

Know Your Action Set: Learning Action Relations for Reinforcement Learning

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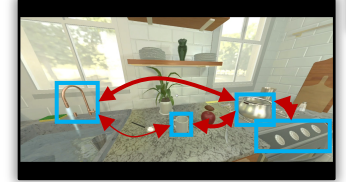
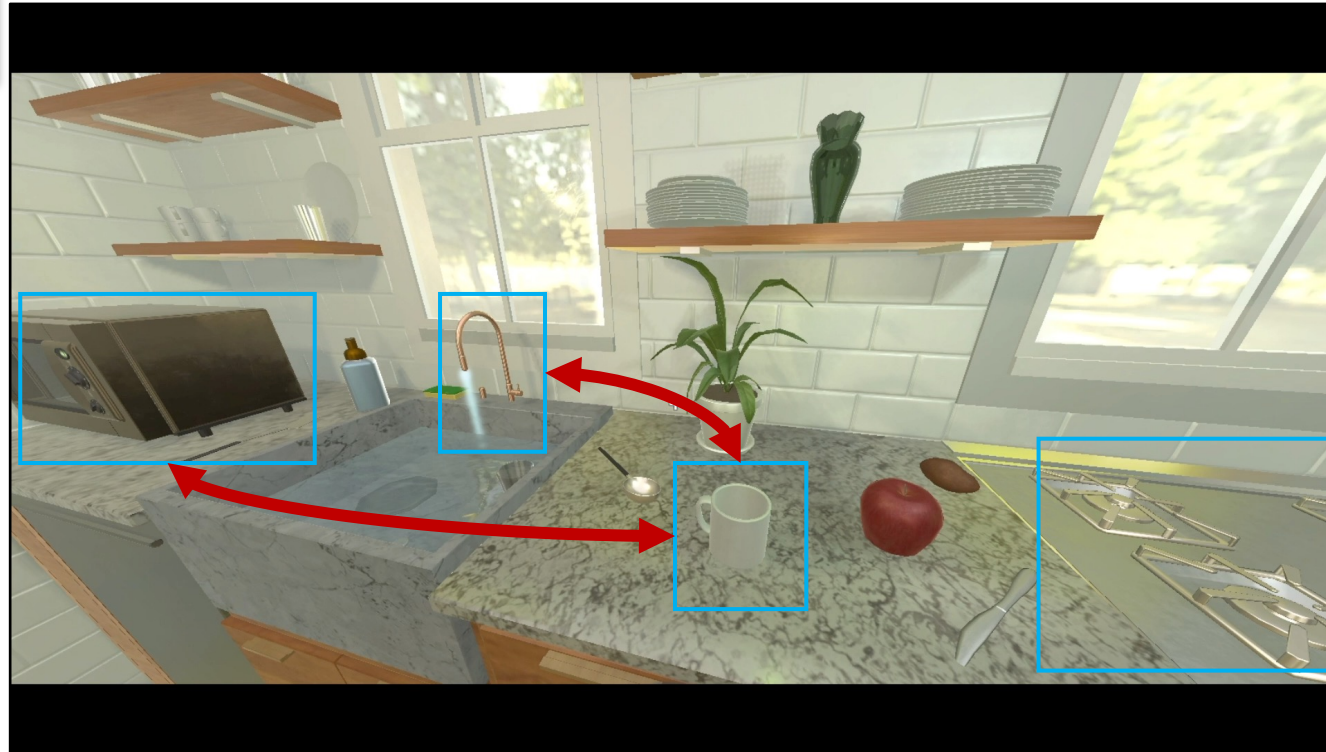
How do we solve tasks with **varying sets of actions**?





Problem

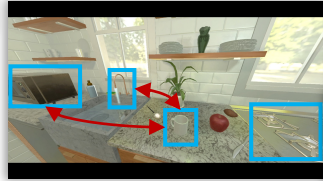
← Varying Action Sets →



RL with varying action sets requires reasoning of **relations** between available **actions**

