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BA, MA

Ev2Gray: Snap Photos with an Event Camera

Event Based Vision and its Shortcomings

Event Based Vision represents a transformative approach to visual sensing, offering unprecedented temporal resolution in the microsecond range. Unlike conventional cameras capturing frames at fixed intervals, these bio-inspired sensors respond instantly to brightness changes, enabling entirely new possibilities in computer vision. The technology combines ultra-low latency, exceptional dynamic range, and minimal power consumption. As a young field, it presents unique opportunities for researchers to make fundamental contributions, particularly in algorithmic development and theoretical understanding.

However, there exists a fundamental limitation in that no absolute intensity information is available. While event-based vision (EBV) is ideally suited for visual tasks that ask "when" or "where," traditional image-based computer vision has the advantage for object recognition and "what" questions, as it provides precise information about a scene's structure - independent of motion.

To address this challenge, the "Ev2Gray" method was developed at IIIT. This technique enables the generation of grayscale images using an event camera by implementing targeted, partial shading. In the right column, you can find a link to our short paper under "SMSI 2025".

Task Description

Building upon the existing concept, the Ev2Gray method is to be further developed and enhanced. Experimental, simulative, and theoretical investigations are equally important and possible. Given the novelty of both technology and method, the exploratory nature of the work should be particularly emphasized - your own ideas and approaches are explicitly encouraged.
The concrete scope will be tailored to your individual skill set and interests, welcoming your creative solutions alongside the implementation of existing concepts. This thesis values both achievement of goals and knowledge acquisition in advancing event-based vision technology. The aim of this work lies more in gaining scientific insights than in achieving concrete goals.

Prerequisites

- Basic programming skills
- Fundamental knowledge of optics and image acquisition
- Interest in creative and scientific work
- Motivation (!)

Research Area

- Computer Vision
- Event Based Vision
- High-Speed Sensing

Course of Studies

- [x] ETIT
- [x] Computer Science
- [x] Mechatronics and IT

Direction

- [ ] Implementation
- [x] Development
- [x] Literature Research
- [x] Sensing

Start

any time

Links

Employee
SMSI 2025

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