PROPHESEE
METAVISION TECHNOLOGIES

WORLD'S FASTEST & LOWEST-ENERGY EYE-TRACKING

World’s fastest & lowest-energy eye-tracking

With Metavision® neuromorphic sensors and algorithms, combine sensor-level **>1kHz sampling rate** and down to **2mW sensing power consumption,** enabling next-generation user experiences in the most compact wearable devices.

CONTACT US

- Join 15,000+ Prophesee community members building the future of machine vision

TRUSTED BY INDUSTRY LEADERS

Meta SONY TCL RayNeo tobii ultraleap XPERI

Prophesee is the inventor of the **world's most advanced neuromorphic vision systems.**

Composed of a patented **Event-based Vision sensor** featuring **intelligent,** independent pixels and an **extensive AI library,** Prophesee Metavision® system unlocks next-level, ultra low-power **bioinspired eye-tracking.**

From gaze-tracking for r**eal-world chat GPT** interaction to **foveated rendering, driver monitoring systems, varioptics headsets** or even **presbyopia correction,** Metavision® sensors and algorithms allow for the first time **both ultra-fast and low-energy** eye tracking in a consumer-friendly form factor.

‹2mW
Sensing power consumption / 16µW standby mode

›1kHz
Sampling rate

5x lower datarate
vs. image-based sensor

›120dB dynamic range
Lower illumination requirements

‹1ms
Sampling rate

‹1°
Detection accuracy

APPLICATIONS

GAZE TRACKING

Zinn Labs uses Prophesee's GenX320 sensor to deliver a **high-refresh-rate, low-latency gaze-tracking solution,** pushing the boundaries of responsiveness and realism of head-worn display devices.

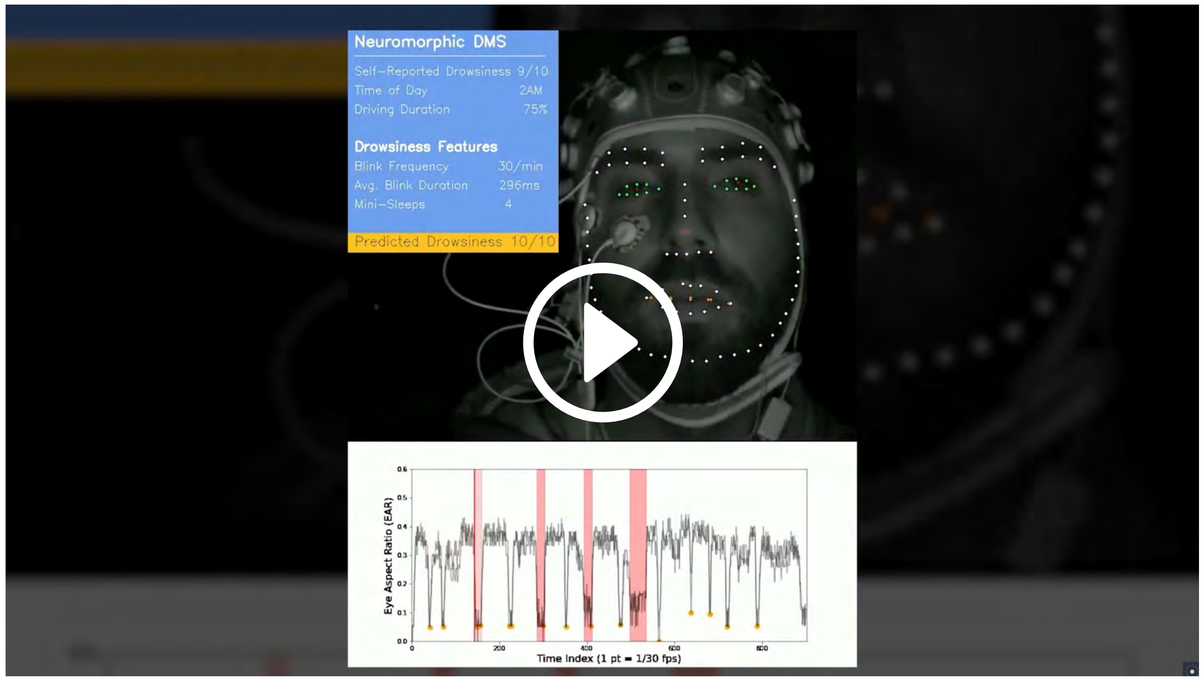
The low compute footprint of Zinn Labs' 3D gaze estimation gives it the flexibility to **support ultra low-power modes for use in smart wearables that look like normal eyewear.**

