

# Learning a Controller Fusion Network by Online Trajectory Filtering for Vision-based UAV Racing – Supplementary Material –

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Here we provide additional results and the recorded paths of the UAV networks and human pilots evaluations in the paper. All results were recorded as logs during testing inside Sim4CV [1] allowing plotting on the GUI track interface developed for the paper. The logs record stick input, position, orientation and velocity. These allow visualization of the performance of the pilot/network on the different tracks. Tables 1 and 2 show the detailed results for adaptation to different textures, lighting and environment conditions.

Figures 1,2,3,4,5,6,7 show the measured performance for all trained models and human pilots.

## References

- [1] Matthias Müller, Vincent Casser, Jean Lahoud, Neil Smith, and Bernard Ghanem. Sim4cv: A photo-realistic simulator for computer vision applications. *Int. J. Comput. Vision*, 126(9):902–919, Sept. 2018.

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Figure 1: Qualitative results on track1. The color encodes speed as a heatmap, where blue corresponds to the minimum speed and red to the maximum speed.

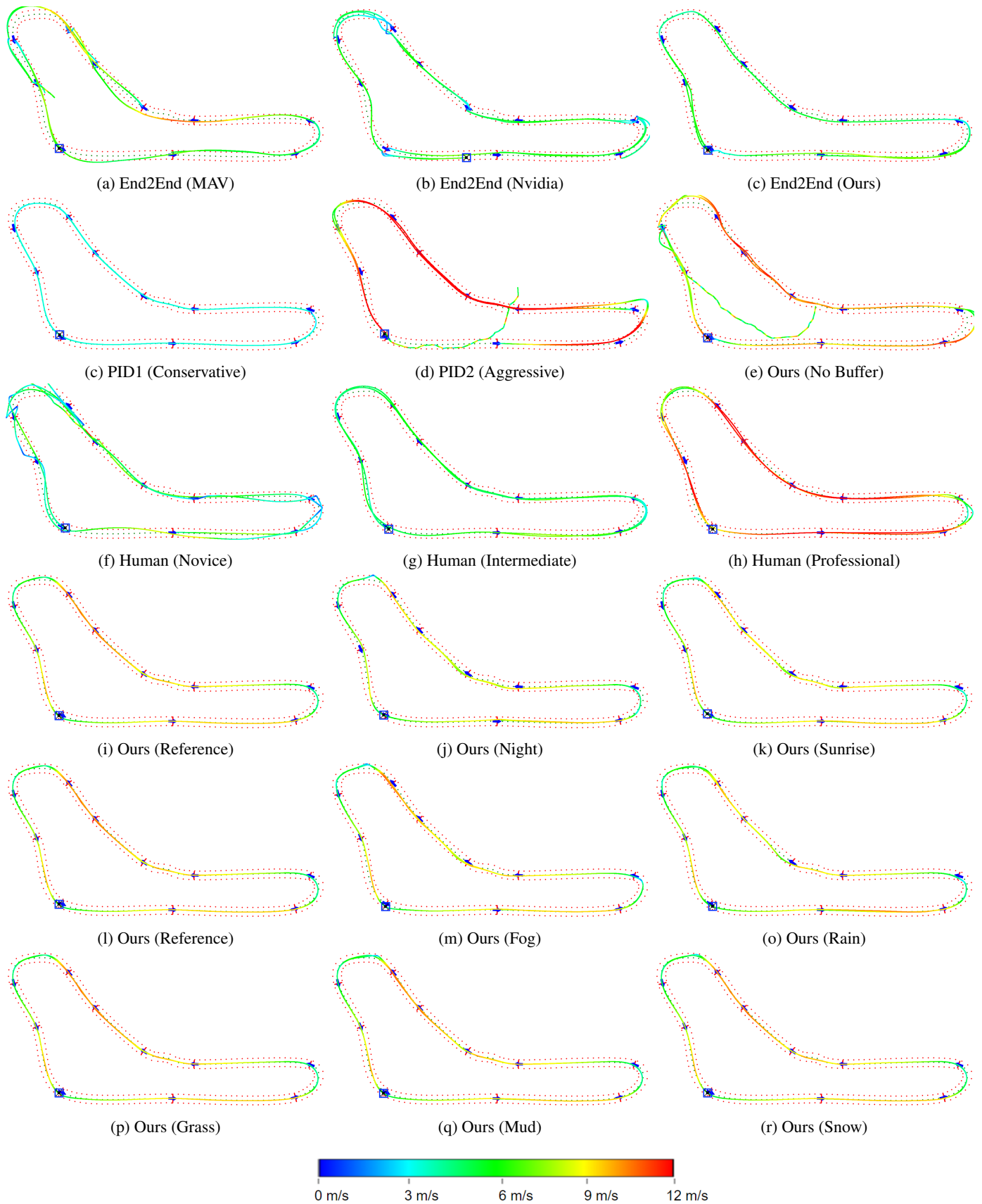


Figure 2: Qualitative results on track2. The color encodes speed as a heatmap, where blue corresponds to the minimum speed and red to the maximum speed.