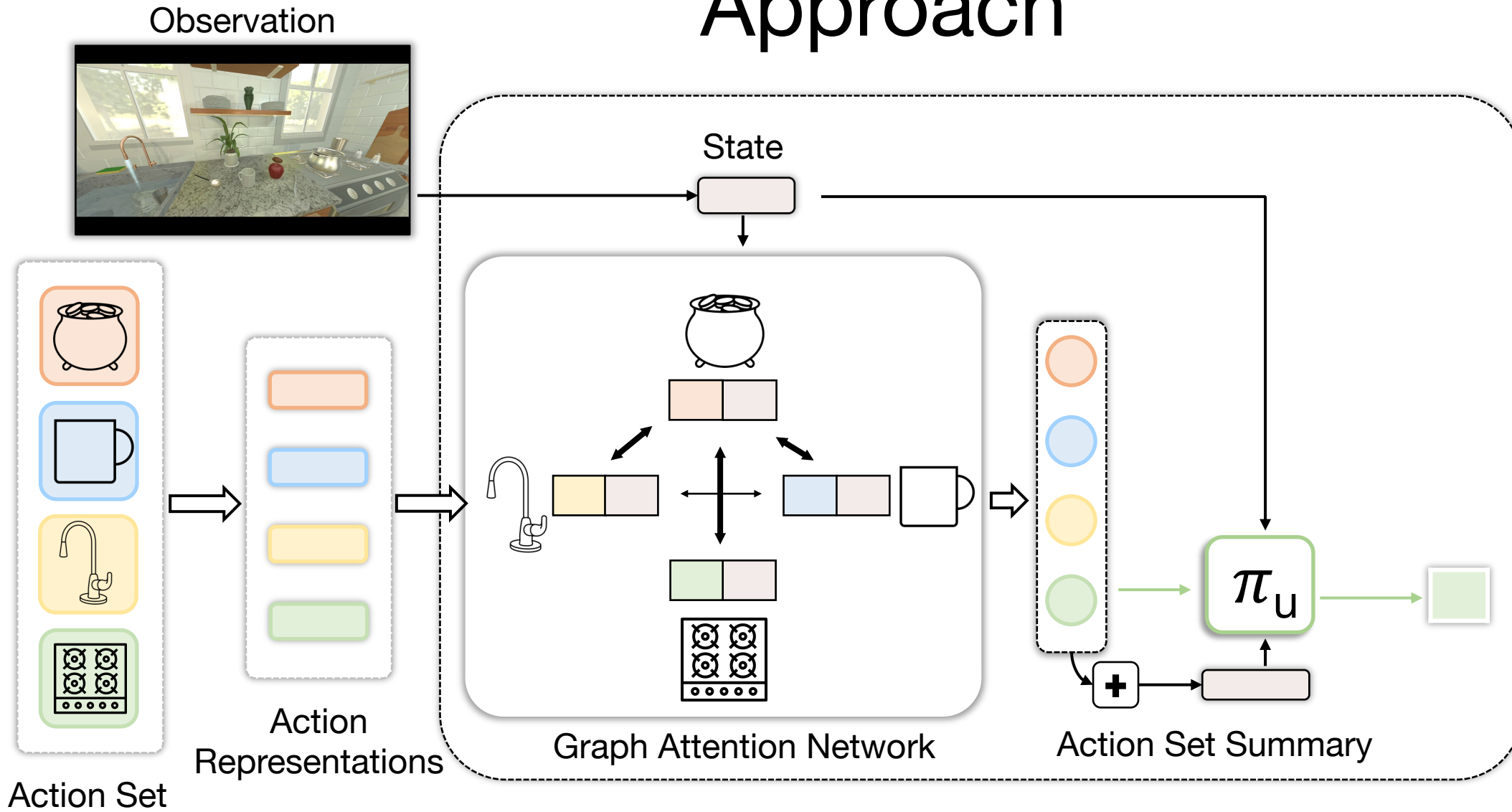
Problem

← Varying Action Sets →



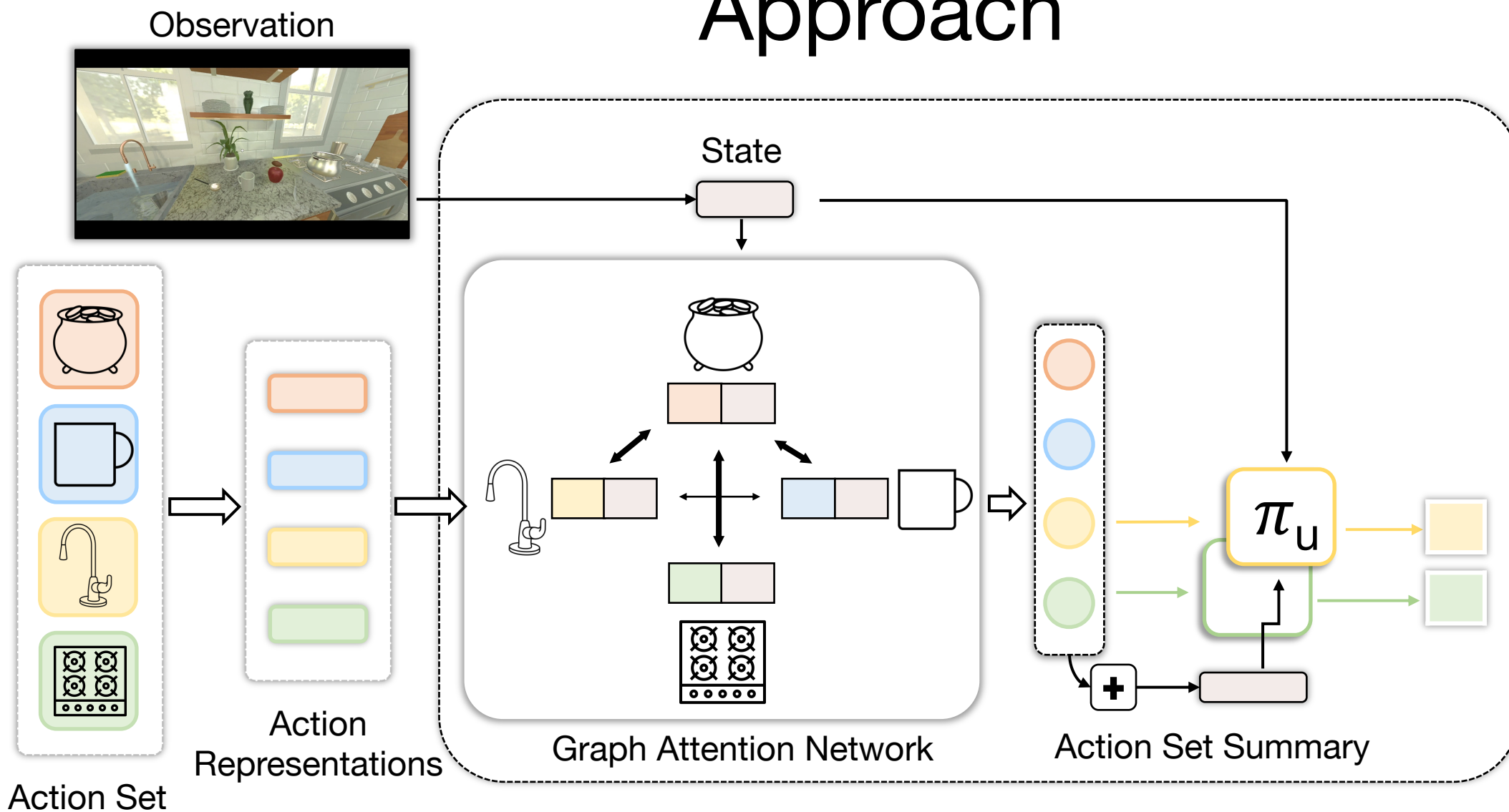
RL with varying action sets requires reasoning of **relations** between available **actions**

