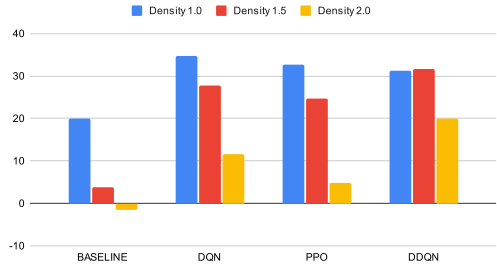


algorithm	training_density	test_density	duration_s	avg_reward	%_collision_rate	avg_speed_mps	avg_distance_m	rms_accel	rms_jerk	actions_total	%_lane_left	count_lane_left	%_idle	count_idle	%_lane_right	count_lane_right	%_faster	count_faster	%_slower	count_slower
BASELINE	1	1	40	38.941	36	22.997	779.419	2.845	11.018	5282	60.14	3178	0	0	0	0	19.83	1048	20.02	1058
BASELINE	1.5	1.5	40	4.666	90	22.997	383.76	2.83	10.75	2614	60.7	1588	0	0	0	0	19.19	502	20.11	526
BASELINE	2	2	40	-5.376	100	22.997	247.951	2.822	10.489	1750	61.3	1074	0	0	0	0	18.61	326	20.09	352
BASELINE	1	1	20	20.005	22	22.998	413.206	2.836	10.9	2758	60.8	1678	0	0	0	0	19.49	538	19.71	544
BASELINE	1.5	1.5	20	3.82	70	22.998	301.908	2.83	10.72	2042	61.11	1249	0	0	0	0	19.08	390	19.81	405
BASELINE	2	2	20	-1.592	82	23.003	251.19	2.815	10.546	1690	61.41	1039	0	0	0	0	18.68	316	19.92	337
DQN	1	1	40	64.066	50	29.85	952.134	0.586	1.072	4846	10.4	504	11.01	534	57.53	2789	20.75	1006	0.31	15
DQN	1	1.5	40	23.262	90	29.648	533.599	0.909	1.986	2874	9.6	276	20.76	597	48.47	1394	20.31	584	0.87	25
DQN	1	2	40	-5.045	100	29.312	197.898	1.298	2.248	1054	12.22	129	19.98	211	38.07	402	28.03	296	1.7	18
DQN	1	1	20	34.77	34	29.758	531.767	0.744	1.275	2770	7.11	197	10.71	297	59.38	1646	22.37	620	0.43	12
DQN	1	1.5	20	15.153	74	29.601	386.451	0.966	1.796	2042	9.34	191	20.45	418	48.39	989	20.84	426	0.98	20
DQN	1	2	20	-3.326	100	29.075	220.716	1.546	3.68	1150	11.98	138	21.96	253	39.76	458	23.78	274	2.52	29
DQN	1.5	1	40	84.075	12	29.907	1140.267	0.428	0.431	5870	11.73	689	30.33	1781	14.94	877	43	2525	0	0
DQN	1.5	1.5	40	34.976	82	29.745	682.049	0.725	0.914	3590	14.42	518	29.54	1061	16.12	579	39.81	1430	0.11	4
DQN	1.5	2	40	0.785	100	29.391	279.731	1.185	1.755	1474	13.08	193	23.64	349	12.4	183	50.61	747	0.27	4
DQN	1.5	1	20	42.971	6	29.807	586.269	0.611	0.619	2974	12.3	366	34.11	1015	15.15	451	38.44	1144	0	0
DQN	1.5	1.5	20	27.873	46	29.733	493.723	0.76	0.796	2630	13.56	357	29.9	787	15.31	403	41.19	1084	0.04	1