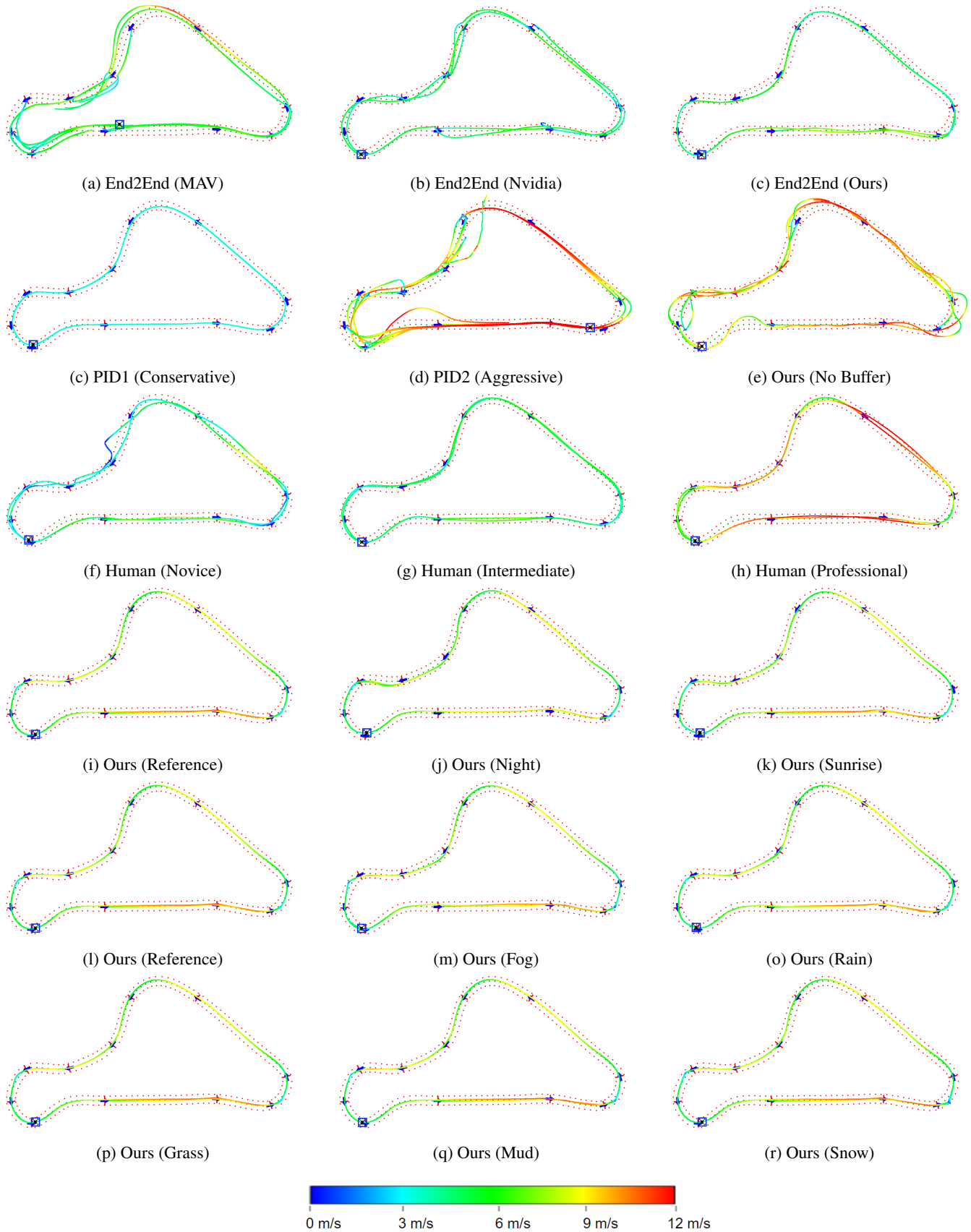


Figure 3: Qualitative results on track3. The color encodes speed as a heatmap, where blue corresponds to the minimum speed and red to the maximum speed.

