacing

Inference-only output
Ultra-sparse, ultra-informative
Milliwatt power

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Applications

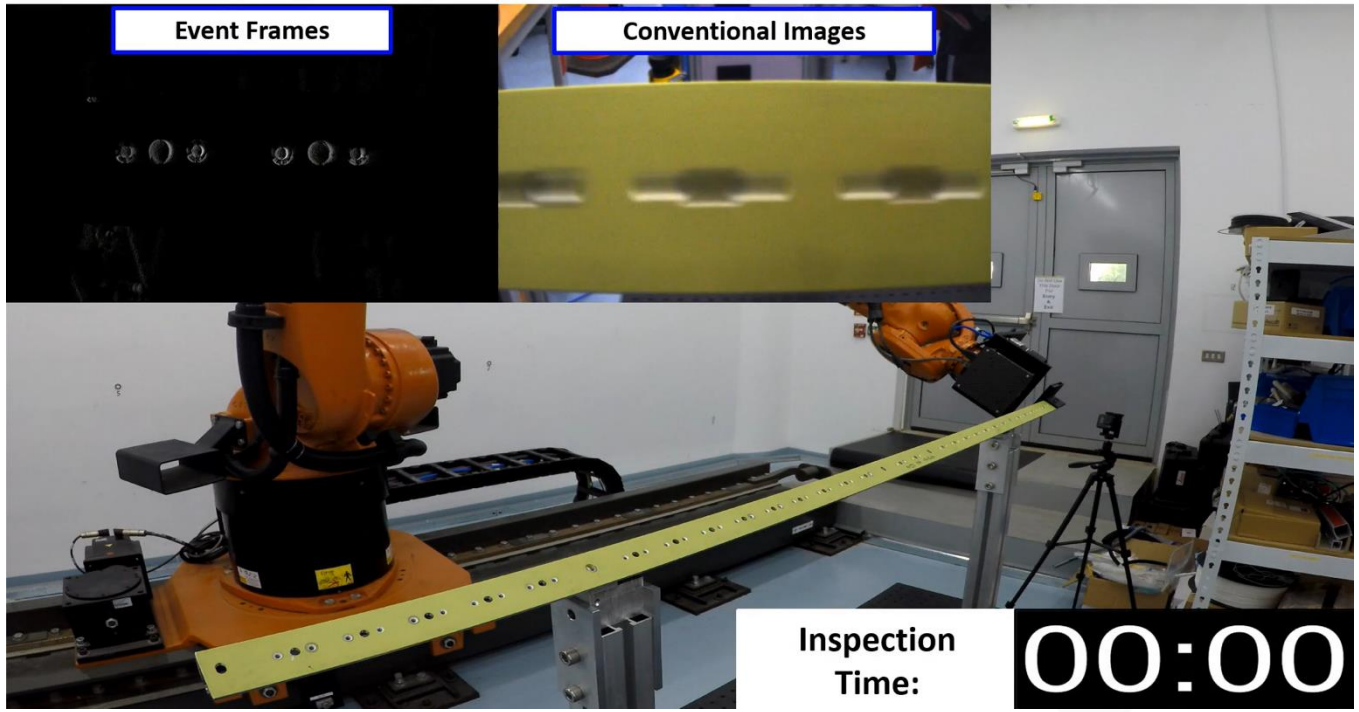
Fast countersink hole inspection

Flush rivets for aerospace assembly
One aircraft fuselage has 100–1000+ holes

Using DVXplorer

- 108x faster than frame-based method
- Much less data to analyse
- No need to stop at each hole: inspect many holes with one sweep

