A Short Note on Analyzing Sequence Complexity in Trajectory Prediction Benchmarks

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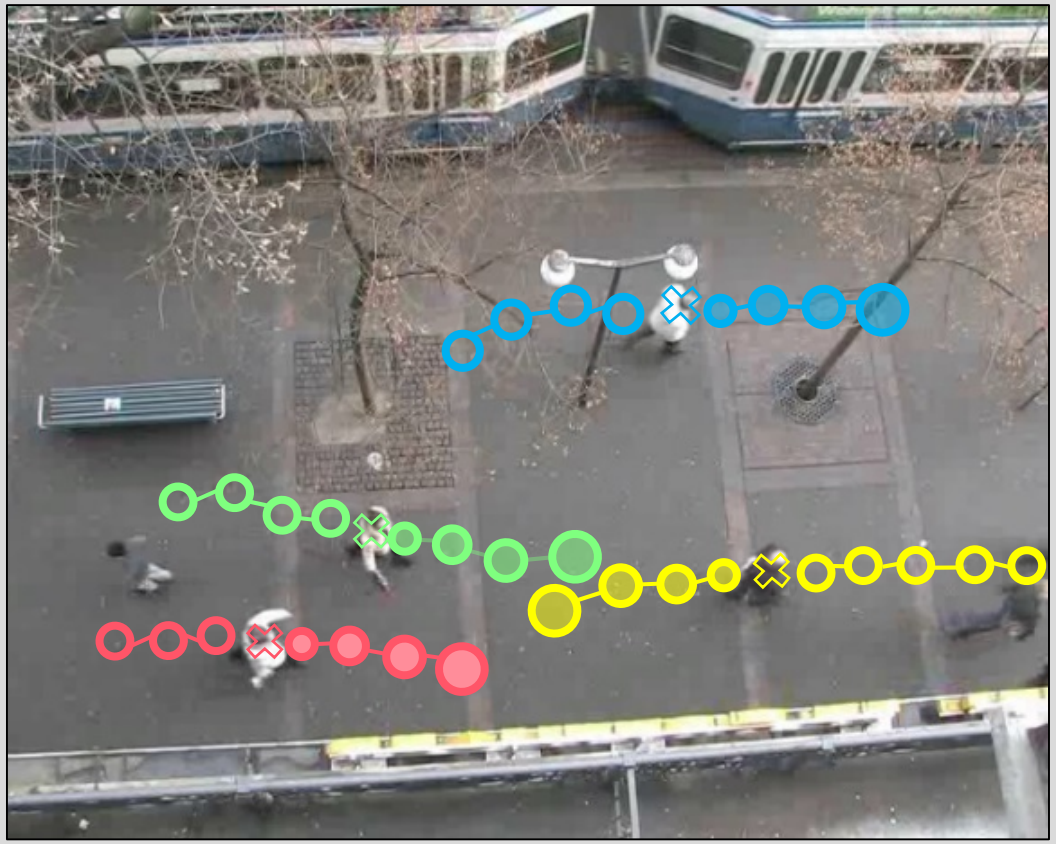


Dataset (e.g. BIWI-Hotel)

- Prediction of human trajectories is a fundamental ability essential for intelligent autonomous systems to see, understand, and react to the environment.

