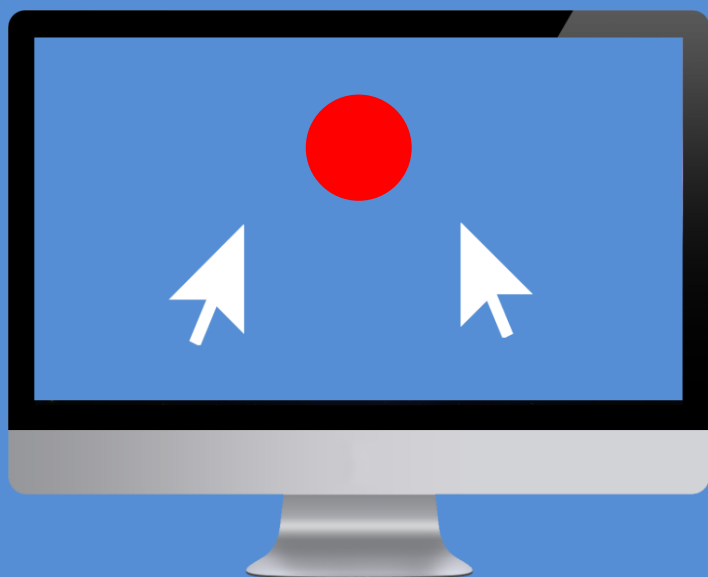


Simulating Point-and-Click Behavior in Implicit Adversarial Environment



Q & A

박진형, 심규철, 이현우

VideoHighlight

이병주 교수님

Human Factor

Q1. Human factor에는 어떤 것들이 있는지? 5개의 영역, 11개의 Factor

Q2. 각 Agent의 human factor 값 설정 기준? Average User를 모델링한 선행연구 참고

Table 1: This table shows the free parameters that describe the simulated user's cognitive and behavioural characteristics. The parameter values were set by referring to previous studies assuming an average user.

Variable	Description	Value	Ref	Module
T_p	Planning time interval	0.1 s	[11]	Motor control
n_v	Motor noise constant (parallel)	0.2	[44]	Upper limb
n_p	Motor noise constant (perpendicular)	0.02	[44]	Upper limb
l_{se}	Shoulder-to-elbow length	25.7 cm	[40]	Upper limb
l_{ew}	Elbow-to-wrist length	25.7 cm	[54]	Upper limb
l_{wh}	Wrist-to-hand length	6.43 cm	[40]	Upper limb
σ_v	Width of likelihood of visual speed perception	0.15	[60]	Visual perception
$f_{gain}()$	Mouse acceleration function	OS X 10.12	[14]	Mouse
c_σ	Precision of internal clock	0.09015	[41, 53]	Click action
c_μ	Implicit aim point	0.185	[41, 53]	Click action
v	Drift rate	19.931	[41, 53]	Click action
δ	Visual encoding precision limit	0.399	[41, 53]	Click action

Mouse

Visual Perception

Motor Control

Click Action

Upper Limb

Human Factor

Q3. Decision making skill과 Motor execution 관련 factor들의 의미와 역할

Agent 1

(Improved Decision-Making Skill Agent)

변수		Value	Module
c_{μ}	Precision of internal clock	0.185 → 0.3	Click action
c_{σ}	Implicit aim point	0.09015 → 0.06	Click action
ν	Drift rate	19.931 → 40	Click action
δ	Visual encoding precision limit	0.399 → 0.25	Click action

Clicking Process 능력 강화

Agent 2

(Improved Motor Execution Agent)

변수		Value	Module
n_v	Motor noise constant (parallel)	0.2 → 0.24	Upper limb
n_p	Motor noise constant (perpendicular)	0.02 → 0.024	Upper limb
σ_v	Width of likelihood of visual speed perception	0.15 → 0.18	Visual Perception

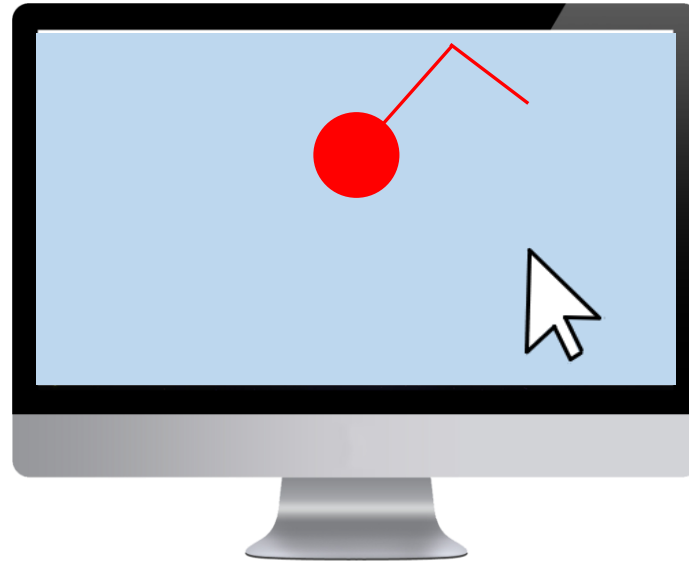
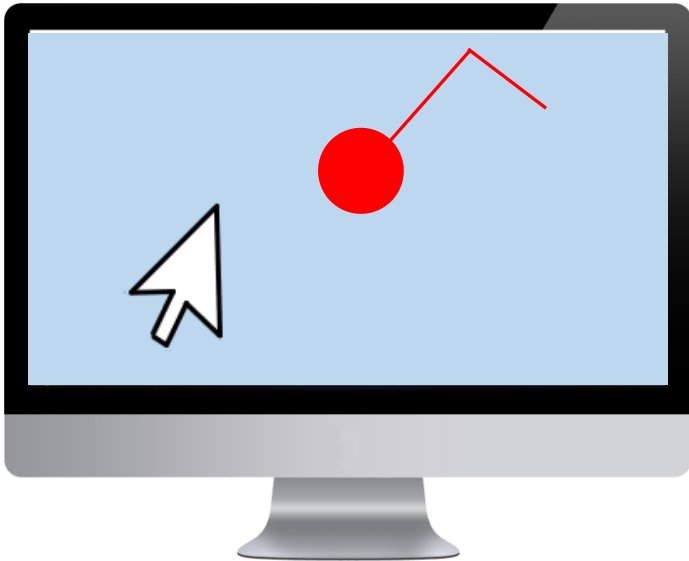
Tracking Process 능력 강화

