ml-agent를 활용한 드론 제어

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Unity 환경
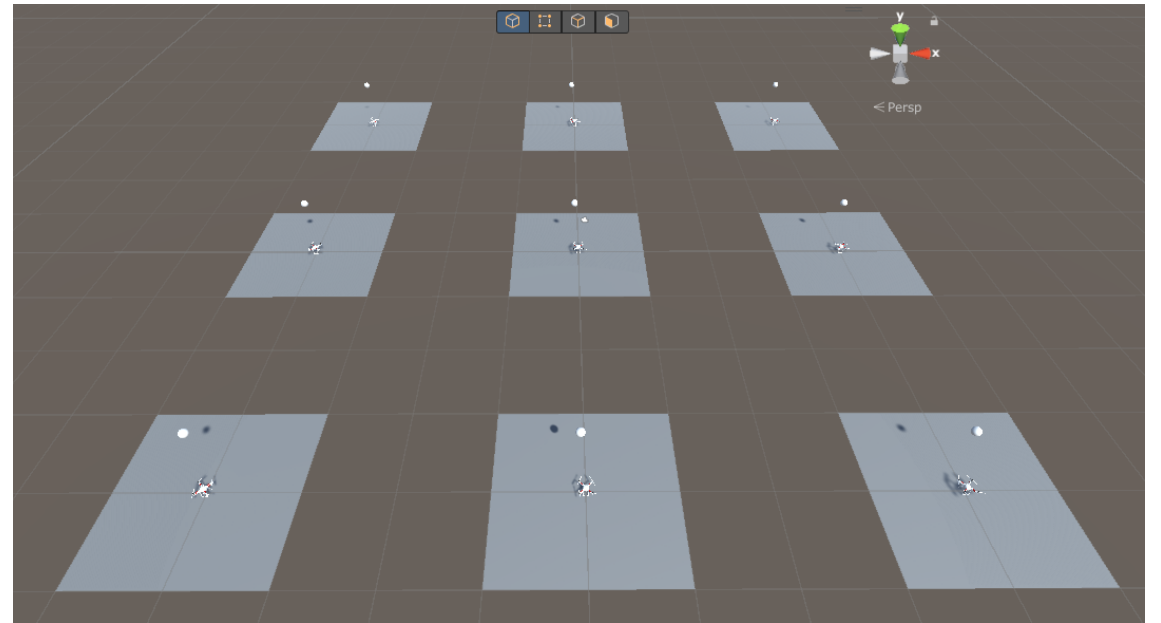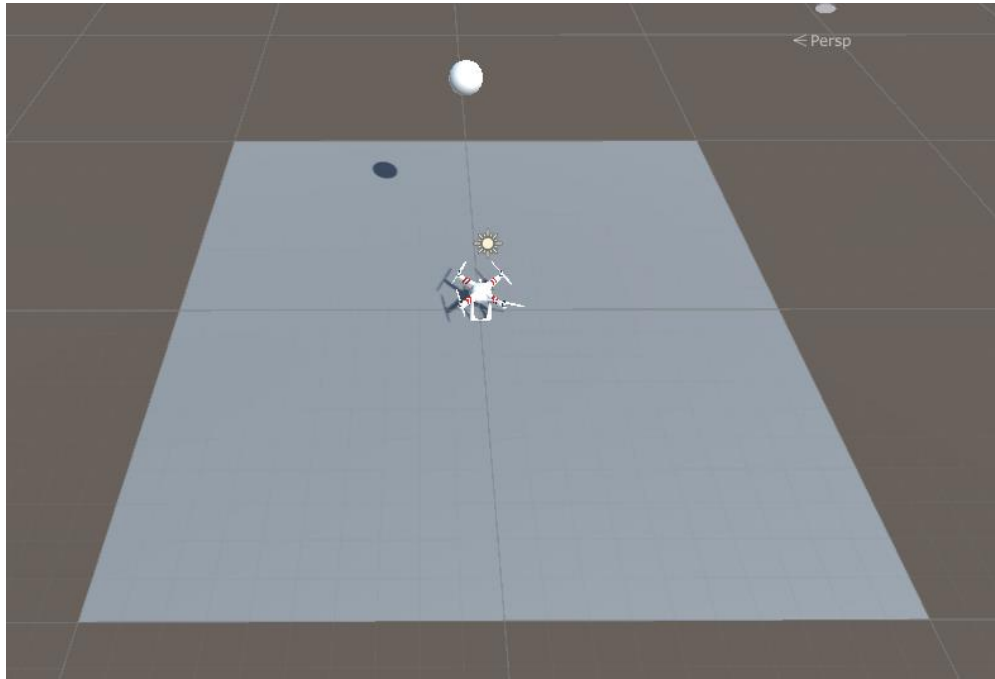
모델 상태

