VibES: Induced Vibration for Persistent Event-Based Sensing

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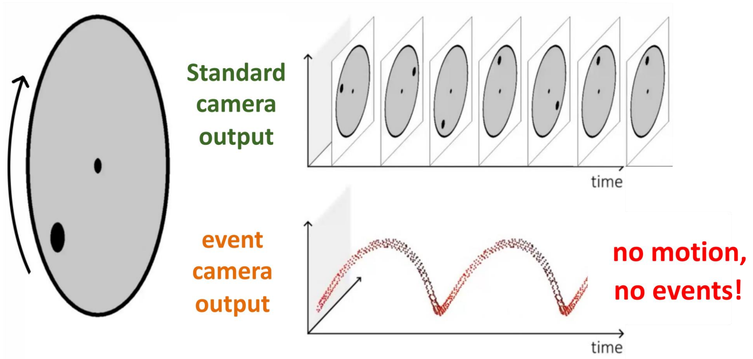
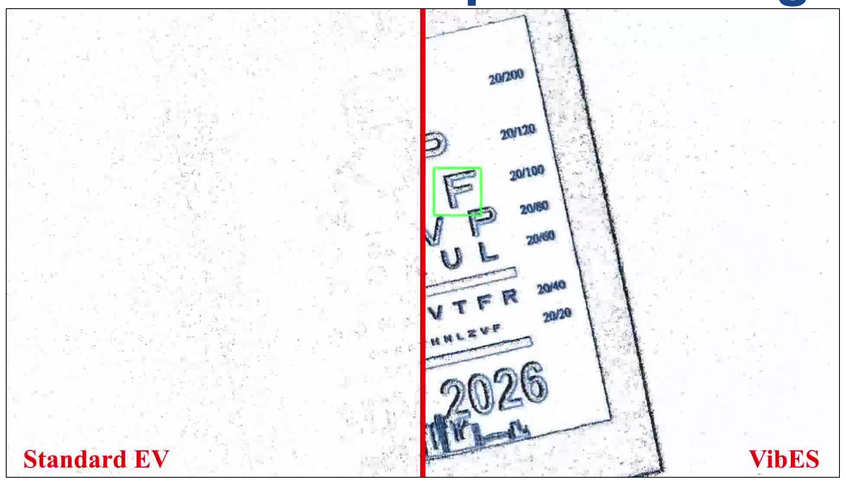
Event Cameras

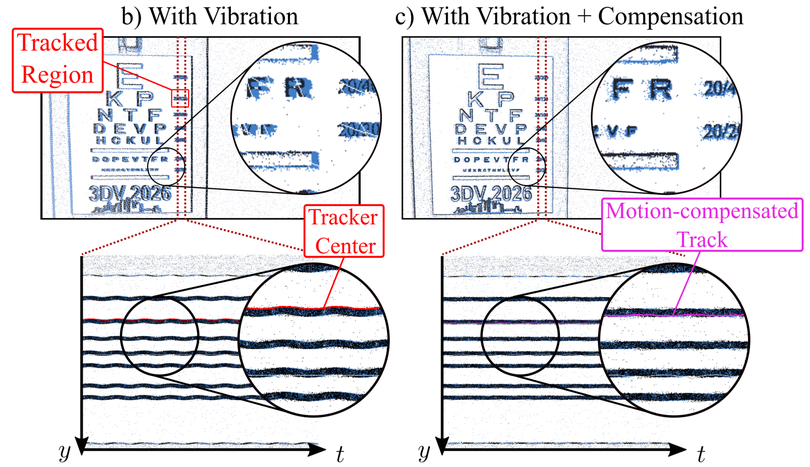


Event-cameras are vision sensors where each pixel operates independently, generating outputs ("events") whenever the log-intensity changes beyond a threshold.