실제 FPS 게임에의 적용 가능성

Q1. Target이 불규칙 혹은 곡선으로 움직이는 경우?

Q2. 서로 동일한 Target을 두고 경쟁하는 것이 아니라 서로를 겨냥하는 경우에도 동일한 양상?

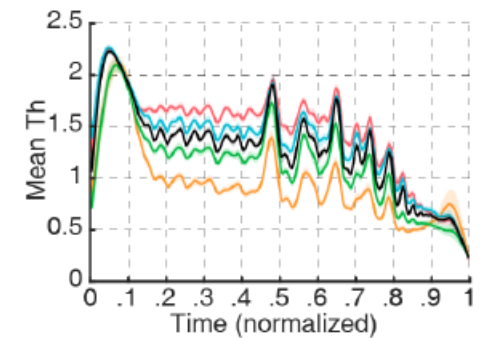
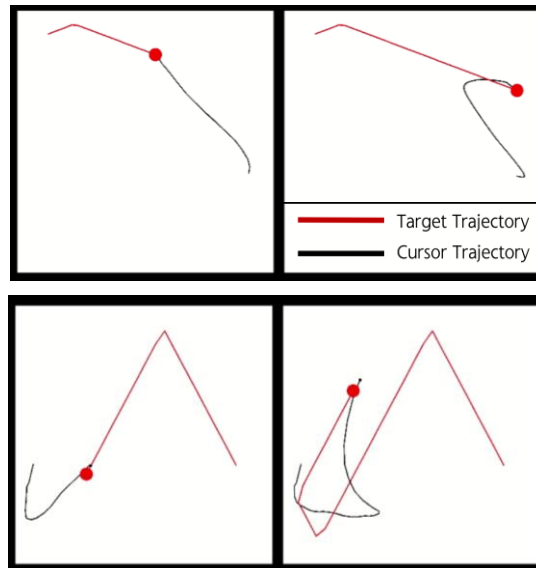
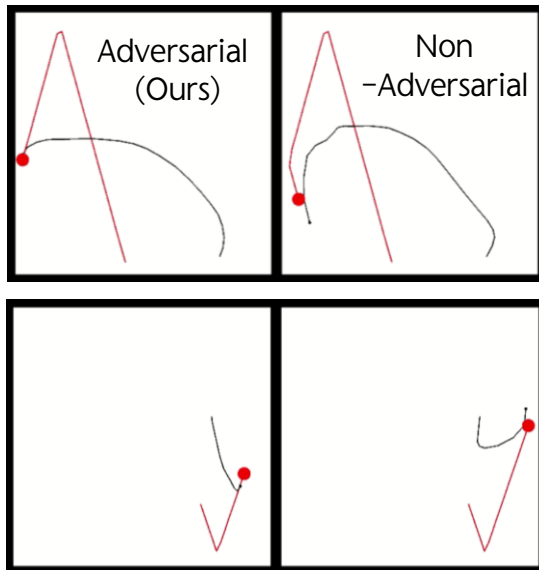
→ 기본적인 접근방식은 동일 but 좀 더 섬세한 tuning이 필요할 것으로 생각



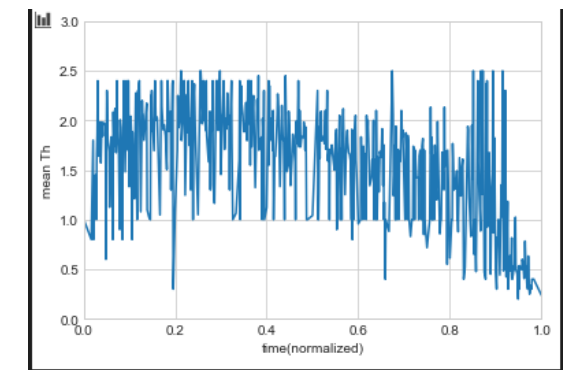
Q1. 단순히 가장 빠르게 target을 클릭하도록 학습시키는 것 VS 적대적으로 학습시키는 것 ?

→ 단순히 빠르게 클릭하는 것이 아니라 ① 인간의 제약조건, ② 상대 agent의 존재를 고려했을 때 타겟을 정확하고 빠르게 클릭하는 것이 목표

→ 결과적으로도 보면 Optimal Policy는 다름



Non-Adversarial Model (SOTA)



Adversarial Model (Ours)