Camera	Resolution	Precision [mm]	Inspect time [s]
Frame camera (Yu et al. 2019)	2050 x 2448	0.02	42.0
DVXplorer	640 x 480	0.025	4.98



https://arxiv.org/abs/2304.04108
Salah et al., J Intell. Manuf. 2023

Active Marker Tracking

- Unique IDs
- Works indoors/outdoors

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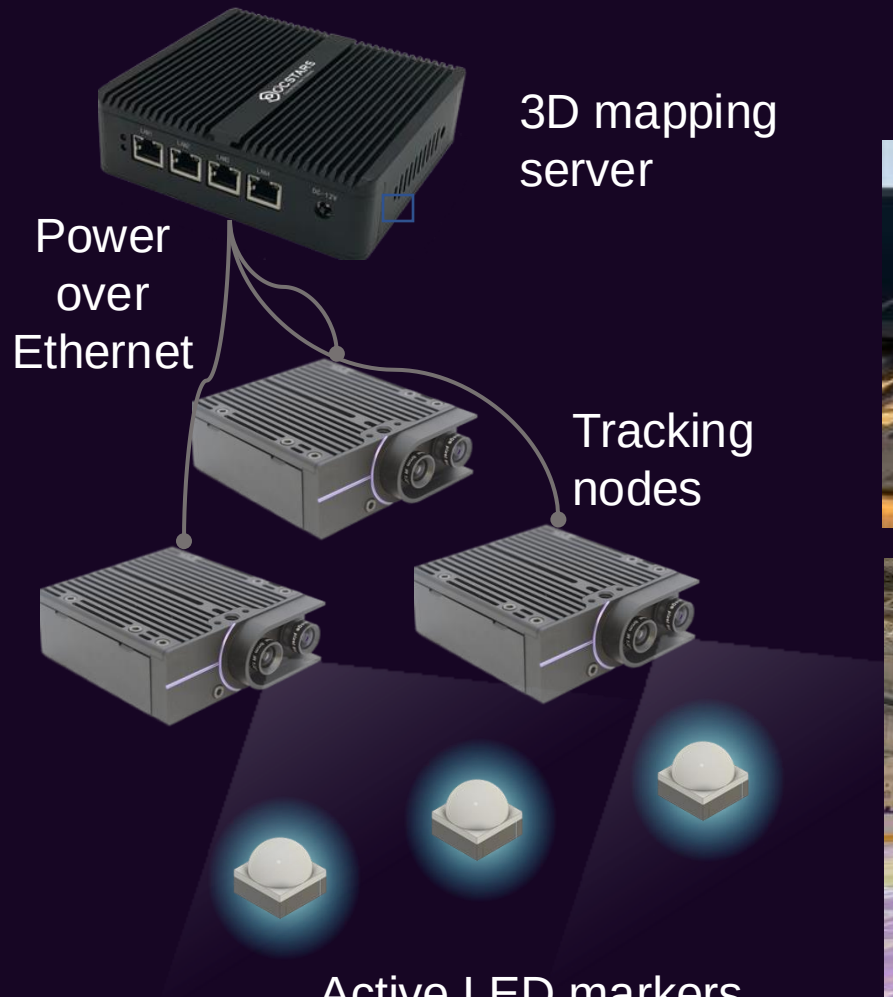
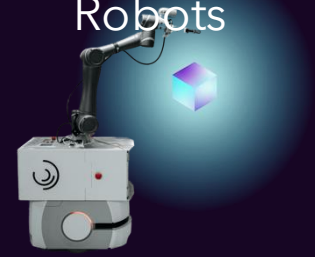


Reference customer (30 cameras)