DQN	1.5	2	20	1.909	96	29.478	286.403	1.116	1.406	1478	11.89	176	28.51	422	12.91	191	46.49	688	0.2	3
DQN	2	1	40	75.564	18	28.671	1065.3	1.201	3.795	5706	10.16	580	34.3	1958	16.82	960	35.04	2000	3.68	210
DQN	2	1.5	40	49.977	56	29.307	817.162	1.231	3.466	4230	12.12	513	37.95	1606	16.33	691	30.93	1309	2.67	113
DQN	2	2	40	17.727	86	29.435	468.783	1.299	3.097	2590	12.23	317	41.44	1074	16.71	433	26.85	696	2.78	72
DQN	2	1	20	39.287	8	28.082	560.614	1.272	3.882	3150	10.79	340	42.7	1346	16.09	507	27.79	876	2.63	83
DQN	2	1.5	20	33.723	28	29.169	527.457	1.194	3.215	2826	13.37	378	37.2	1052	18	509	29.21	826	2.23	63
DQN	2	2	20	11.511	76	29.311	361.661	1.247	2.801	1890	13.64	258	43.08	815	15.38	291	25.16	476	2.75	52
PPO	1	1	40	60.638	14	24.451	917.873	2.203	8.118	5758	23.65	1362	8.49	489	17.66	1017	21.53	1240	28.68	1652
PPO	1	1.5	40	23.942	70	24.796	561.449	2.267	6.07	3650	24.45	893	16.18	591	8.19	299	15.09	551	36.09	1318
PPO	1	2	40	2.268	92	25.521	307.476	2.346	5.935	1950	32.22	629	11.58	226	5.33	104	13.68	267	37.19	726
PPO	1	1	20	32.745	16	26.133	507.99	2.183	6.842	3038	28.16	856	7.66	233	16.58	504	25.62	779	21.97	668
PPO	1	1.5	20	11.327	64	24.776	352.965	2.306	6.085	2218	23.47	521	10.86	241	9.86	219	17.34	385	38.47	854
PPO	1	2	20	-3.352	94	25.56	222.554	2.54	6.63	1386	24.57	341	11.02	153	8.43	117	19.96	277	36.02	500
PPO	1.5	1	40	53.662	0	20.431	817.234	0.615	1.262	6238	15.75	983	0	0	32.64	2037	0.54	34	51.06	3186
PPO	1.5	1.5	40	40.583	34	21.069	735.398	1.645	4.002	5418	11.92	646	0.11	6	2.9	157	7.71	418	77.36	4193
PPO	1.5	2	40	7.414	86	21.245	394.827	1.757	4.541	2898	14.69	426	0.21	6	2.31	67	8.69	252	74.1	2149
PPO	1.5	1	20	27.991	0	20.972	426.43	0.908	1.908	3170	16.99	539	0	0	21.75	690	1.29	41	59.96	1902
PPO	1.5	1.5	20	24.701	10	20.946	419.682	1.336	3.216	3122	17.09	534	0.19	6	4.42	138	4.99	156	73.3	2290
PPO	1.5	2	20	5.356	70	21.286	308.602	1.768	4.876	2298	13.22	304	0.35	8	1.96	45	8.39	193	76.09	1750
PPO	2	1	40	50.25	2	20.482	813.426	1.051	3.83	6238	22.07	1377	0.53	33	17.88	1116	3.73	233	55.79	3481