Approach



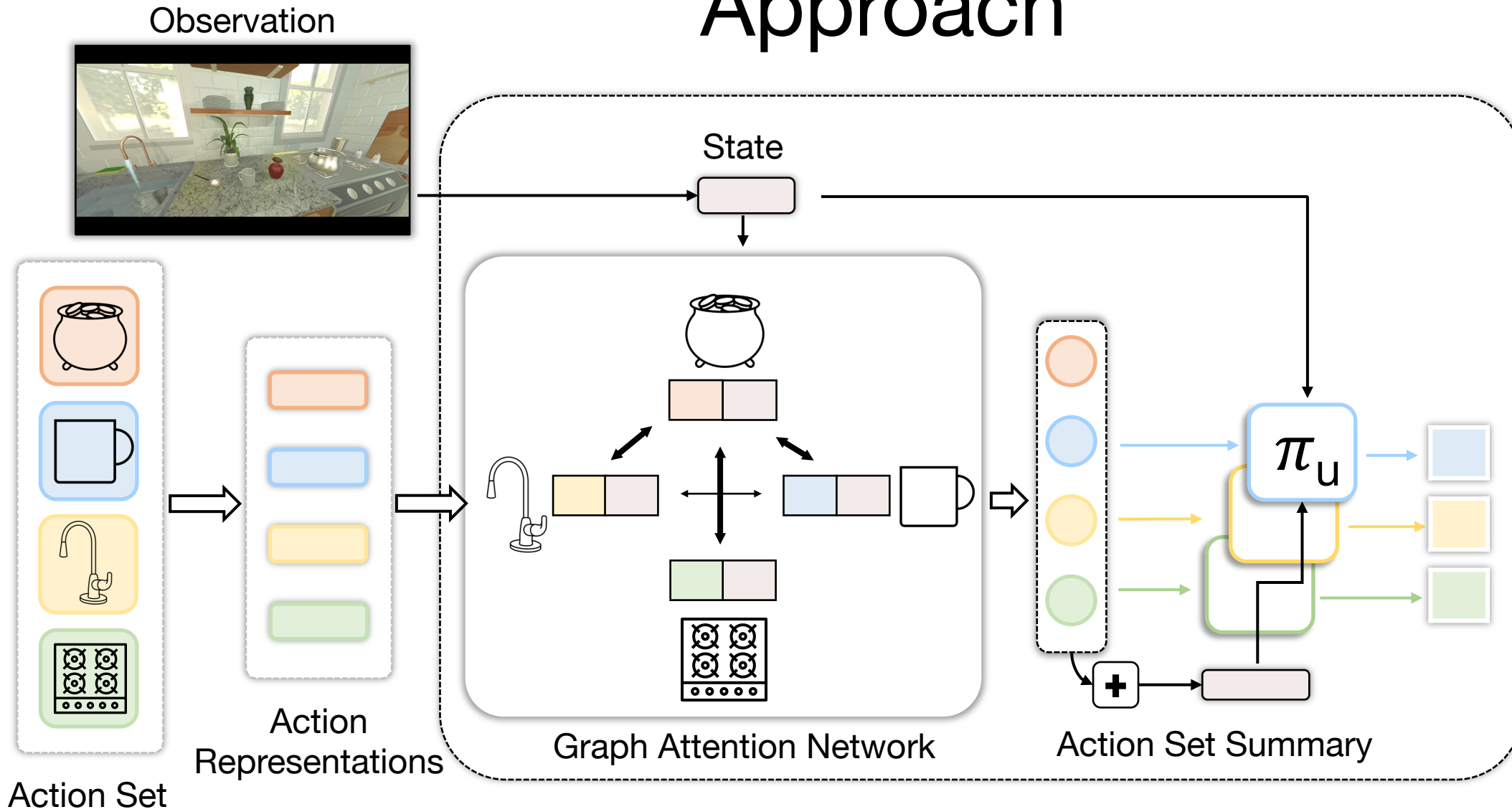
AGILE: Action Graph for Interdependence Learning