Scientific paper >

*Kevin Boyle, **CEO of Zinn Labs,** explains, "Zinn Labs' event-based gaze-tracking **reduces bandwidth by two orders of magnitude** compared to video-based solutions, allowing it to scale to previously impractical applications and form factors.*

APPLICATIONS

XPERI | PROPHESEE



DRIVER MONITORING SYSTEM

Real-Time Face & Eye Tracking and Blink Detection using Event Cameras.

The paper introduces a novel method using a convolutional recurrent neural network to **detect and track faces and eyes for DMS.** It also highlights how event cameras can better capture the unique temporal signature of eye blinks, **providing insights into driver fatigue.**

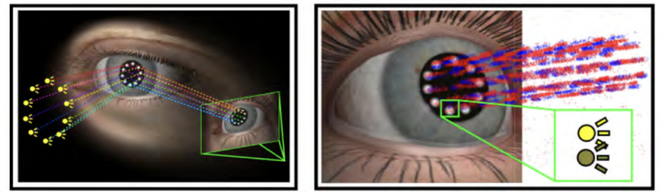
Project page > Scientific paper >

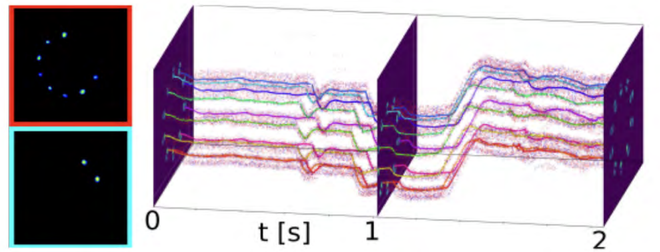
APPLICATIONS

Meta

KILOHERTZ EYE TRACKING

Event-Based Kilohertz Eye Tracking using Coded Differential Lighting – 2022





Sampling Rate: Test results show the VGA-based system operates at a **1 kHz sampling rate,** with accurate corneal glint detection even at **high eye movement velocities up to 1,000°/s.**

Detection Accuracy: The system achieves **sub-pixel accuracy** in glint detection, with an error of **less than 0.5 pixels even at high rotational velocities.**

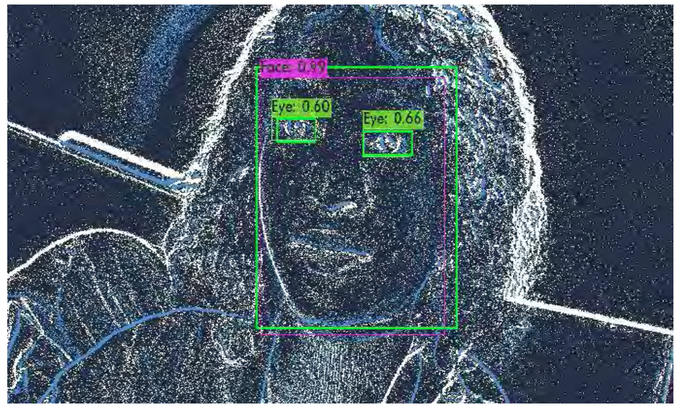
Noise Rejection: The system remains robust against external noise, maintaining sub-pixel accuracy **even in challenging conditions like background light flicker.**