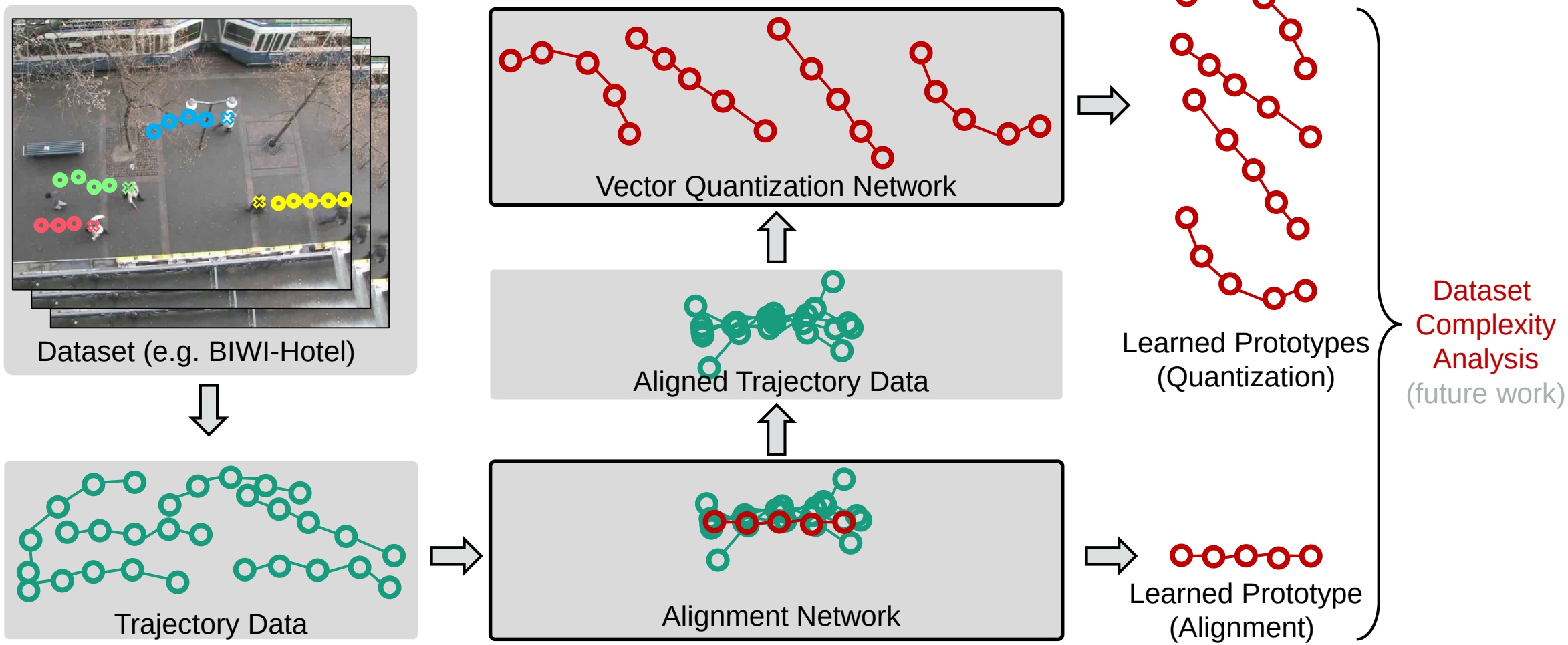
Motivation:

- Analysis and quantification of dataset complexity is still a missing piece in benchmarking human trajectory prediction models.
- Current attempts to standardized benchmark originate from heuristics or experienced based criteria.

Scope:

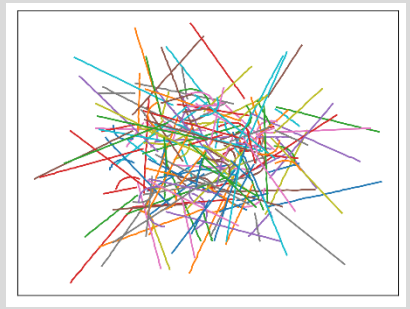
- Dataset complexity analysis can be based on a dataset representation in terms of few prototypical trajectories
  - First step: Approach for determining a prototype-based representation of the dataset is proposed.
- Dataset representation is obtained by utilizing a spatial sequence alignment enabling a learning vector quantization.
- First proof of concept on synthetic and real-world datasets.