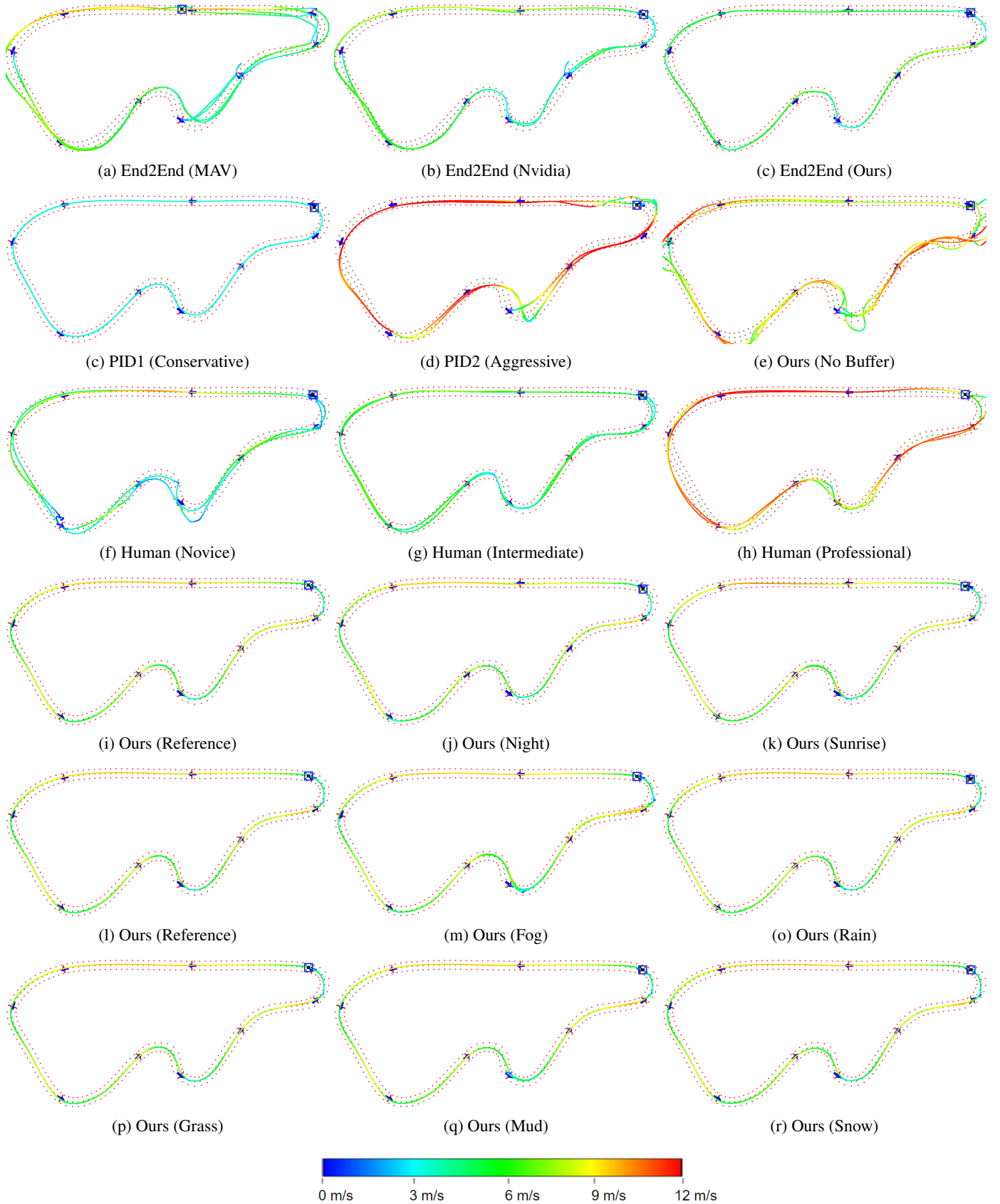


Figure 4: Qualitative results on track4. The color encodes speed as a heatmap, where blue corresponds to the minimum speed and red to the maximum speed.