Drones

AGVs Robots

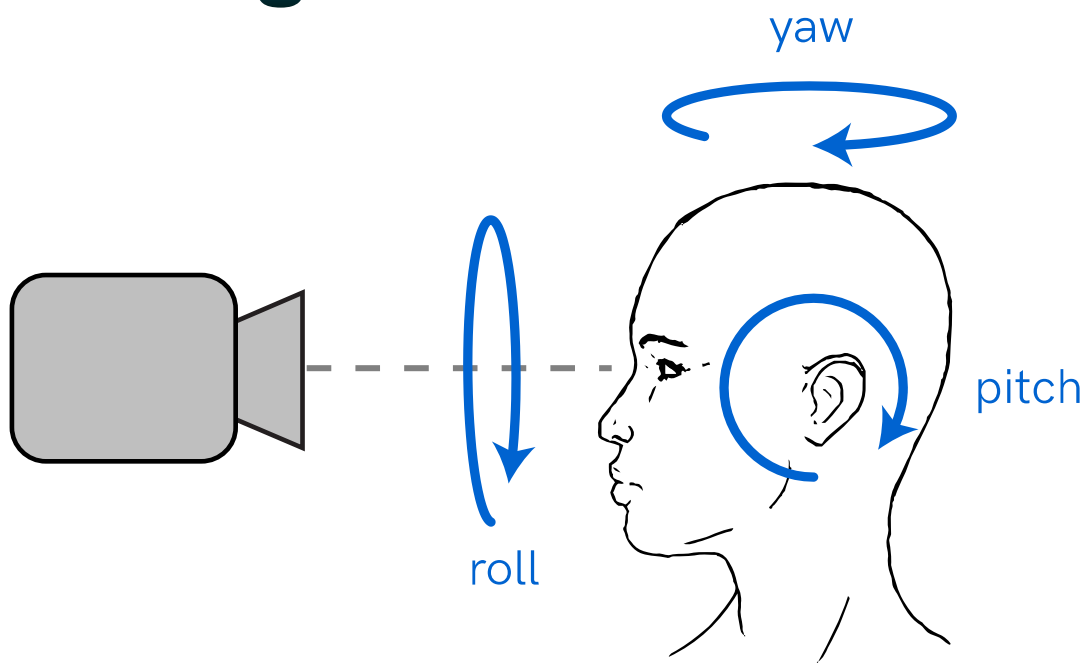


Spacecraft docking

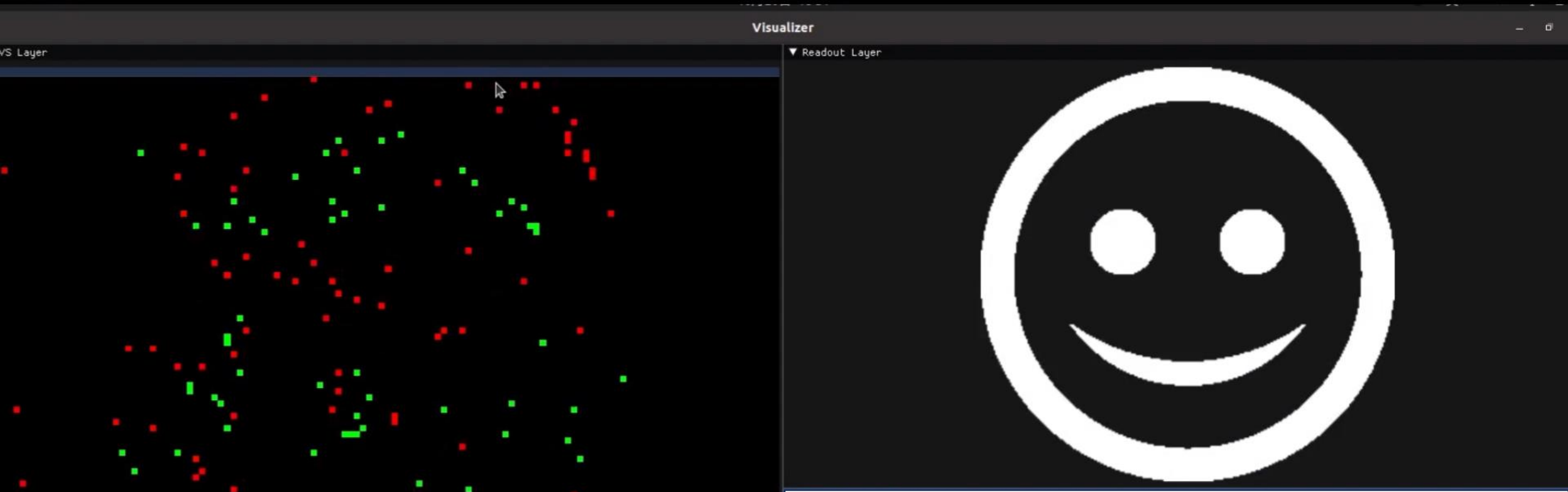
Car lights & road signals

In-sensor Attention Monitoring

- Attention detection
  - Glance / Non-glance
- Continuous operation
- Low latency (<100ms)
- Low power (<10mW)