Approach



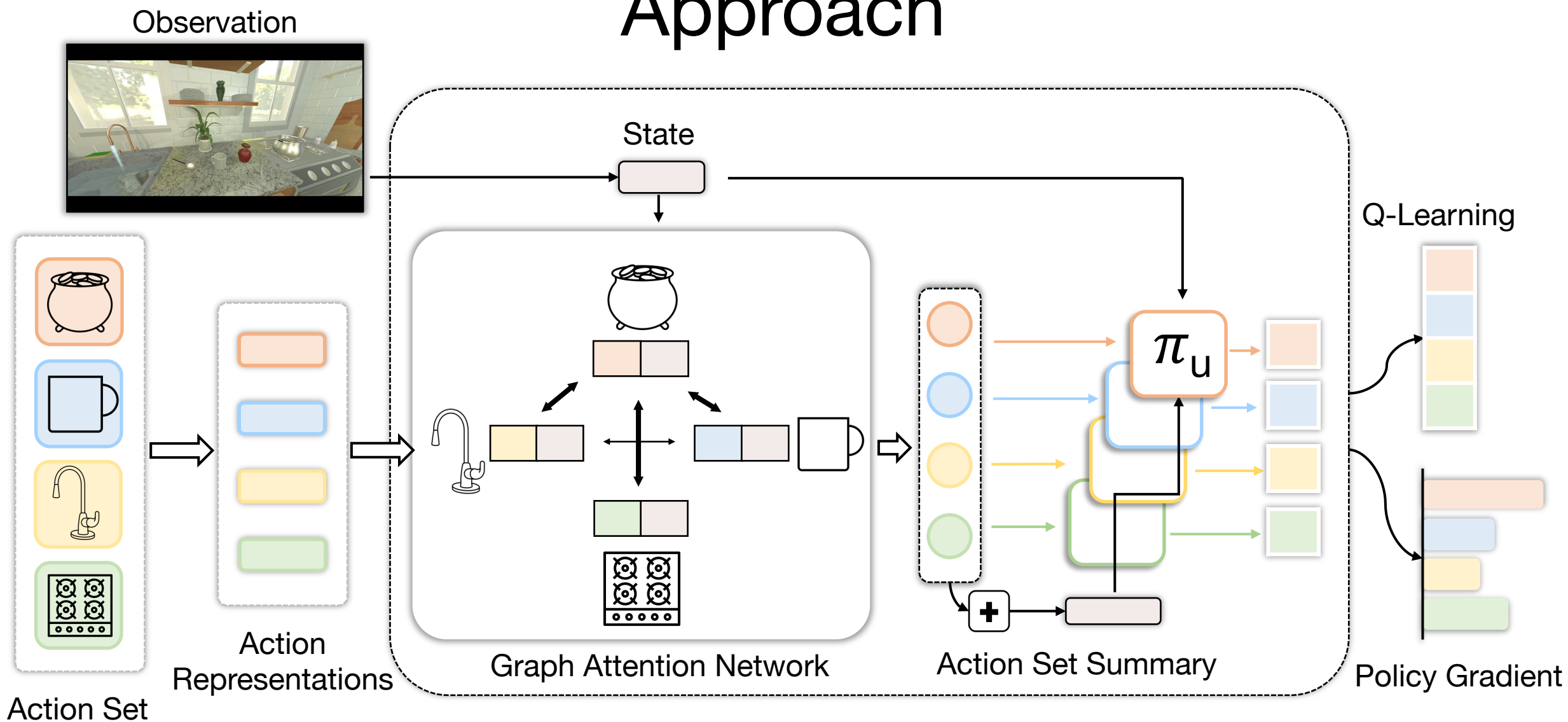
AGILE: Action Graph for Interdependence Learning

Approach



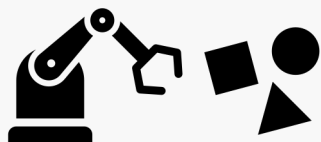
AGILE: Action Graph for Interdependence Learning