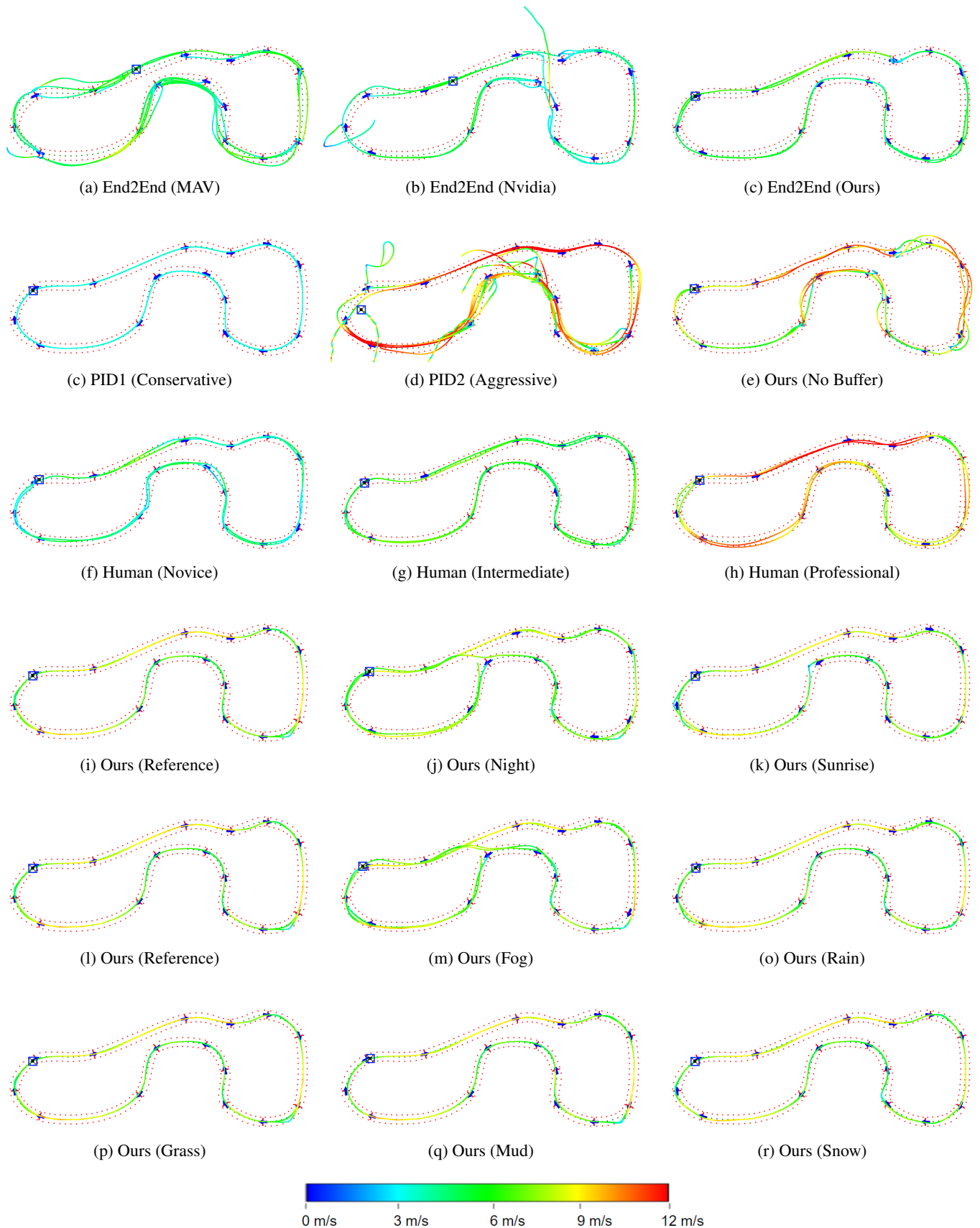


Figure 5: Qualitative results on track5. The color encodes speed as a heatmap, where blue corresponds to the minimum speed and red to the maximum speed.