state		value
Target location	x	-5 ~ 5
	y	9
	z	-5 ~ 5
Drone location	x	
	y	- ∞ ~ ∞
	z	
Drone rotation	roll	
	pitch	0 ~ 360
	yaw	
Drone Velocity (m/s)	fr	0 ~ 6
	fl	0 ~ 6
	br	0 ~ 6
	bl	0 ~ 6

Reward

GP = (Gaussian(pitch , 0 , 2) -1)*2
GR = (Gaussian(roll , 0 , 2) -1)*2
GD = Gaussian(distance , 0 , 8)*100

$$Reward = GP + GR + (1.5*GD)$$

if

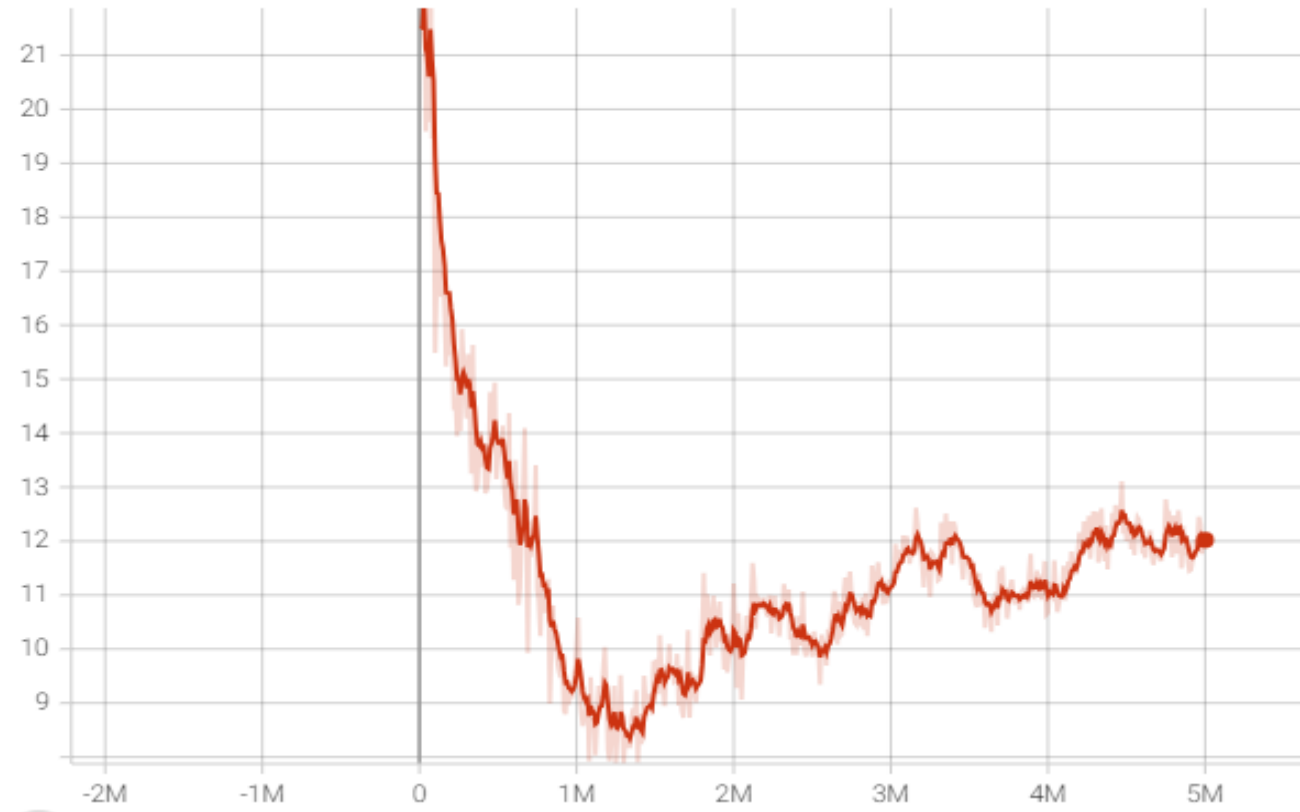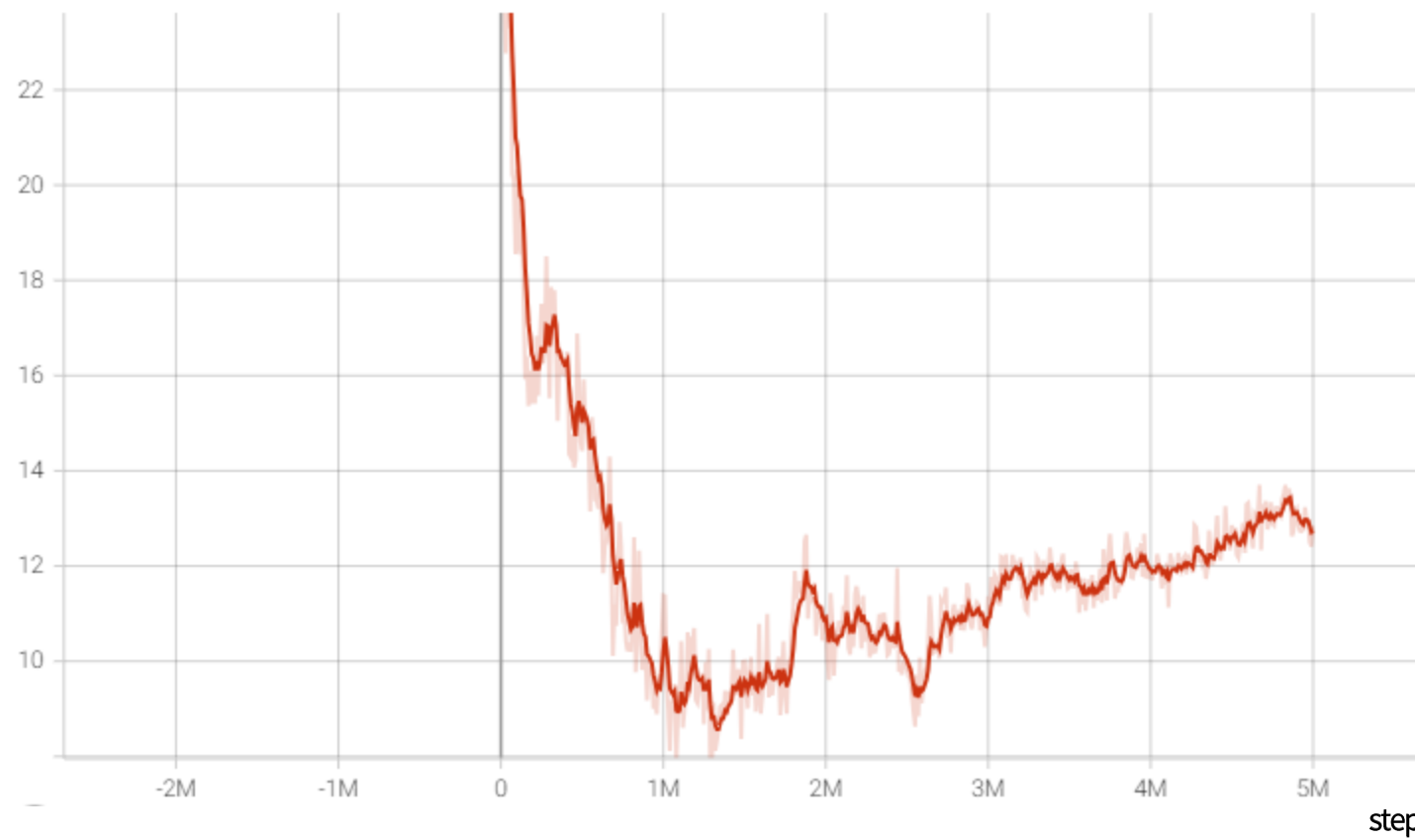| Pitch & roll < 90°	Drone location x, z > 10	Step > 5000
Reward = -1000 에피소드 종료	Reward = -1000 에피소드 종료	Reward -= 1000 에피소드 종료

