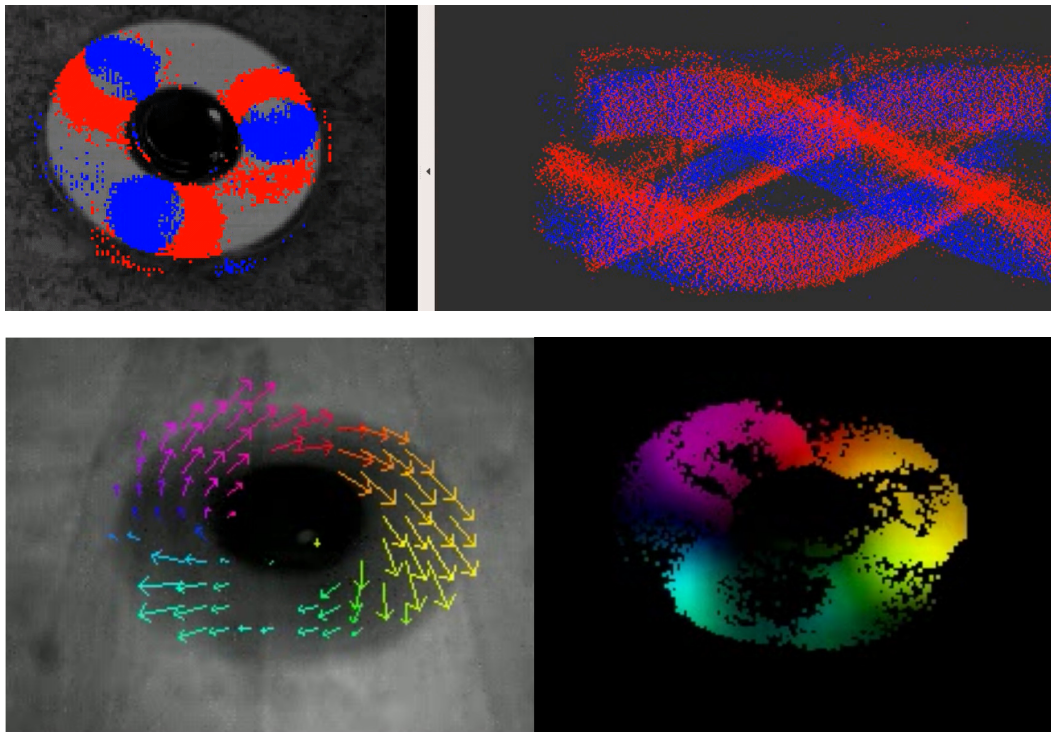# Live Demonstration: Unsupervised Event-based Learning of Optical Flow, Depth and Egomotion

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We propose a demo of our work, Unsupervised Event-based Learning of Optical Flow, Depth and Egomotion [1], which will also appear at CVPR 2019. Our demo consists of a CNN which takes as input events from a DAVIS-346b event camera[1], represented as a discretized event volume, and predicts optical flow for each pixel in the image. Due to the generalization abilities of our network, we are able to predict accurate optical flow for a very wide range of scenes, including for very fast motions and challenging lighting.

Our network runs on a standard laptop GPU at around 20Hz, with output being displayed in realtime on the laptop screen, or an external screen if available. We will bring objects to demonstrate the performance of the network in challenging environments, such as a fidget spinner in a box where we can vary the lighting conditions, and objects to be thrown quickly in front of the camera. The network is also able to predict accurate flow values for humans, so audience participation is encouraged. In addition, we can provide a 3D (x-y-t) visualization of the events to allow viewers a better understanding of the structure of the data coming from the camera. A sample of the proposed set of visualizations can be seen in the title figure.

For a visual demonstration of the output of the network, please see the following video: `https://youtu.be/cdcg-CdV7TU`.

References

[1] Alex Zihao Zhu, Liangzhe Yuan, Kenneth Chaney, and Kostas Daniilidis. Unsupervised event-based learning of optical flow, depth, and egomotion. In *2019 IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*. IEEE, 2019.

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[1]`https://inivation.com/dvs/`