Approach

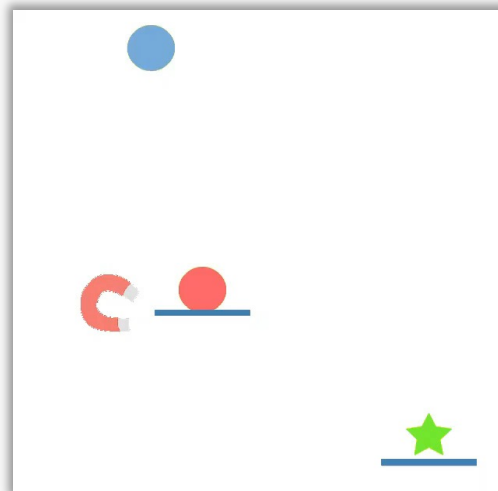


AGILE: Action Graph for Interdependence Learning

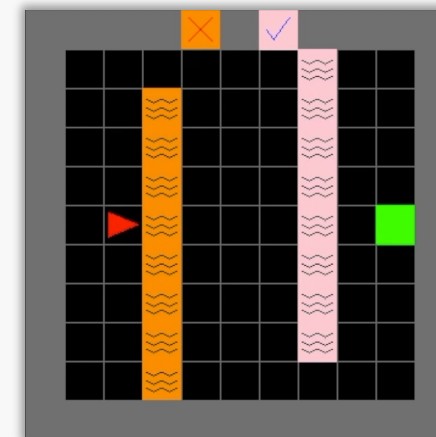
Experiments: Varying Action Set



Physical Reasoning



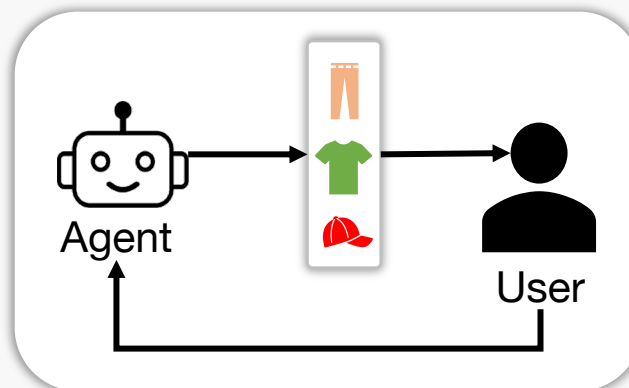
