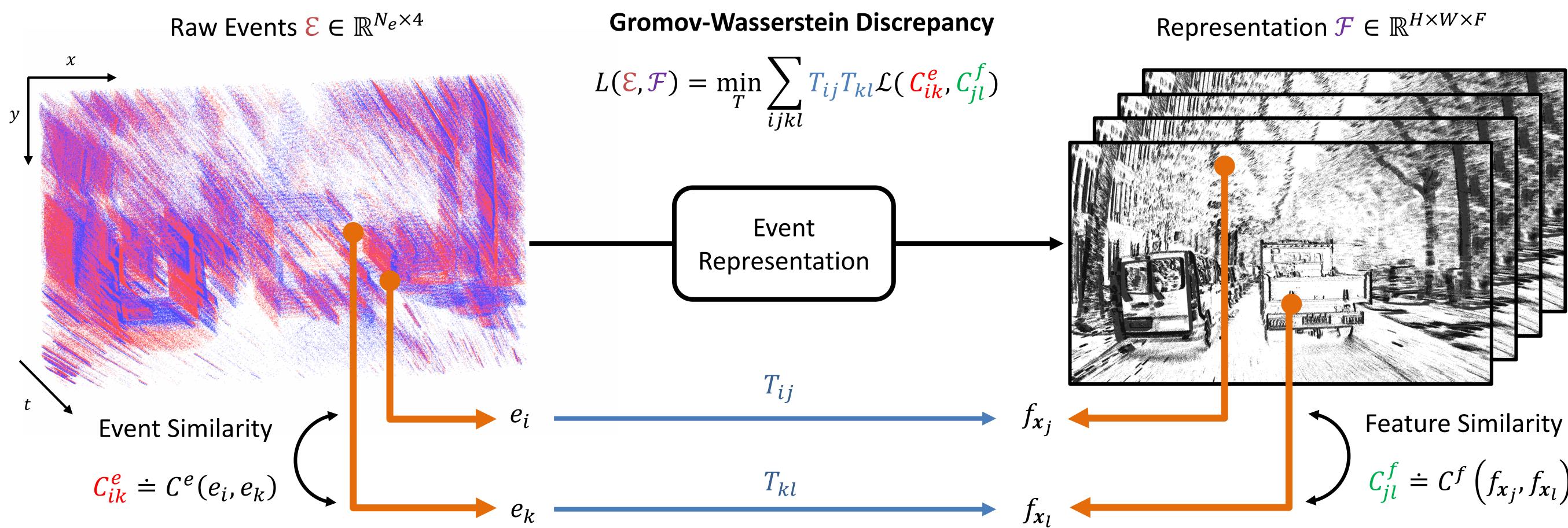


From Chaos Comes Order: Ordering Event Representations for

• We calculate the Gromov-Wasserstein Discrepancy (GWD) between raw events and event representations.

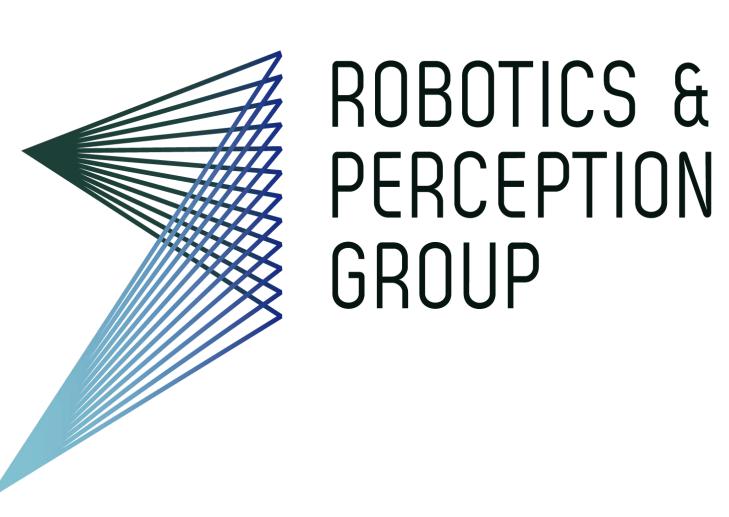
• It is defined as the solution to an optimal transport problem which transports events pairs (e_i, e_k) to feature

• If the transport plan preserves the similarities C_{ik}^{e} and C_{il}^{f} between event and feature pairs, this results in a low GWD.



er 50% on the <i>Gen1</i>	Representation	GWD (GEN1) ↓	Accuracy ↑	
irrent network with	2D Histogram	0.6220	46.10%	
	Voxel Grid	0.4028	52.40%	
6 on the 1 Mpx	MDES	0.3831	53.30%	
orrelation between the	TORE	0.3694	54.64%	
	Time Surface	0.3252	57.58%	
d the task ance	ERGO-12	0.3045	61.40%	
	Mini N. Imaga Nat [Kim ICC\/'21] regulte			

Method	Event Representation	mAP ↑		
		Gen1	1 Mpx	
Gehrig arxiv'22]	Graph	32.1%	_	
erot NIPS'20]	Voxel Grid	40.0%	43.0%	
Net [Li TIP'22]	Async. attention embedding	46.7%	48.3%	
Gehrig CVPR'23]	2D Histogram	47.2%	<u>47.4%</u>	
YOLOv6 (Ours)	ERGO-12	<u>49.3%</u>	40.0%	
	ERGO-12 augmentation	50.4%	40.6%	
omparison of state-of-the-art event-based object detectors				





Event-based Vision Research

Details of optimization

- Search for the optimal representation by minimizing GWD (fast) over a space of possible representations
- w_c is a windowing function (selects events within an interval)
- m_c is the measurement function, e.g. select t_{-} (timestamps of negative events)
- a_c is the aggregation function, e.g. mean which aggregates measurements into a single feature map

