

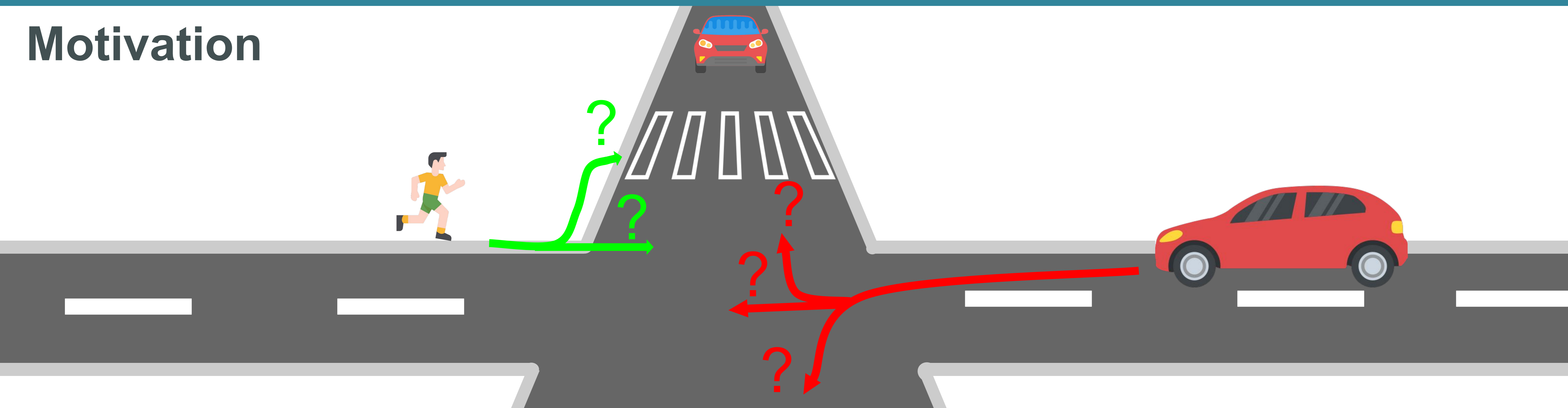
Likely, Light, and Accurate Context-Free Clusters-based Trajectory Prediction