Sequence Alignment & Vector Quantization

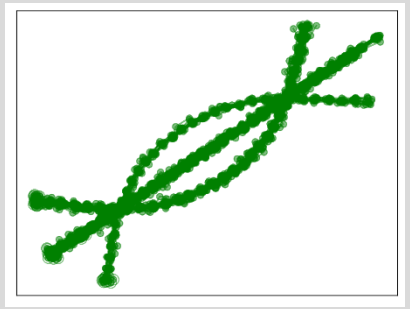


Evaluation

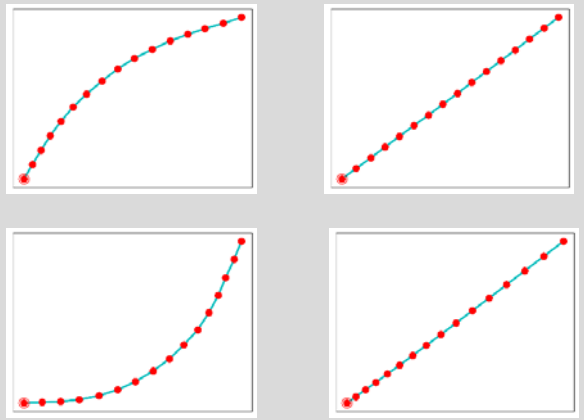
Synthetic Data:



Trajectory Data

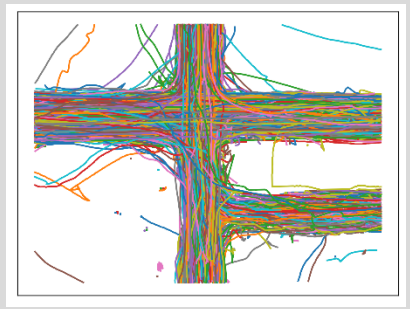


Aligned Trajectory Data

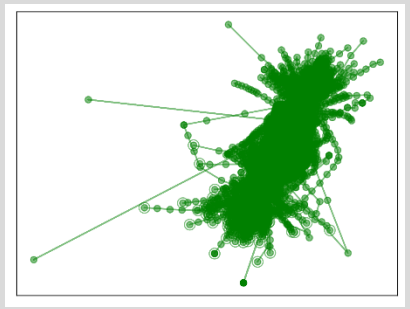


Learned Prototypes

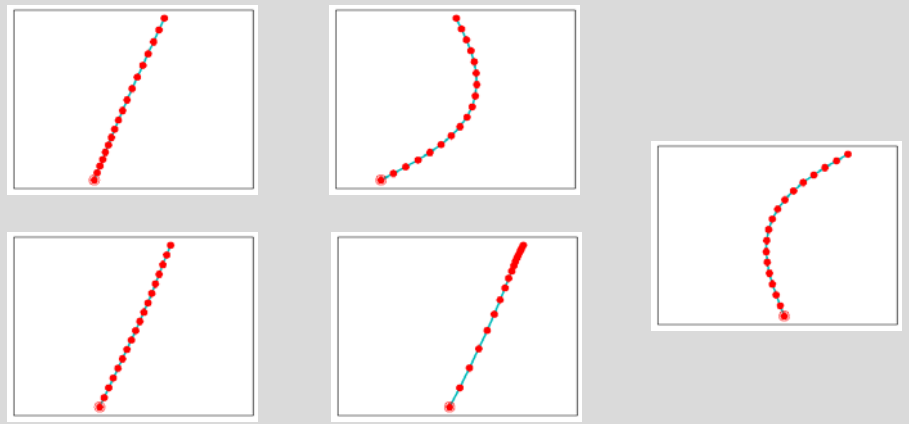
Real-World Data: Stanford Drone Dataset



Trajectory Data



Aligned Trajectory Data



Learned Prototypes

Extended Version:

R. Hug, S. Becker, W. Hübner, M. Arens
Quantifying the Complexity of Standard Benchmarking Datasets for Long-Term Human Trajectory Prediction
https://arxiv.org/abs/2005.13934, 2020 (submitted RA-L Special Issue Long-Term Human Motion Prediction)