EPFL

MULTIMODAL HUMAN TRAJECTORY PREDICTION

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Introduction

- **Selected paper/literature:** Stochastic Trajectory Prediction via Motion Indeterminacy Diffusion
- **Objective and contribution:** Evaluate the performance of the trajectory prediction model used in the paper on a different dataset.

Methodology

- Implement the code of the Motion Indeterminacy Diffusion model
- Original code designed for ETH UCY dataset
- Chose NUSCENES as the new dataset
- Download metadata for nearly 700 scenes from the NUSCENES website
- Implement the code from the paper on **10%** of the 700 scenes from the metadata

Challenge

Challenge → Lack of Reference Results

- Unable to compare our results with a known reference to assess the performance of the original code on nuScenes

Solution → Compare results with Trajectron++

- Trajectron++ is a different trajectory prediction model known to perform well on NUSCENES

Experimental Setup

1. Train and evaluate the original code (Stochastic Trajectory Prediction via Motion Indeterminacy Diffusion) on 10% of NUSCENES data
2. Train and evaluate Trajectron++ on 10% of NUSCENES data
3. Collect results from both models for comparison (only pedestrian's trajectory prediction)

Implementation/Contribution

1. NUSCENES being very different from ETH, we added a preprocessing adapted for the dataset and our code.

2. Fine Tuning hyperparameters of the model for the NUSCENES dataset : very challenging

3. Implement a equivalent evaluation method to make fair comparison between MID and Trajectron++

Results/Comparison

Prediction Horizon	Metrics	Motion Indeterminacy Diffusion	Trajectron++
2	FDE	0.351	**0.197**
	ADE	0.370	**0.146**
4	FDE	0.737	**0.442**
	ADE	0.631	**0.262**
6	FDE	1.272	**0.727**
	ADE	0.899	**0.392**
8	FDE	1.809	**1.042**
	ADE	1.194	**0.535**

Results analysis

Consistent outperformance of Trajectron++ over MID may be due to multiple factors.

- Possible shortcomings in our implementation and preprocessing of MID.
- Unique characteristics of NuScenes dataset could have impacted the effectiveness of our MID model.
- Fine-tuning of MID model may not have been optimal.
- Recognized robustness and adaptability of Trajectron++ contributes to its strong performance.

Results highlight the robustness and adaptability of Trajectron++ and the potential for MID model refinement.