PPO	2	1.5	40	31.252	36	20.493	637.799	1.002	2.908	4910	4.99	245	14.05	690	0.79	39	2.18	107	77.99	3831
PPO	2	2	40	8.376	80	20.34	390.058	0.794	1.073	3046	1.67	51	3.77	115	0.59	18	0.13	4	93.83	2860
PPO	2	1	20	26.772	0	21.186	430.792	1.584	5.646	3170	14.88	472	4.04	128	12.14	385	9.55	303	59.39	1884
PPO	2	1.5	20	19.258	20	20.615	383.365	1.076	2.829	2946	7.5	221	8.14	240	1.49	44	3.26	96	79.61	2347
PPO	2	2	20	4.842	64	20.522	294.488	1.062	2.047	2230	3.9	87	7.71	172	1.08	24	1.43	32	85.89	1917
DDQN	1	1	40	63.359	4	23.288	921.975	1.663	6.585	6178	3.66	226	15.73	972	13.87	857	15.44	954	51.31	3171
DDQN	1	1.5	40	33.933	76	27.573	699.328	2.144	6.771	3978	13.19	525	47.71	1899	10.1	402	15.85	631	13.14	523
DDQN	1	2	40	7.416	90	27.116	368.005	2.526	6.489	2246	17.13	385	41.28	928	8.19	184	18.59	418	14.81	333
DDQN	1	1	20	31.183	0	22.364	454.731	1.501	5.465	3170	2.18	69	15.26	484	13.3	422	12.86	408	56.4	1789
DDQN	1	1.5	20	24.607	42	26.798	466.31	2.272	7.066	2706	12.52	339	37.22	1008	11.04	299	18.91	512	20.31	550
DDQN	1	2	20	8.94	68	27.247	327.935	2.264	5.924	1894	19.04	361	40.24	763	7.33	139	19.51	370	13.87	263
DDQN	1.5	1	40	55.256	0	20.511	820.434	0.585	1.055	6238	2.5	156	14.31	893	41.27	2575	2.2	137	39.73	2479
DDQN	1.5	1.5	40	60.157	30	25.463	917.488	1.598	4.211	5566	9.34	520	26.42	1471	21.52	1198	30.94	1723	11.78	656
DDQN	1.5	2	40	31.538	68	27.171	611.131	2.099	5.567	3538	10.96	388	15.96	565	18.31	648	44.01	1558	10.76	381
DDQN	1.5	1	20	27.432	0	20.377	414.324	0.784	1.485	3170	3.66	116	20.71	657	48.33	1533	0.13	4	27.18	862
DDQN	1.5	1.5	20	31.638	12	24.569	482.669	1.593	3.77	3030	7.92	240	28.17	854	19.89	603	27.14	823	16.89	512
DDQN	1.5	2	20	15.63	62	26.088	392.837	2.184	5.743	2314	11.49	266	23.66	548	15.46	358	36.01	834	13.39	310
DDQN	2	1	40	47.401	8	20.784	791.148	1.276	4.713	5938	2.53	150	11.9	707	5.81	345	5.57	331	74.19	4407
DDQN	2	1.5	40	50.161	8	21.318	813.039	2.384	9.716	5918	9.76	578	32.15	1903	10.32	611	13.29	787	34.48	2041
DDQN	2	2	40	42.577	22	20.625	757.783	1.585	5.813	5702	10.43	595	42.6	2430	10.4	593	6.56	374	30.01	