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Motivation

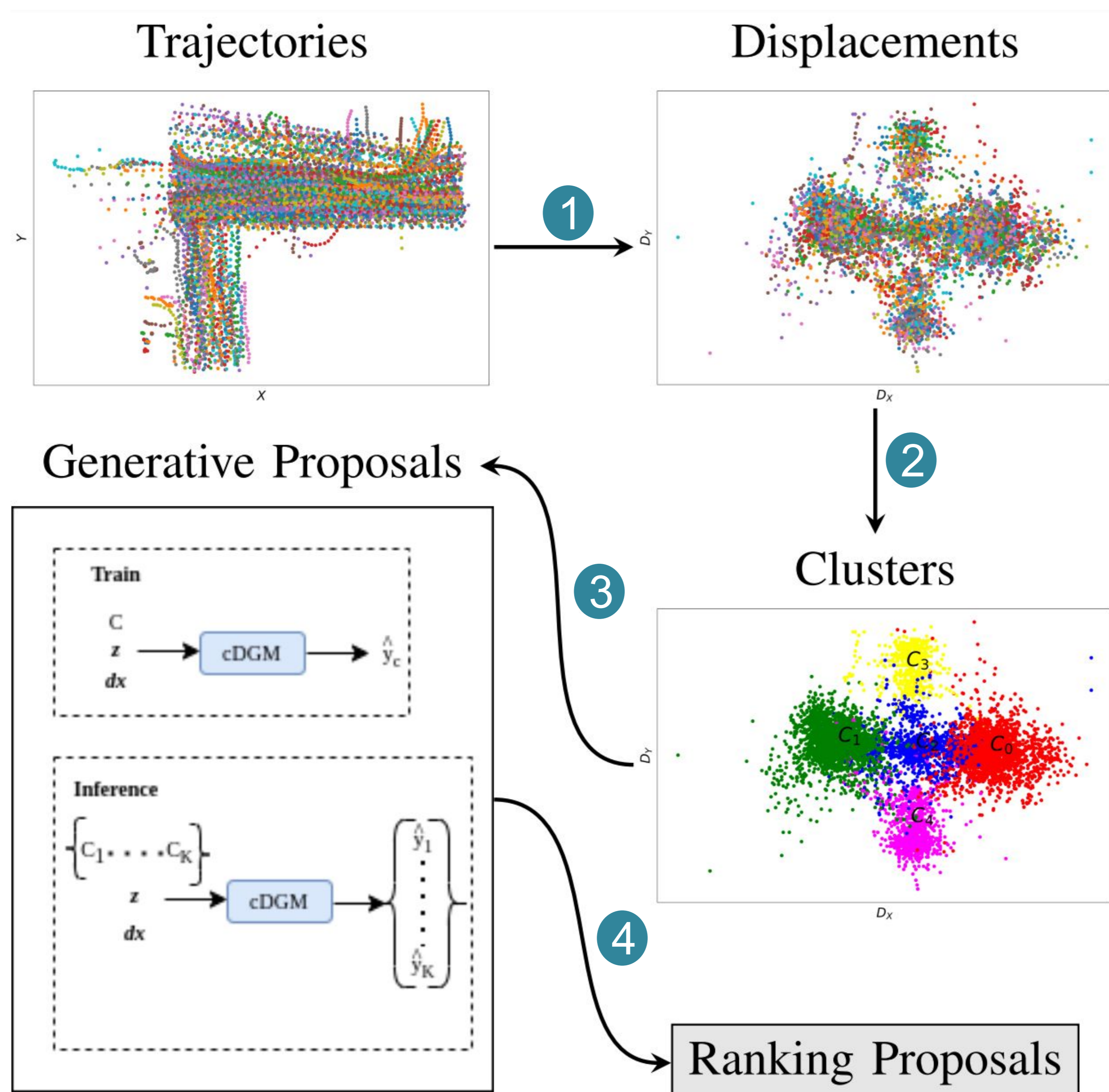


1. Trajectory Prediction Problem

Observation (X): 2D positions of a dynamic agent for an observation horizon

Prediction (Y): future 2D positions for a prediction horizon

2. System Overview



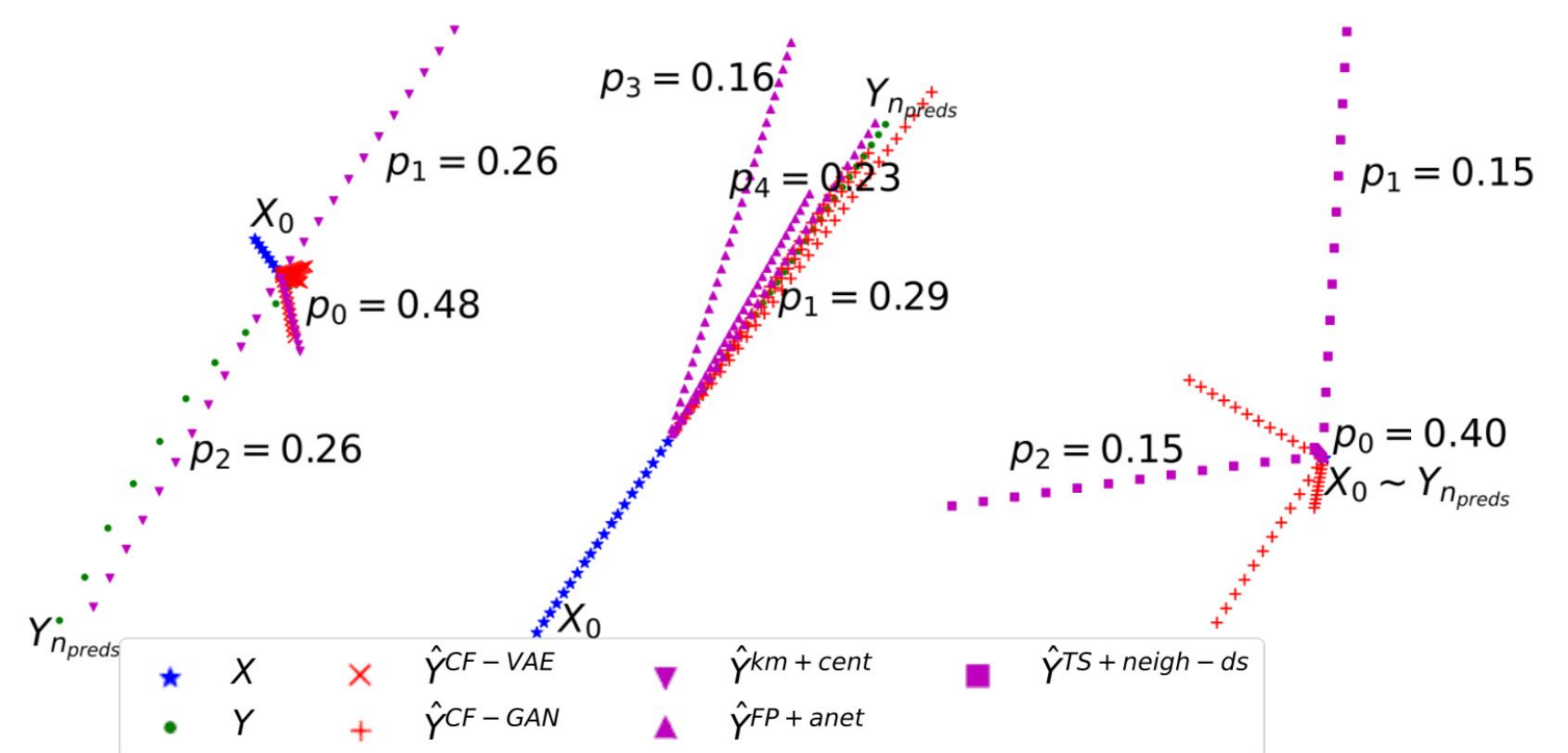
3. Experiments

Argoverse, ETH/UCY, and THÖR datasets

Clustering: *k*-means (*km*), *TS k*-means (*TS*), and Full Path Self-Conditioned GAN (*FP*)

DGMs: VAEs (*CF*-VAE) and GANs (*CF*-GAN)

Ranking proposals: centroids (*cent*), neighbors (*neig-ds*), and auxiliary NN (*anet*)



4. Conclusions

- FP generalizes better than traditional clustering methods
- Ranking proposals are accurate and run in linear time
- More accurate predictions: better Top-k ADE/FDE scores



1 Transformation of trajectory data ($X \oplus Y$) into displacements ($D_X \oplus D_Y$)

2 Clustering $D_X \oplus D_Y$ into C clusters

3 Train Deep Generative Models (DGMs): $\{D_X, c\} \rightarrow D_Y$

4 Assign likelihoods to the C predicted trajectories (\hat{D}_Y)

Argoverse Scores	CF-GAN	OURS GAN	CF-VAE	OURS VAE
Top-1 ADE	2.41±0.09	1.92±0.02	2.69±0.02	1.95±0.01
Top-1 FDE	4.53±0.17	3.27±0.03	4.94±0.02	3.39±0.04
Top-3 ADE	1.62±0.07	1.56±0.02	1.96±0.02	1.62±0.02
Top-3 FDE	2.81±0.14	2.69±0.02	3.44±0.06	2.82±0.04