결과 그래프 생성

결과 그래프 추가

각각의 값들 (reward, pitch, roll 등등)을 표현 가능
Step단위, episode단위 모두 표현 가능

Log -> CSV 파일 생성 -> 그래프 생성

	Episode	distance	New_pitch	New_roll	reward	success		
2	1	8.317265	28.93063	91.42687	-1060.39	0		
3	1	9.04603	36.93271	91.18341	-1044.42	0		
4	1	12.46556	13.25382	91.08292	-1132.84	0		
5	1	9.851191	22.02907	91.3034	-1099.24	0		
6	1	10.34691	68.01331	90.10691	-1111.29	0		
7	1	11.3255	48.70987	90.08246	-1119.26	0		
8	1	11.26222	16.87866	92.52438	-1170.73	0		
9	1	9.471581	20.37622	90.88455	-1095.9	0		
10	2	8.947462	42.87195	91.07191	-1059.43	0		
11	2	9.072182	18.21795	91.07657	-1051.71	0		
12	2	10.12233	7.345001	90.54981	-1065.45	0		
13	2	12.6286	24.94693	92.68341	-1158.07	0		
14	2	9.15597	58.40445	90.55355	-1047.06	0		
15	1	9.146259	20.81417	90.16861	-1113.2	0		
16	2	12.86319	80.46643	97.70667	-1150.74	0		
17	3	8.980405	5.206899	92.09032	-1058.49	0		
18	2	10.91414	69.24478	93.63116	-1101.44	0		
19	3	8.592869	77.74759	92.50423	-1061.56	0		
20	3	9.928078	27.98852	91.30831	-1057.94	0		
21	3	9.330876	1.718195	92.69537	-1070.04	0		
22	3	12.05645	75.70959	96.63699	-1121.08	0		
23	2	14.48517	56.18429	90.18275	-1177.29	0		
24	3	8.595849	86.12921	116.2713	-1030.31	0		
25	4	11.14984	4.84766	91.28011	-1068.27	0		
26	4	9.306068	71.11987	95.00447	-1032.79	0		
27	2	10.88728	66.62159	91.00124	-1105.28	0		
28	4	10.03908	22.40108	92.89875	-1051.39	0		
29	4	8.871087	60.44531	102.3073	-1047.71	0		
30	4	9.345608	80.76996	97.57159	-1044.83	0		
31	3	11.56923	8.096893	90.54802	-1132.6	0		
32	4	9.445333	85.6388	91.63599	-1046.55	0		
33	5	8.902338	10.17511	91.97662	-1053.49	0		