

Research topics	[AI, Computer Vision, Event-based cameras, Autonomous Systems, Multi-sensors]
Position (M/F)	PhD, thesis offer; CIFRE EURECOM x IMRA, Sophia Antipolis
Reference offer	DS/JLD/event/062026
Research Department	Data Science (DS)
Publication date	16/06/2026
Start date	October 1st, 2026
Type of employment contract	Thesis CIFRE EURECOM x IMRA, IMRA employment contract (imra.eu/fr)

Description

Event-based Vision for Navigation in Autonomous Systems

Robots, cars as well, are expected to become increasingly autonomous and efficient in terms of navigation, thanks to a range of sensors and the associated data processing based on artificial intelligence.

Among existing sensors, event-based cameras offer numerous advantages, however, they have not yet been studied extensively enough to be used in practical applications today. This thesis aims to investigate (i) their use for motion understanding, trajectory estimation, and decision-making in autonomous navigation (ii) their use for behavior recognition (detection and analysis of person's face and body in / around vehicles, drivers, passengers, pedestrians around).

Event cameras are bio-inspired vision sensors that represent a fundamental breakthrough compared to traditional frame-based imaging. Rather than capturing entire frames at regular intervals, these sensors operate in an asynchronous manner, meaning that each pixel independently triggers an event only when a change in brightness exceeds a specific threshold. The properties of these cameras (alone, or jointly with RGB and/or LIDAR sensors) align with the dynamic and unpredictable characteristics of potential activities around moving cars or robots, making them particularly suited for capturing fast, irregular and unexpected actions. However, they also introduce unique challenges that require a deep rethinking of conventional vision methodologies and the use of specific neural networks.

Reference: Adra, Mira, Simone Melcarne, Nelida Mirabet-Herranz, and Jean-Luc Dugelay. "Event-based solutions for human-centered applications: a comprehensive review." *Frontiers in Signal Processing* 5 (2025): 1585242.

Requirements

- Education Level / Degree : Master
- Field / specialty: AI, Computer Vision.

Application

The application must include:

- Curriculum,
- Name and address of two references.

Applications should be submitted by e-mail to secretariat@eurecom.fr with the reference: DS/JLD/event/062026