CREATE: Tools



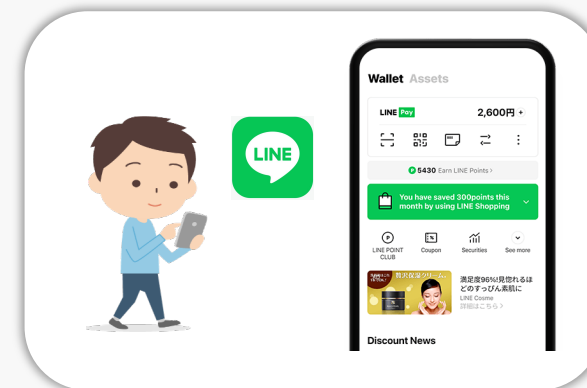
Grid World: Skills



Recommender Systems

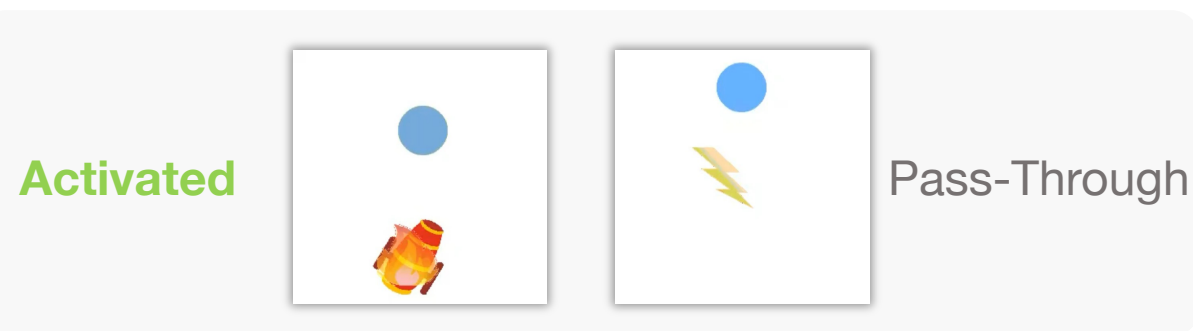
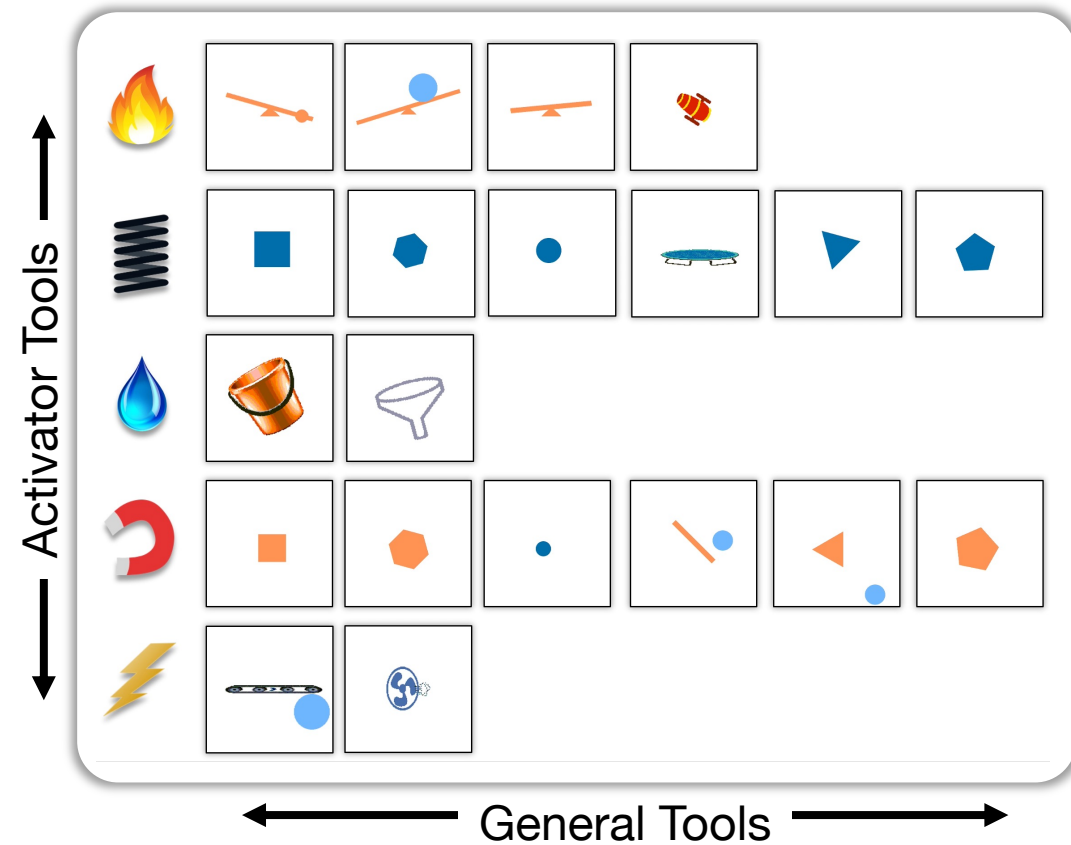
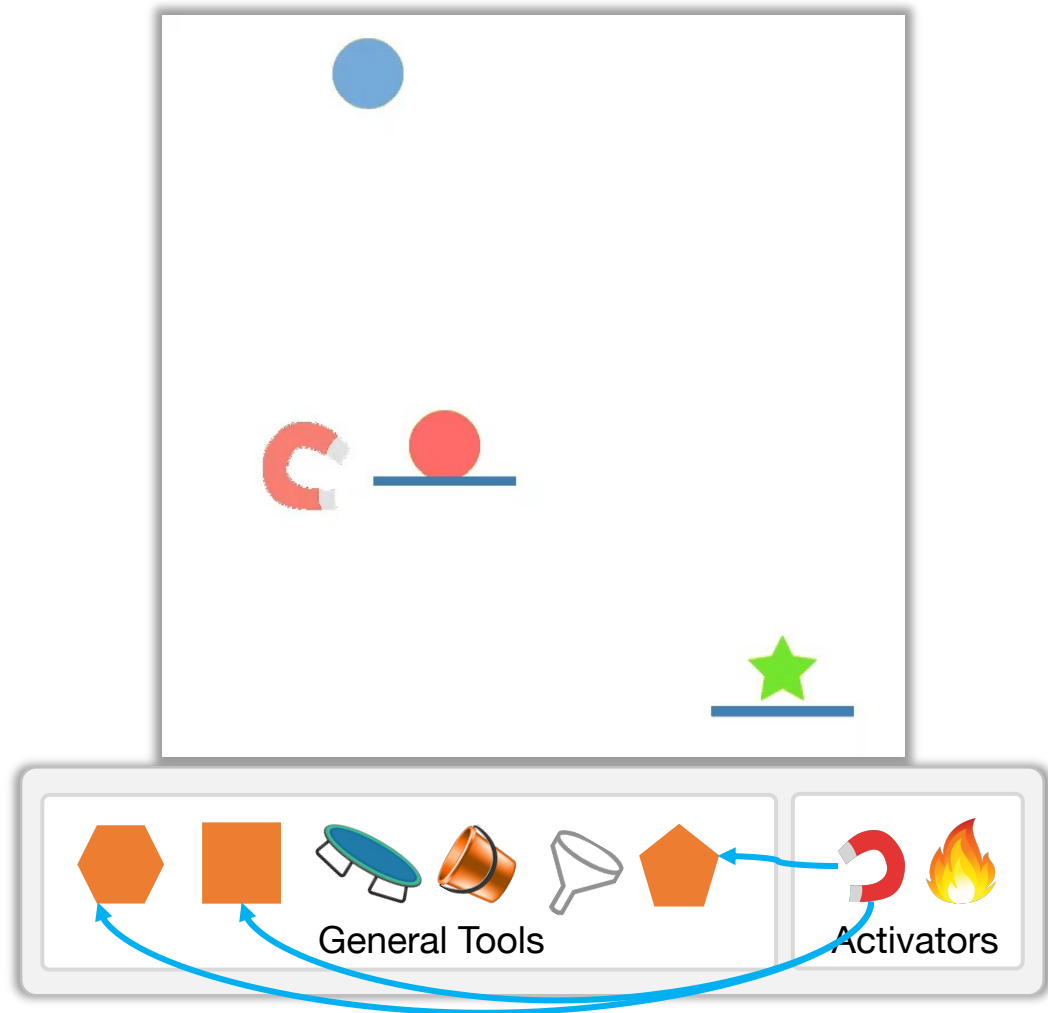


