CMSC 733: Project 4
Neuromorphic Vision

Chahat Deep Singh

Robotics Graduate Student

University of Maryland

Email: chahat@umd.edu

Abstract—**This project introduces a new methodology to compute visual flow using an asynchronous event-based sensor.**

I. IMPLEMENTATION

The presented method does not rely on gray levels, nor on the integration of activity over long time intervals.

Parameters:
$L = 20$ (spatial dimensions: $L \times L$)
$\Delta T = 1000 \ \mu$s (spatiotemporal window: $L \times L \times 2\Delta t$)
$\text{Threshold}_1 = 1e - 5$
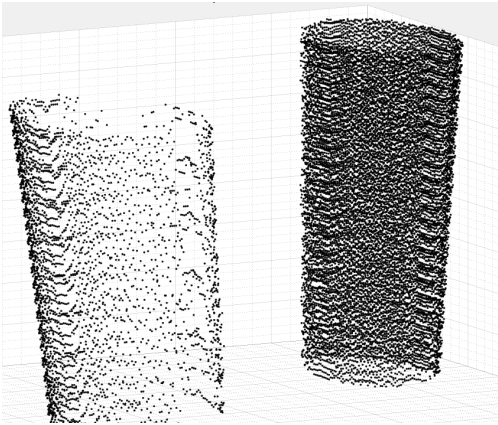$\text{Threshold}_2 = 0.05$

Fig. 1. Data Input: Events

Fig. 2. Visual Flow (all samples)

II. CONCLUSION

A plane fitting was applied to each event arriving at time t over the window of size: $L \times L \times 2\Delta t$ (centered on the event). As mentioned in the paper, the plane fitting provides an approximation of the timing of nonactive spatial locations. Also, it can be observed that: the slope of the fitted plane with respect to time axis is directly proportional to the motion velocity.

REFERENCES

1. **'Event-based visual flow'**, Benosman R, Clercq C, Lagorce X, Ieng SH, Bartolozzi C., IEEE Trans Neural Netw Learn Syst. 2014 Feb;25(2):407-17. doi: 10.1109/TNNLS.2013.2273537.
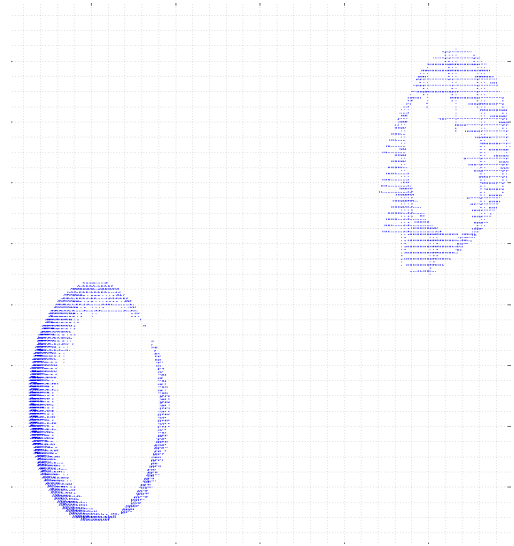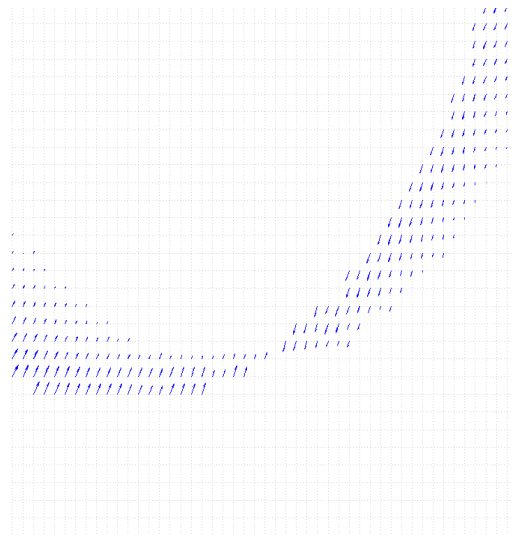
Fig. 3. Visual Flow, zoomed-in; Vectors pointing in opposite direction