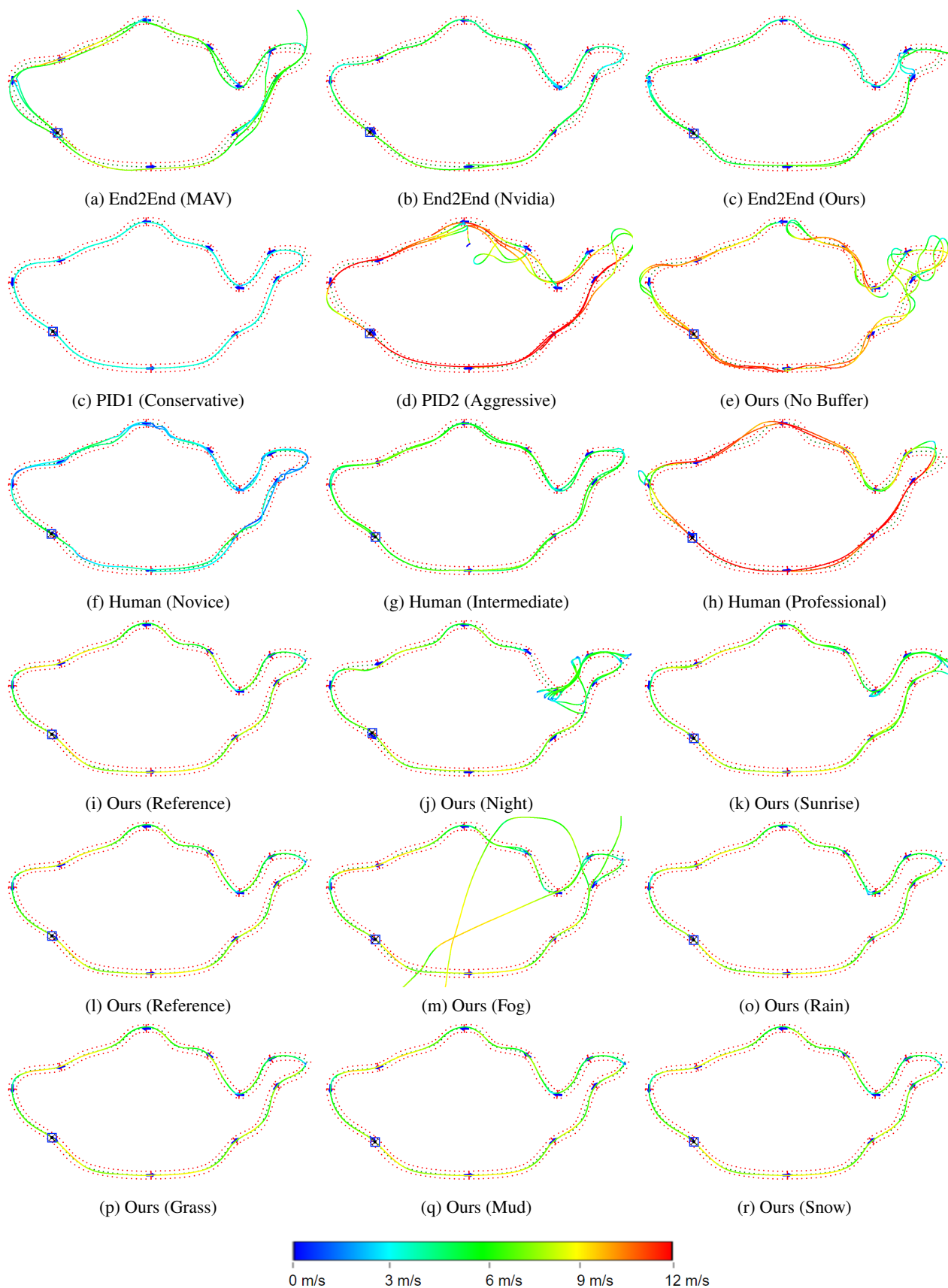


Figure 6: Qualitative results on track6. The color encodes speed as a heatmap, where blue corresponds to the minimum speed and red to the maximum speed.