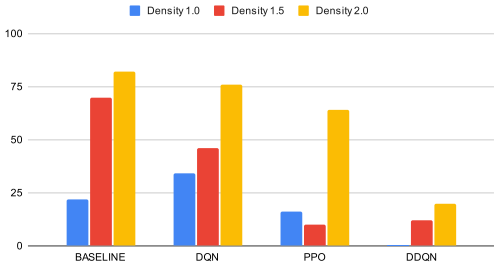
algorithm	training_density	test_density	duration_s	avg_reward	%_collision_rate	avg_speed_mps	avg_distance_m	rms_accel	rms_jerk	actions_total	%_lane_left	count_lane_left	%_idle	count_idle	%_lane_right	count_lane_right	%_faster	count_faster	%_slower	count_slower
BASELINE	1	1	20	20.005	22	22.998	413.206	2.836	10.9	2758	60.8	1678	0	0	0	0	19.49	538	19.71	544
BASELINE	1.5	1.5	20	3.82	70	22.998	301.908	2.83	10.72	2042	61.11	1249	0	0	0	0	19.08	390	19.81	405
BASELINE	2	2	20	-1.592	82	23.003	251.19	2.815	10.546	1690	61.41	1039	0	0	0	0	18.68	316	19.92	337
DQN	1	1	20	34.77	34	29.758	531.767	0.744	1.275	2770	7.11	197	10.71	297	59.38	1646	22.37	620	0.43	12
DQN	1.5	1.5	20	27.873	46	29.733	493.723	0.76	0.796	2630	13.56	357	29.9	787	15.31	403	41.19	1084	0.04	1
DQN	2	2	20	11.511	76	29.311	361.661	1.247	2.801	1890	13.64	258	43.08	815	15.38	291	25.16	476	2.75	52
PPO	1	1	20	32.745	16	26.133	507.99	2.183	6.842	3038	28.16	856	7.66	233	16.58	504	25.62	779	21.97	668
PPO	1.5	1.5	20	24.701	10	20.946	419.682	1.336	3.216	3122	17.09	534	0.19	6	4.42	138	4.99	156	73.3	2290
PPO	2	2	20	4.842	64	20.522	294.488	1.062	2.047	2230	3.9	87	7.71	172	1.08	24	1.43	32	85.89	1917
DDQN	1	1	20	31.183	0	22.364	454.731	1.501	5.465	3170	2.18	69	15.26	484	13.3	422	12.86	408	56.4	1789
DDQN	1.5	1.5	20	31.638	12	24.569	482.669	1.593	3.77	3030	7.92	240	28.17	854	19.89	603	27.14	823	16.89	512
DDQN	2	2	20	20.019	20	20.483	394.659	1.259	4.091	2958	12.67	375	39.7	1175	12.91	382	4.05	120	30.68	908