Simulated

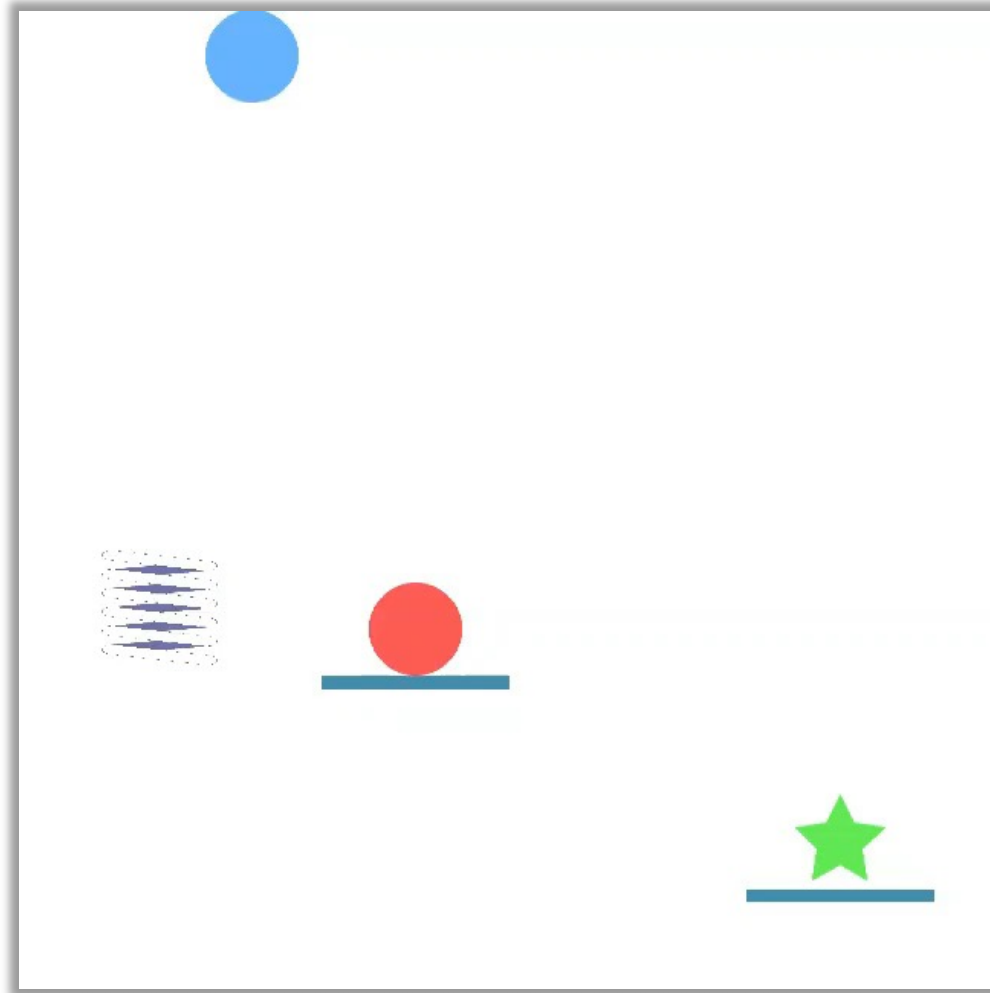


Real-Data

CREATE: Varying Tool Sets

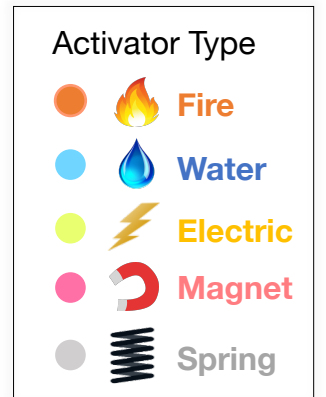
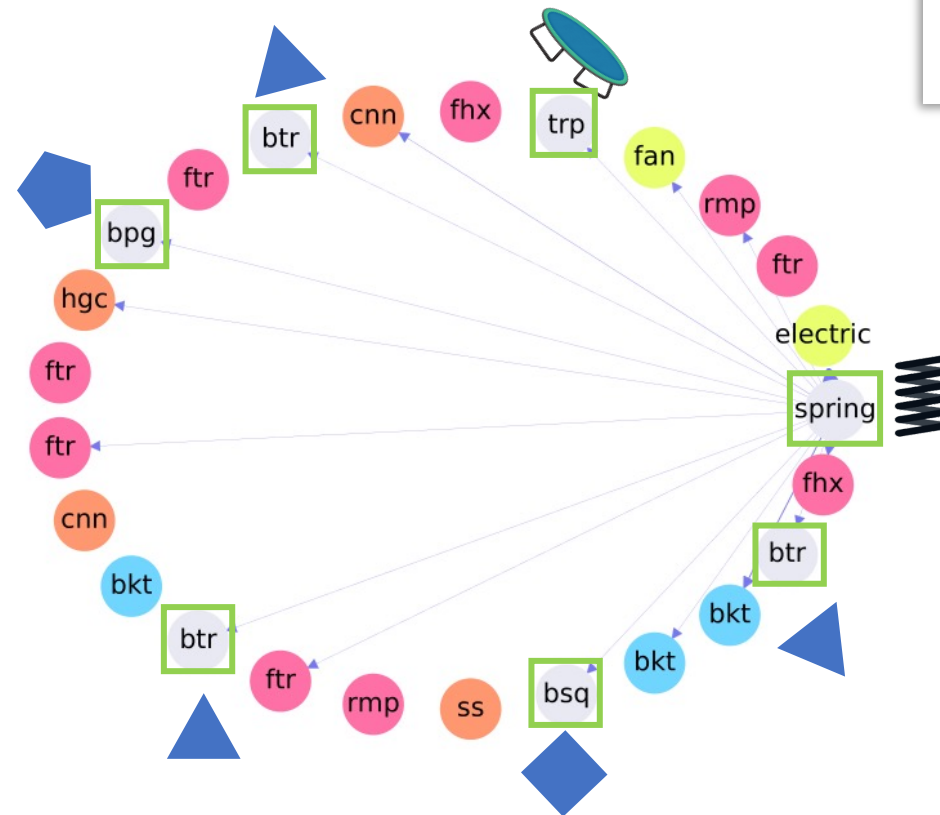
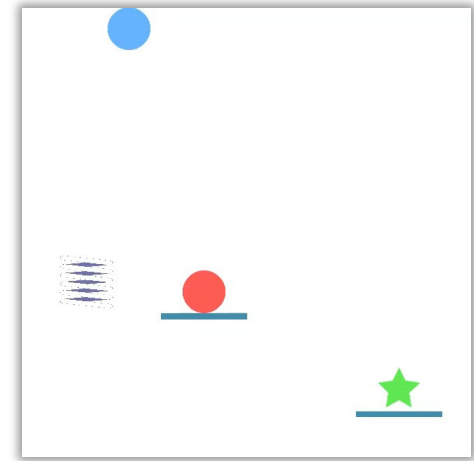
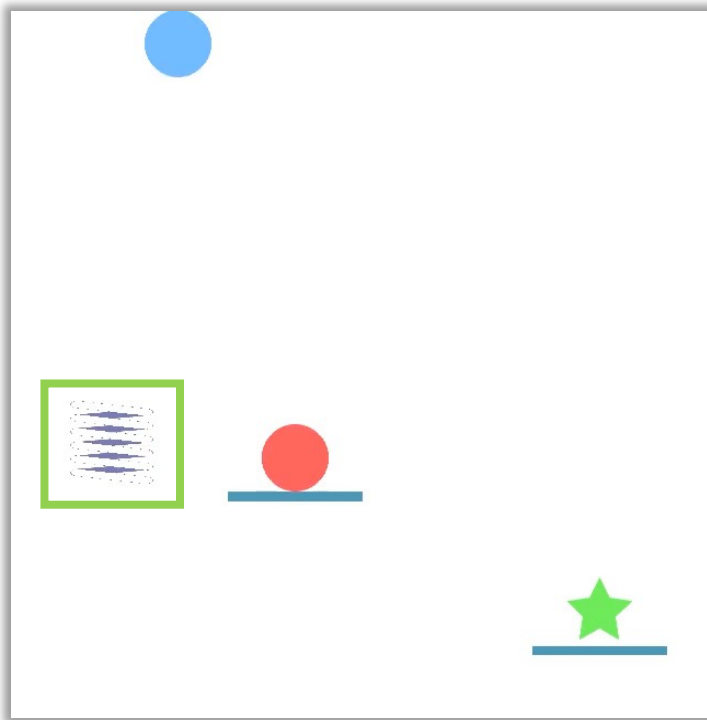