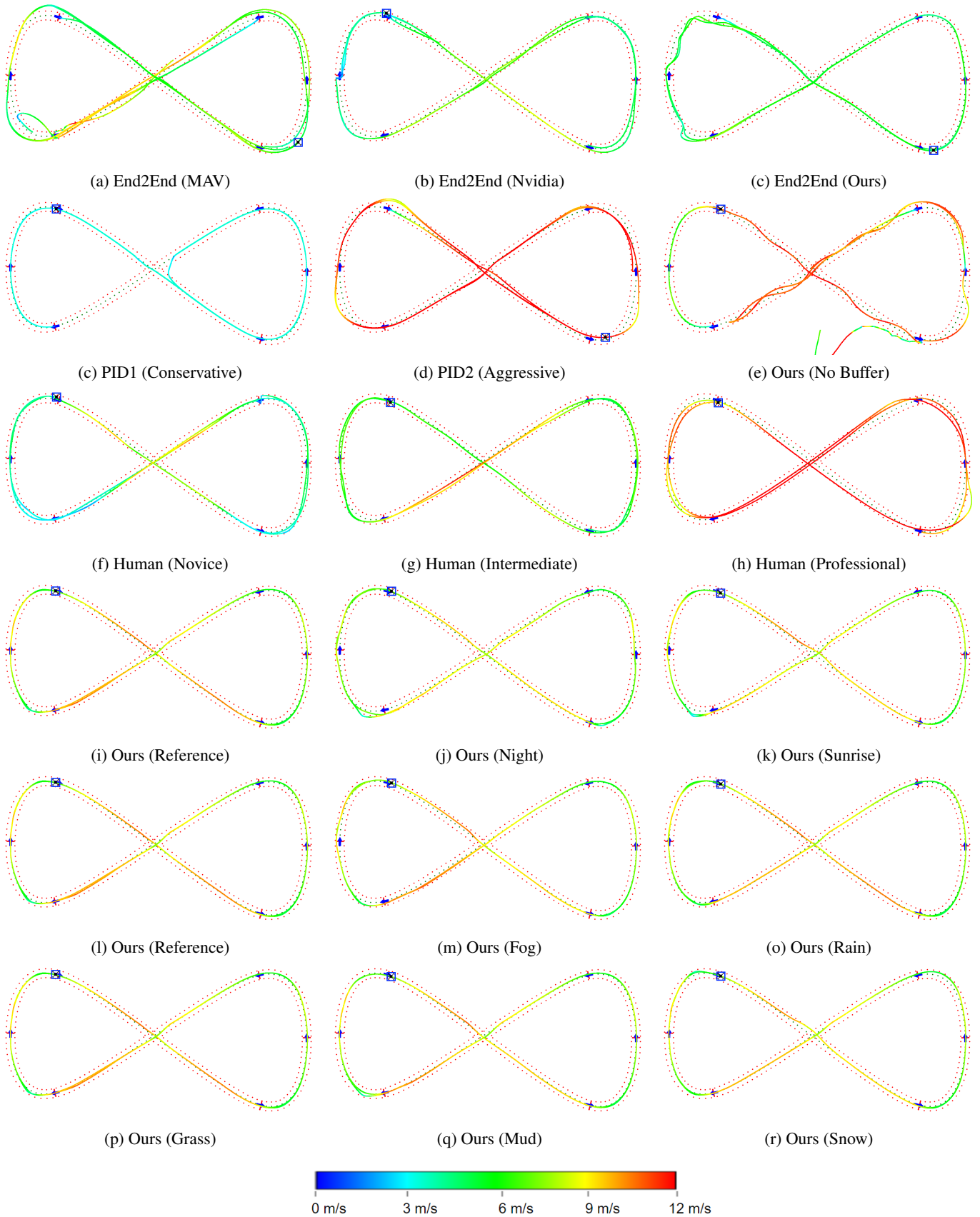


Figure 7: Qualitative results on track7. The color encodes speed as a heatmap, where blue corresponds to the minimum speed and red to the maximum speed.



Table 1: Adaptation with different weather and lighting conditions

	Ours (Fog)			Ours (Rain)			Ours (Sunrise)			Ours (Night)		
	Score	Time	Resets	Score	Time	Resets	Score	Time	Resets	Score	Time	Resets
Track1	12/12	57.43	0	12/12	54.97	0	12/12	55.43	0	12/12	58.07	0
Track2	20/20	67.75	0	20/20	67.27	0	20/20	66.50	0	20/20	69.33	0
Track3	22/22	64.32	0	22/22	62.63	0	22/22	62.95	0	22/22	65.17	0
Track4	17/18	93.02	1	18/18	72.42	0	18/18	70.95	0	18/18	72.23	0
Track5	28/30	114.11	2	30/30	73.01	0	30/30	74.10	0	28/30	114.03	2
Track6	17/20	136.71	3	20/20	84.92	0	19/20	118.89	1	17/20	154.74	3