	Average Reward			Collision Rate			Average RMS Acceleration			Average Speed			Average Distance Travelled			Average RMS Jerk			
Agent	Density 1.0	Density 1.5	Density 2.0	Density 1.0	Density 1.5	Density 2.0	Density 1.0	Density 1.5	Density 2.0	Density 1.0	Density 1.5	Density 2.0	Density 1.0	Density 1.5	Density 2.0	Density 1.0	Density 1.5	Density 2.0	
BASELINE	20.005	3.82	-1.592	22	70	82	2.836	2.83	2.815	22.998	22.998	23.003	413.206	301.908	251.19	10.9	10.72	10.546	
DQN	34.77	27.873	11.511	34	46	76	0.744	0.76	1.247	29.758	29.733	29.311	531.767	493.723	361.661	1.275	0.796	2.801	
PPO	32.745	24.701	4.842	16	10	64	2.183	1.336	1.062	26.133	20.946	20.522	507.99	419.682	294.488	6.842	3.216	2.047	
DDQN	31.183	31.638	20.019	0	12	20	1.501	1.593	1.259	22.364	24.569	20.483	454.731	482.669	394.659	5.465	3.77	4.091	

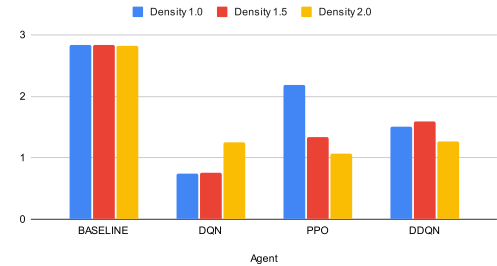
Average Reward



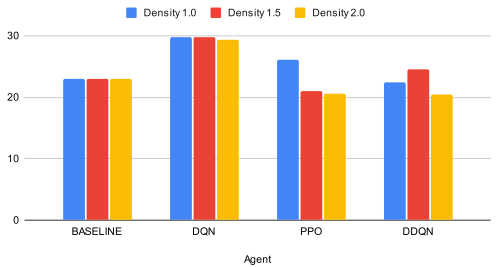
Collision Rate



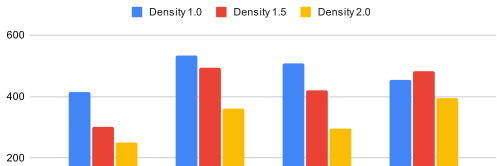
Average RMS Acceleration



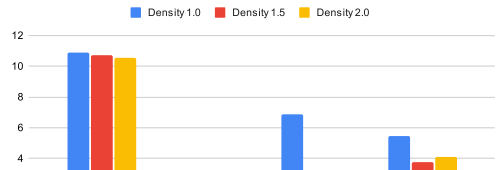
Average Speed



Average Distance Travelled

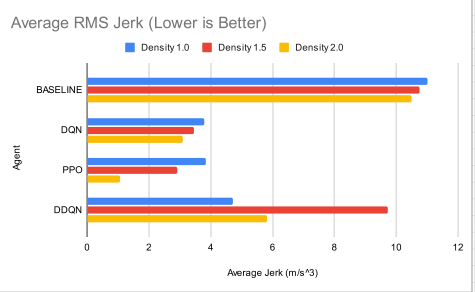
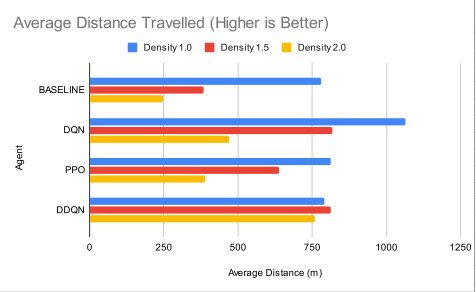
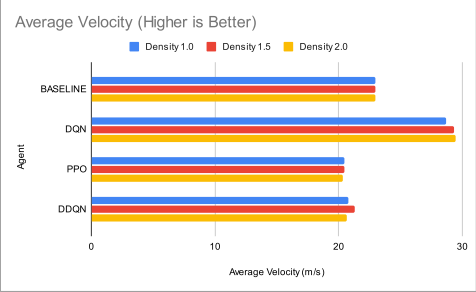
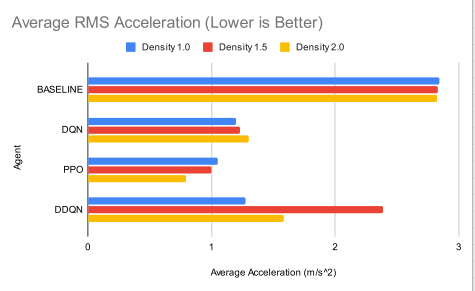
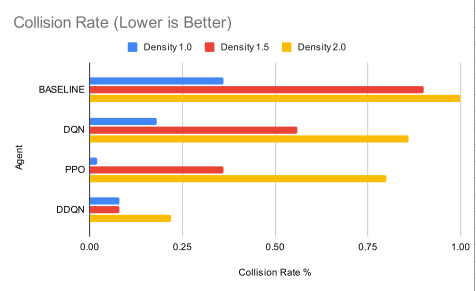
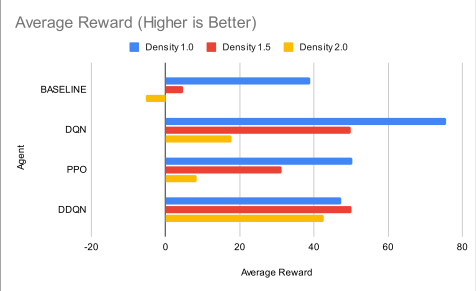