Scientific paper >

> *Event cameras are a good fit for eye tracking sensors in AR/VR headsets, since they **fulfil key requirements on power and latency.** By pulsing the glint stimuli in binary patterns in the 1-2kHz range, **we are able to achieve sampling-time of 1 ms on glint updates**. The result is a **low-power, sub-pixel accurate corneal glint detector** which robustly **provides updates at kHz rates.***

APPLICATIONS

EVS ALGORITHMS INTEGRABILITY

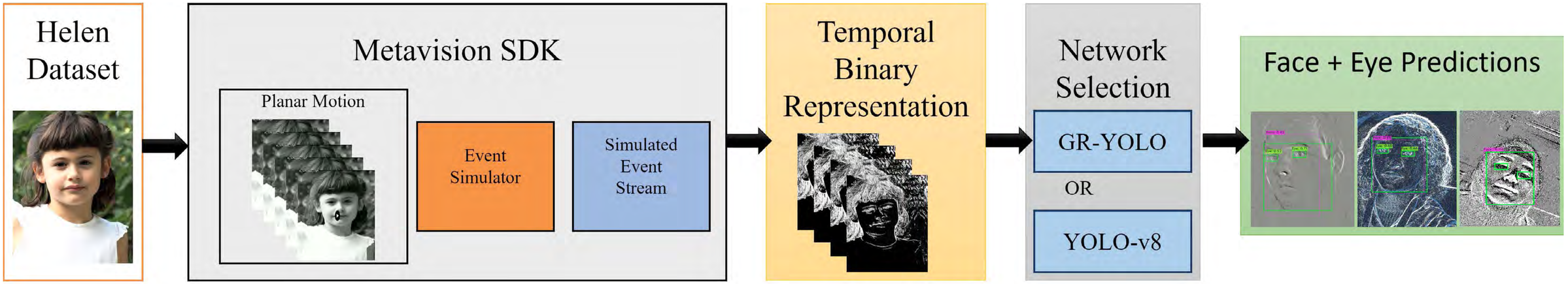


Evaluating Image-Based Face and Eye Tracking with Event Cameras

This paper showcases the viability of **integrating conventional algorithms with event-based data** by converting it into a frame format.

The study achieved a **mean Average Precision (mAP) score of 0.91** using models like GR-YOLO and YOLOv8, **demonstrating robust performance across various real-world datasets, even under challenging lighting conditions.**

