

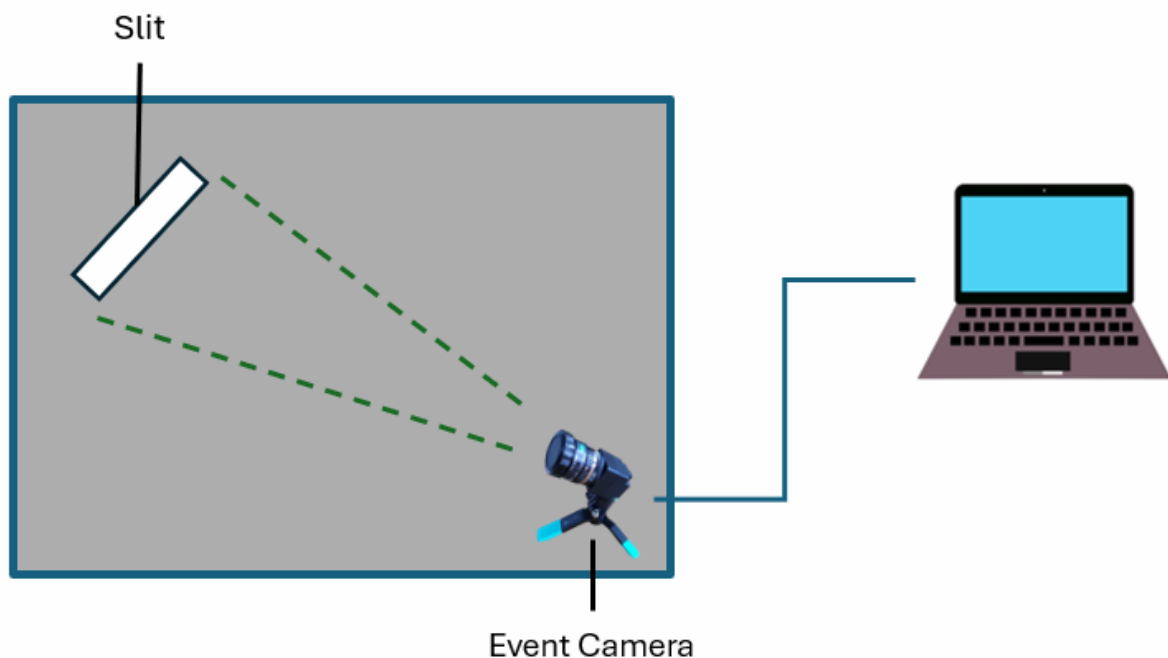
## SpikeCV Competition (Track 3)

Team name: Spike Symphony

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### Demo 1: Spiky Piano

Imagine stepping into a room where every fluttering pebble or racing grain triggers a musical note beneath your fingertips. The Spiky DVS Piano brings this vision to life by combining an event camera's lightning-fast vision with a playful piano interface. At its heart, it is a creative playground: participants adjust live sliders for sensitivity, size thresholds and replay speed, and watch a colourful heatmap pulse in synchrony with their movements. A reset button offers instant control over scorekeeping, encouraging exploration and experimentation. This hands-on approach turns a sophisticated computer vision pipeline into a delightful interactive performance, captivating both technologists and casual observers alike.

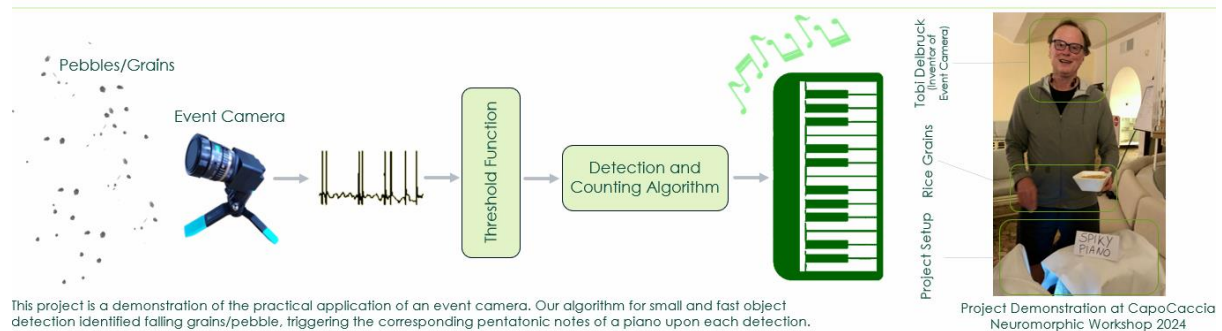


### Technical Pipeline

Behind the enchantment lies a robust yet elegant algorithm. The event camera captures asynchronous pixel changes in microseconds, producing streams of spikes whenever motion occurs. These events are filtered for noise and polarity before being rendered into rapid binary frames. A connected-components analysis isolates individual motion clusters and computes the bounding box for each. By comparing the largest cluster's area to dynamic thresholds (one per cent and ten per cent of the sensor's frame), the system instantly classifies objects as small, medium or large. Crossing any of the configurable horizontal lines increments a counter and triggers a short piano grain, with support for up to sixty-four simultaneous voices capped at fifty milliseconds for crisp, staccato rhythms.

What sets Spiky DVS Piano apart is its fusion of cutting-edge neuromorphic vision and musical play. It transforms raw event data into an engaging multisensory experience. The vibrant heatmap

and clickable controls invite users to become conductors of motion-driven melodies, fostering creativity and wonder. Imagine choreographing a dance of grains that compose their own tune or competing to create the most complex rhythmic pattern by tossing objects of various sizes.



## Real-World Use Cases and Impact

Beyond entertainment, the underlying algorithm addresses practical challenges in diverse fields. In industrial settings, it can sort and count items on high-speed conveyors with minimal latency, improving quality control for pharmaceuticals, agriculture and manufacturing. Autonomous robots and drones gain rapid obstacle recognition tailored by object size, boosting safety in dynamic environments. Traffic monitoring systems can classify vehicles in real time, providing richer analytics for smart cities. In sports tech, ultra-fast detection of balls or equipment leads to immediate insights and highlights. Even in microscopy, tracking microscopic beads or cells by size enables precise experiment triggers without overwhelming data volumes. Spiky DVS Piano not only delights the senses but also demonstrates a versatile technology with genuine commercial and scientific promise.

## Demo Video