Average RMS Jerk



algorithm	training_density	test_density	duration_s	avg_reward	collision_rate_pe	avg_speed_mps	avg_distance_m	rms_accel	rms_jerk	actions_total	pct_lane_left	count_lane_left	pct_idle	count_idle	pct_lane_right	count_lane_right	pct_faster	count_faster	pct_slower	count_slower	
BASELINE		1	1	40	38.941	0.36	22.997	779.419	2.845	11.018	5282	60.14	3178	0	0	0	19.83	1048	20.02	1058	
BASELINE		1.5	1.5	40	4.666	0.9	22.997	383.76	2.83	10.75	2614	60.7	1588	0	0	0	19.19	502	20.11	526	
BASELINE		2	2	40	-5.376	1	22.997	247.951	2.822	10.489	1750	61.3	1074	0	0	0	18.61	326	20.09	352	
DQN		2	1	40	75.564	0.18	28.671	1065.3	1.201	3.795	5706	10.16	580	34.3	1958	16.82	960	35.04	2000	3.68	210
DQN		2	1.5	40	49.977	0.56	29.307	817.162	1.231	3.466	4230	12.12	513	37.95	1606	16.33	691	30.93	1309	2.67	113
DQN		2	2	40	17.727	0.86	29.435	468.783	1.299	3.097	2590	12.23	317	41.44	1074	16.71	433	26.85	696	2.78	72
PPO		2	1	40	50.25	0.02	20.482	813.426	1.051	3.83	6238	22.07	1377	0.53	33	17.88	1116	3.73	233	55.79	3481
PPO		2	1.5	40	31.252	0.36	20.493	637.799	1.002	2.908	4910	4.99	245	14.05	690	0.79	39	2.18	107	77.99	3831
PPO		2	2	40	8.376	0.8	20.34	390.058	0.794	1.073	3046	1.67	51	3.77	115	0.59	18	0.13	4	93.83	2860
DDQN		2	1	40	47.401	0.08	20.784	791.148	1.276	4.713	5938	2.53	150	11.9	707	5.81	345	5.57	331	74.19	4407
DDQN		2	1.5	40	50.161	0.08	21.318	813.039	2.384	9.716	5918	9.76	578	32.15	1903	10.32	611	13.29	787	34.48	2041
DDQN		2	2	40	42.577	0.22	20.625	757.783	1.585	5.813	5702	10.43	595	42.6	2430	10.4	593	6.56	374	30.01	1712

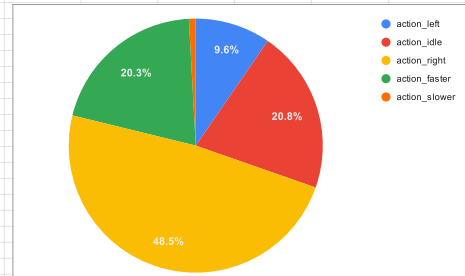
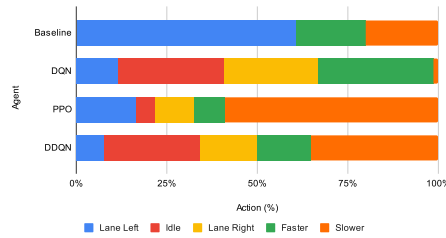
Agent	Average Reward			Collision Rate			Average RMS Acceleration			Average Speed			Average Distance Travelled			Average RMS Jerk		
	Density 1.0	Density 1.5	Density 2.0	Density 1.0	Density 1.5	Density 2.0	Density 1.0	Density 1.5	Density 2.0	Density 1.0	Density 1.5	Density 2.0	Density 1.0	Density 1.5	Density 2.0	Density 1.0	Density 1.5	Density 2.0
BASELINE	38.941	4.666	-5.376	0.36	0.9	1	2.845	2.83	2.822	22.997	22.997	22.997	779.419	383.76	247.951	11.018	10.75	10.489
DQN	75.564	49.977	17.727	0.18	0.56	0.86	1.201	1.231	1.299	28.671	29.307	29.435	1065.3	817.162	468.783	3.795	3.466	3.097
PPO	50.25	31.252	8.376	0.02	0.36	0.8	1.051	1.002	0.794	20.482	20.493	20.34	813.426	637.799	390.058	3.83	2.908	1.073
DDQN	47.401	50.161	42.577	0.08	0.08	0.22	1.276	2.384	1.585	20.784	21.318	20.625	791.148	813.039	757.783	4.713	9.716	5.813