Scientific paper >



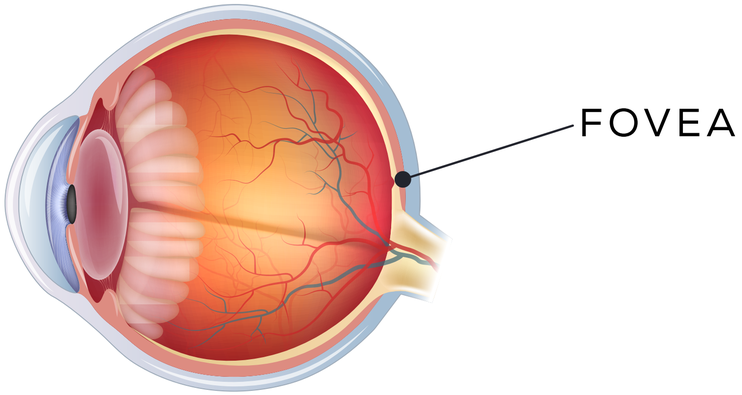
APPLICATIONS

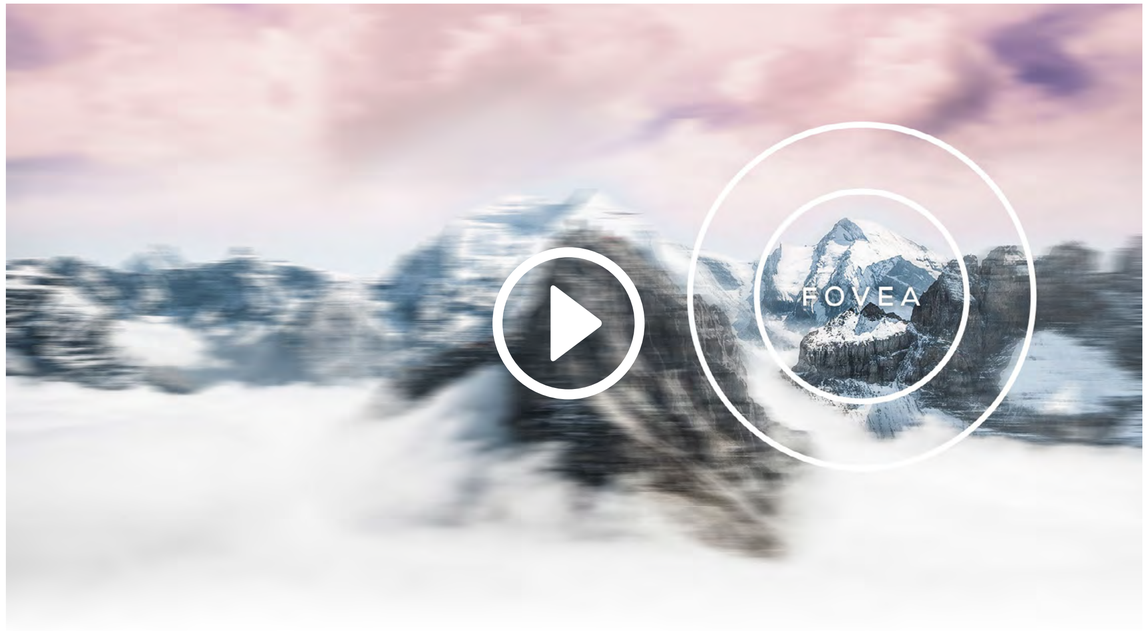
FOVEATED RENDERING

The human eye **never sees the whole scene in high definition.**

It can only perceive HD through its fovea which covers **just 3 degrees of the field of view.**

~90% of the virtual scene is currently wasted being rendered in HD while these parts of the scene are not perceived in details by the human eye.





But, foveated rendering is not an easy feat.

The eye has some of the fastest moving muscles in the body, **contracting in less than 10ms.** The eye's angular speed regularly reaches extremes of around **700°/s.**

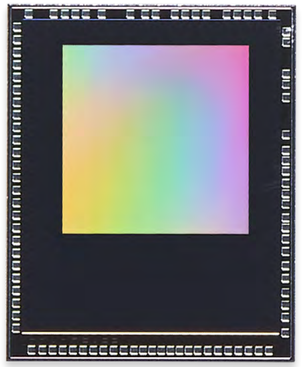
Event-based vision's speed and energy efficiency allows for the first time to achieve optimal foveated rendering, **capturing the finest fleeting movements of the eye at speeds up to 1kHz.**

>120dB
Dynamic Range

1µs
TIMESTAMP RESOLUTION

EASY INTEGRATION WITH STANDARD SOC

ULTRA HIGH-SPEED
10,000 FPS
TIME RESOLUTION
EQUIVALENT



GENX320
METAVISION SENSOR

AI-FRIENDLY
ADVANCED ON-CHIP FEATURES

DOWN TO µW POWER
CONSUMPTION
Ultra low power: **36µW**
Typical operating power: **3mW**

10 to 1000x
less data generated

1/5" OPTICAL FORMAT

320X320 PIXELS

0.05 lux
Low-Light Cutoff

METAVISION_XR

EYE TRACKING

HAND TRACKING

CONSTELLATION TRACKING

LOCALIZATION AND MAPPING

FOVEATED RENDERING

STRUCTURED LIGHT

FIND OUT WHAT PROPHESEE METAVISION® TECHNOLOGIES
CAN BRING TO YOUR XR PROJECTS

CONTACT US