Supplemental Materials to Submission # 81: Trajectory Optimization for Safe Navigation in Maritime Traffic Using Historical Data

1 Hyper-parameter settings for learning experiments

Parameters	Values
Optimizer	Adam
Learning rate	10^{-3}
Batch size	4096
LSTM Hidden size	16
Number of iteration	1000
Number of trajectory samples	12
Noise dimensions	4

Table 1: experimental settings on maritime dataset

Parameters	Values
Optimizer	Adam
Learning rate	3.10^{-3}
Batch size	256
LSTM Hidden size	25
Number of iteration	3000
Number of trajectory samples	20
Noise dimensions	2

Table 2: experimental settings on pedestrian dataset

While there is no one to one correspondence between our hyperparams and that of SocialGAN, we match the equivalent hyperparams while training the models. The extra hyperparams of Social-GAN are related to its embeddings, encoder, decoder and the discriminator, None of which are used in our architecture.

Parameters	Values
Optimizer	Adam
Learning rate	10^{-3}
Batch size	1024
LSTM Hidden size	16
Number of iteration	500

Table 3: hyperparams for training the classifier used in evaluating the discriminative score

Datasets	SocialGAN	Ours
ETH	0.81	**0.51**
Hotel	0.67	**0.45**
Zara1	**0.34**	0.42

(a) Average Displacement Error (ADE)

Datasets	SocialGAN	Ours
ETH	1.52	**0.91**
Hotel	1.37	**0.79**
Zara1	**0.68**	0.69

(b) Final Displacement Error (FDE)

Table 4: Comparison of our approach with SocialGAN on different datasets. ADE and FDE metrics are measured in meters (lower is better).

2 Pedestrian data results

Our first experiment focuses on an empirical comparison of SocialGAN [1] (also a generative model) and our approach on the same pedestrian trajectory datasets used in SocialGAN. We use the same experimental settings as used in their work, more details on hyper-parameter settings are provided in supplementary material. We report the results in Table 4a and 4b using the ADE and FDE metrics. The results show our approach performs better on all datasets, except Zara1 where the degradation is quite small. The improved empirical results on the pedestrian datasets show the general effectiveness of our proposed generative model.

References

[1] Agrim Gupta, Justin Johnson, Li Fei-Fei, Silvio Savarese, and Alexandre Alahi. Social gan: Socially acceptable trajectories with generative adversarial networks. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, pages 2255–2264, 2018.