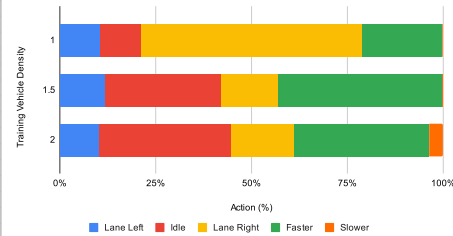
algorithm	training_density	test_density	action_left	action_idle	action_right	action_faster	action_slower
BASLINE	N/A	1	3178	0	0	1048	1058
BASLINE	N/A	1.5	1588	0	0	502	526
BASLINE	N/A	2	1074	0	0	326	352
BASLINE	N/A	1	1678	0	0	538	544
BASLINE	N/A	1.5	1249	0	0	390	405
BASLINE	N/A	2	1039	0	0	316	337
DQN	1	1	504	534	2789	1006	15
DQN	1	1.5	276	597	1394	584	25
DQN	1	2	129	211	402	296	18
DQN	1	1	197	297	1646	620	12
DQN	1	1.5	191	418	989	426	20
DQN	1	2	138	253	458	274	29
DQN	1.5	1	689	1781	877	2525	0
DQN	1.5	1.5	518	1061	579	1430	4
DQN	1.5	2	193	349	183	747	4
DQN	1.5	1	366	1015	451	1144	0
DQN	1.5	1.5	357	787	403	1084	1
DQN	1.5	2	176	422	191	688	3
DQN	2	1	580	1958	960	2000	210
DQN	2	1.5	513	1606	691	1309	113
DQN	2	2	317	1074	433	696	72
DQN	2	1	340	1346	507	876	83
DQN	2	1.5	378	1052	509	826	63
DQN	2	2	258	815	291	476	52
PPO	1	1	1362	489	1017	1240	1652
PPO	1	1.5	893	591	299	551	1318
PPO	1	2	629	226	104	267	726
PPO	1	1	856	233	504	779	668
PPO	1	1.5	521	241	219	385	854
PPO	1	2	341	153	117	277	500
PPO	1.5	1	983	0	2037	34	3186
PPO	1.5	1.5	646	6	157	418	4193
PPO	1.5	2	426	6	67	252	2149
PPO	1.5	1	539	0	690	41	1902
PPO	1.5	1.5	534	6	138	156	2290
PPO	1.5	2	304	8	45	193	1750
PPO	2	1	1377	33	1116	233	3481
PPO	2	1.5	245	690	39	107	3831
PPO	2	2	51	115	18	4	2860
PPO	2	1	472	128	385	303	1884
PPO	2	1.5	221	240	44	96	2347
PPO	2	2	87	172	24	32	1917
DDQN	1	1	226	972	857	954	3171
DDQN	1	1.5	525	1899	402	631	523
DDQN	1	2	385	928	184	418	333
DDQN	1	1	69	484	422	408	1789
DDQN	1	1.5	339	1008	299	512	550
DDQN	1	2	361	763	139	370	263
DDQN	1.5	1	156	893	2575	137	2479
DDQN	1.5	1.5	520	1471	1198	1723	656
DDQN	1.5	2	388	565	648	1558	381
DDQN	1.5	1	116	657	1533	4	862
DDQN	1.5	1.5	240	854	603	823	512
DDQN	1.5	2	266	548	358	834	310
DDQN	2	1	150	707	345	331	4407
DDQN	2	1.5	578	1903	611	787	2041
DDQN	2	2	595	2430	593	374	1712
DDQN	2	1	6	234	30	78	2824
DDQN	2	1.5	263	1090	253	292	1274
DDQN	2	2	375	1175	382	120	908

		Lane Left	Idle	Lane Right	Faster	Slower
DQN	1	504	534	2789	1006	15
DQN	1.5	689	1781	877	2525	0
DQN	2	580	1958	960	2000	210
PPO	1	1362	489	1017	1240	1652
PPO	1.5	983	0	2037	34	3186
PPO	2	1377	33	1116	233	3481
Baseline		9806	0	0	3120	3222
DQN		6120	15576	13753	17007	724
PPO		10487	3337	7020	5368	37508
DDQN		5558	18581	11432	10354	24995

Average Distribution of Actions by Agent



DQN Actions % with Various Training Vehicle Densities



PPO Actions Distribution with Various Training Vehicle Densities