Glance Non-glance



Driver attention monitoring	
Inattention detection accuracy	95.5%
Median latency	~56ms
Mean total power	~1.6mW

Passenger behaviour monitoring (driver distraction)	
Distraction detection accuracy	>99.5%
Median latency	~50ms
Mean total power	~3.5mW

Low-Power, Low-Latency Eye Tracking

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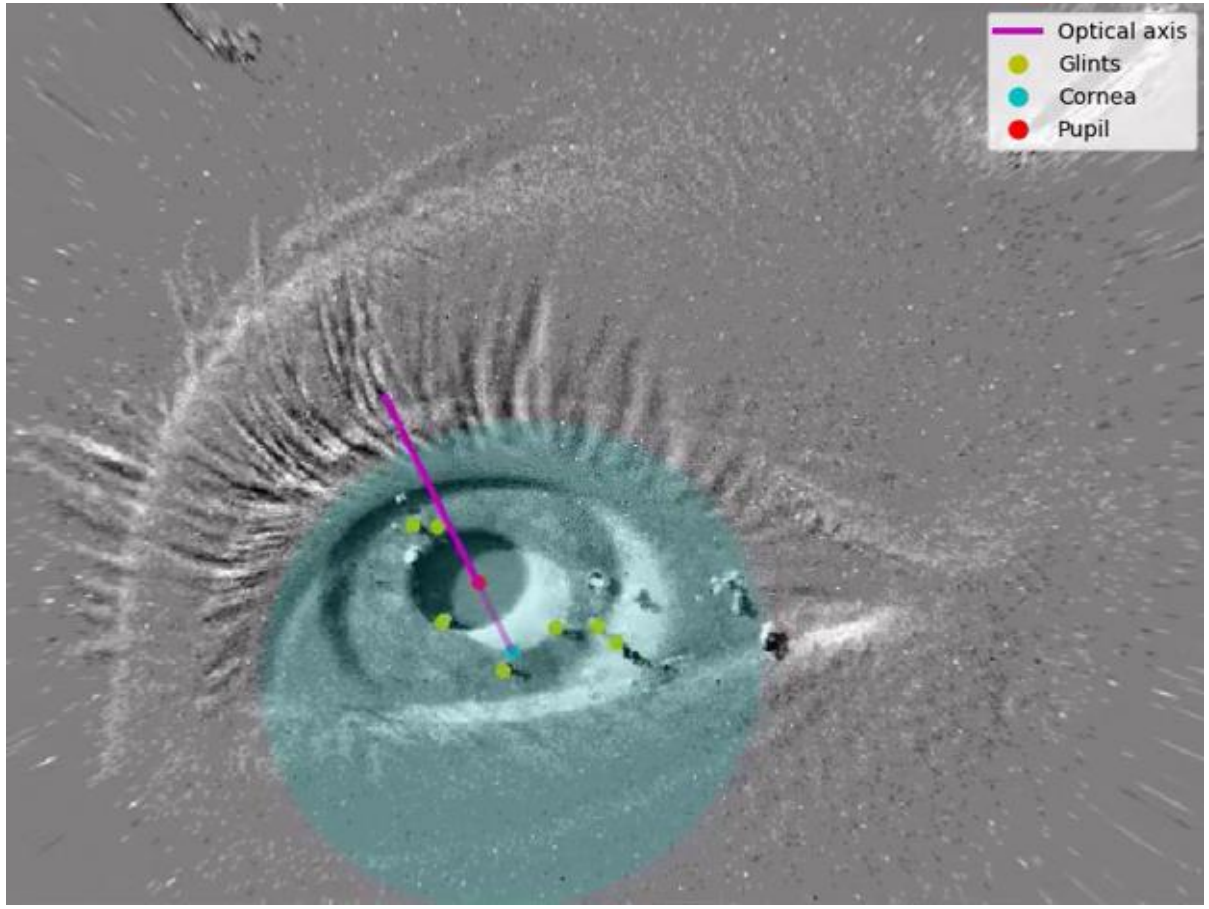
Foveator Eye



Fastest Mobile Eye tracking

- Low latency
- Low power (down to 10 mW)
- Small sensor

Thank you!

Contact us

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