Problem: Perceptual Fading

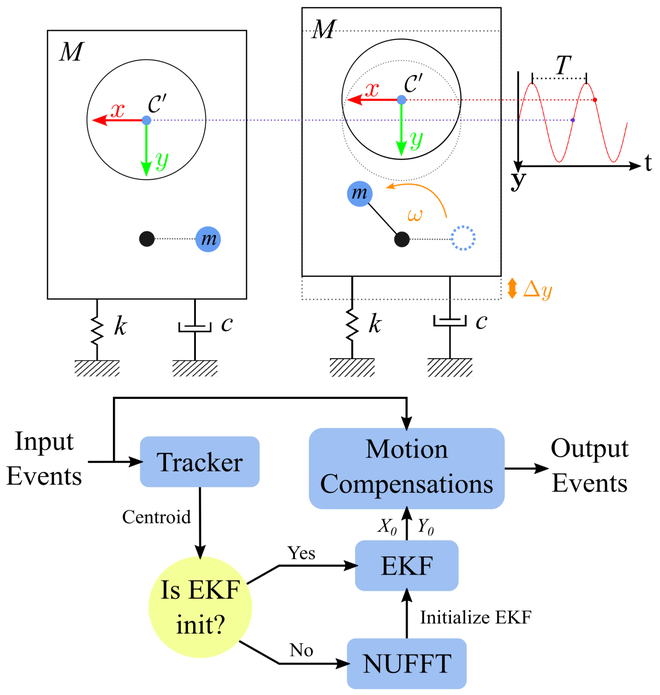


Solution: Vibrating Camera



Methodology

A DC motor with a custom **eccentric mass** is rigidly attached to the camera to induce planar vibrations.

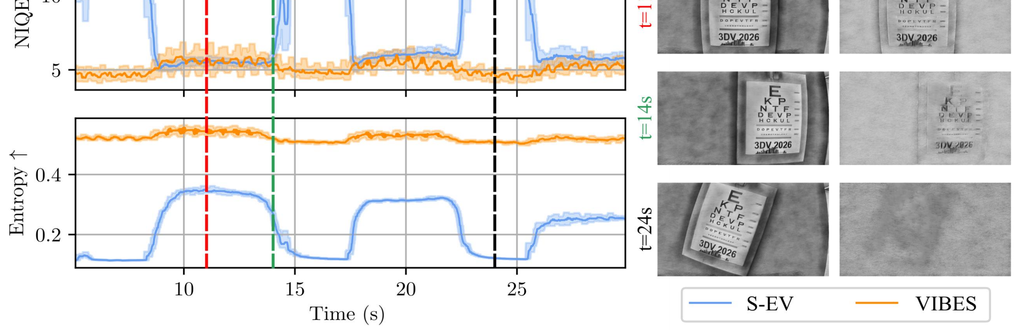


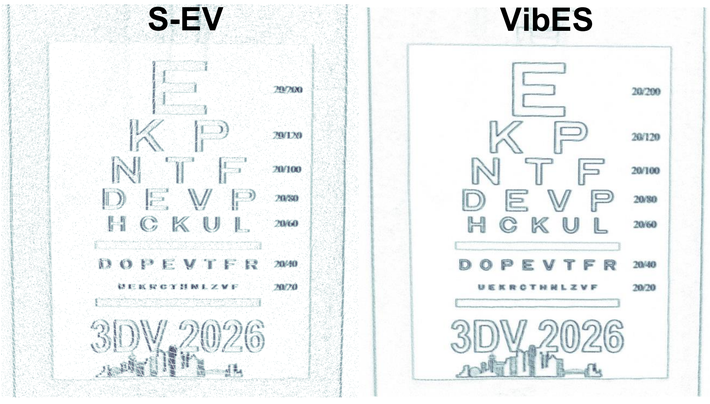
Results

Superior Sensing & Reconstruction: By providing a consistent information stream independent of scene dynamics, VibES achieves high entropy and recovers images significantly closer to natural image quality.

Enhanced Edge Extraction: VibES produces sharper, more continuous contours with higher gradient magnitudes and less fragmentation than standard event-based (S-EV) data.

Extended Depth & Vibration Tracking: The system's induced parallax and motion compensation enable it to estimate external vibration frequencies and predict the relative depth of scene elements





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TCIG Toronto Computational Imaging Group
STARS Space & Terrestrial Autonomous Robotic Systems Laboratory

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