Track7	12/12	65.03	0	12/12	65.58	0	12/12	67.72	0	12/12	68.58	0
<b>Avg.</b>	95.52%	85.48	0.86	100%	68.68	0	99.25%	73.77	0.14	96.27%	86.01	0.71

Table 2: Adaptation with different textures

	Ours (Grass)			Ours (HD Grass)			Ours (Mud)			Ours (Snow)		
	Score	Time	Resets	Score	Time	Resets	Score	Time	Resets	Score	Time	Resets
Track1	12/12	52.20	0	12/12	56.07	0	12/12	53.45	0	12/12	55.13	0
Track2	20/20	64.75	0	20/20	66.98	0	20/20	65.28	0	20/20	64.84	0
Track3	22/22	62.00	0	22/22	64.05	0	22/22	62.03	0	22/22	64.06	0
Track4	18/18	71.93	0	18/18	75.57	0	18/18	73.57	0	18/18	72.18	0
Track5	30/30	71.16	0	30/30	73.78	0	30/30	71.20	0	30/30	73.28	0
Track6	20/20	81.66	0	20/20	85.77	0	20/20	82.21	0	20/20	82.31	0
Track7	12/12	64.86	0	12/12	66.01	0	12/12	65.03	0	12/12	65.99	0
<b>Avg.</b>	100%	66.94	0	100%	69.75	0	100%	67.54	0	100%	68.26	0