CREATE: Attention in AGILE



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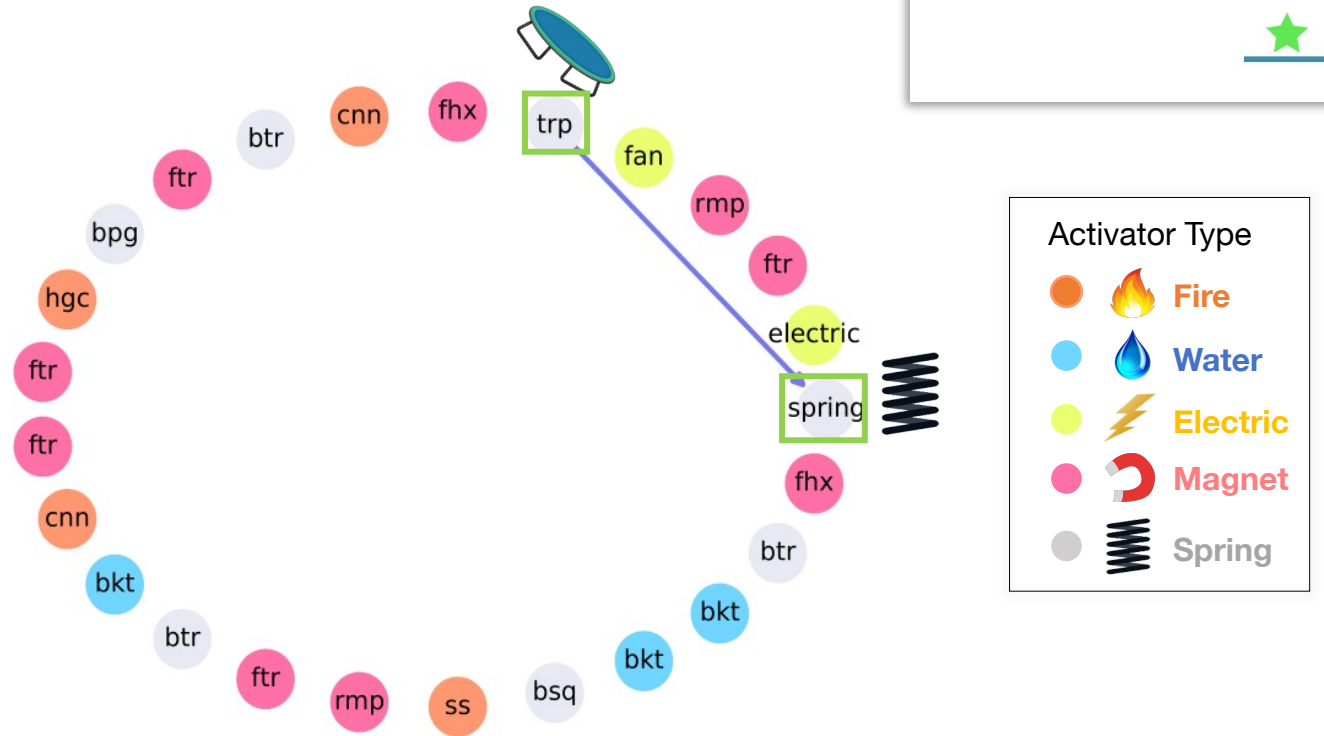
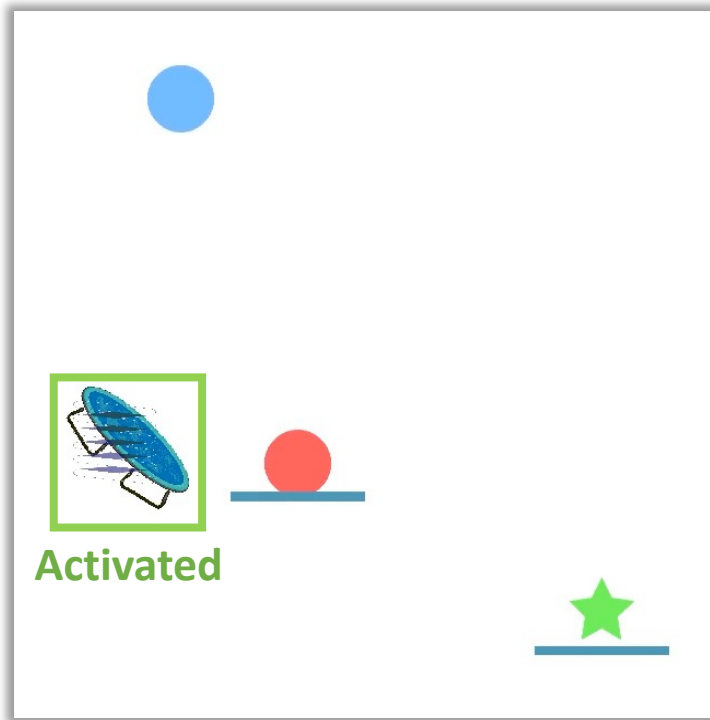
Step-1
Place **Spring**



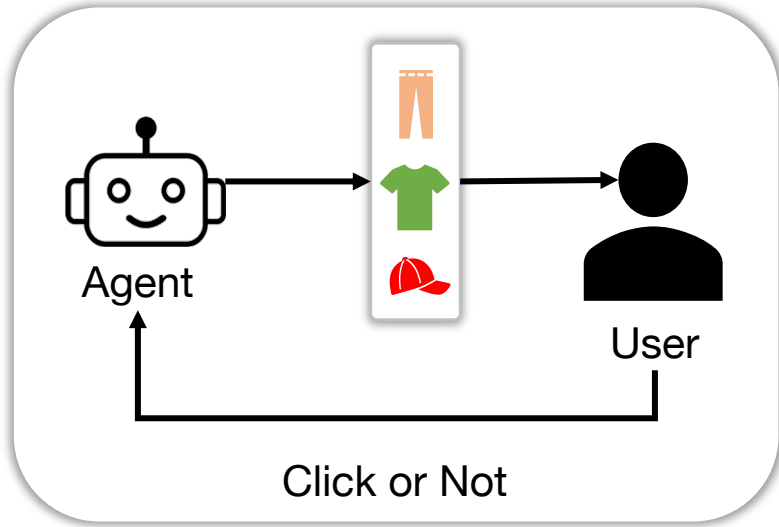
CREATE: Attention in AGILE

Step-2

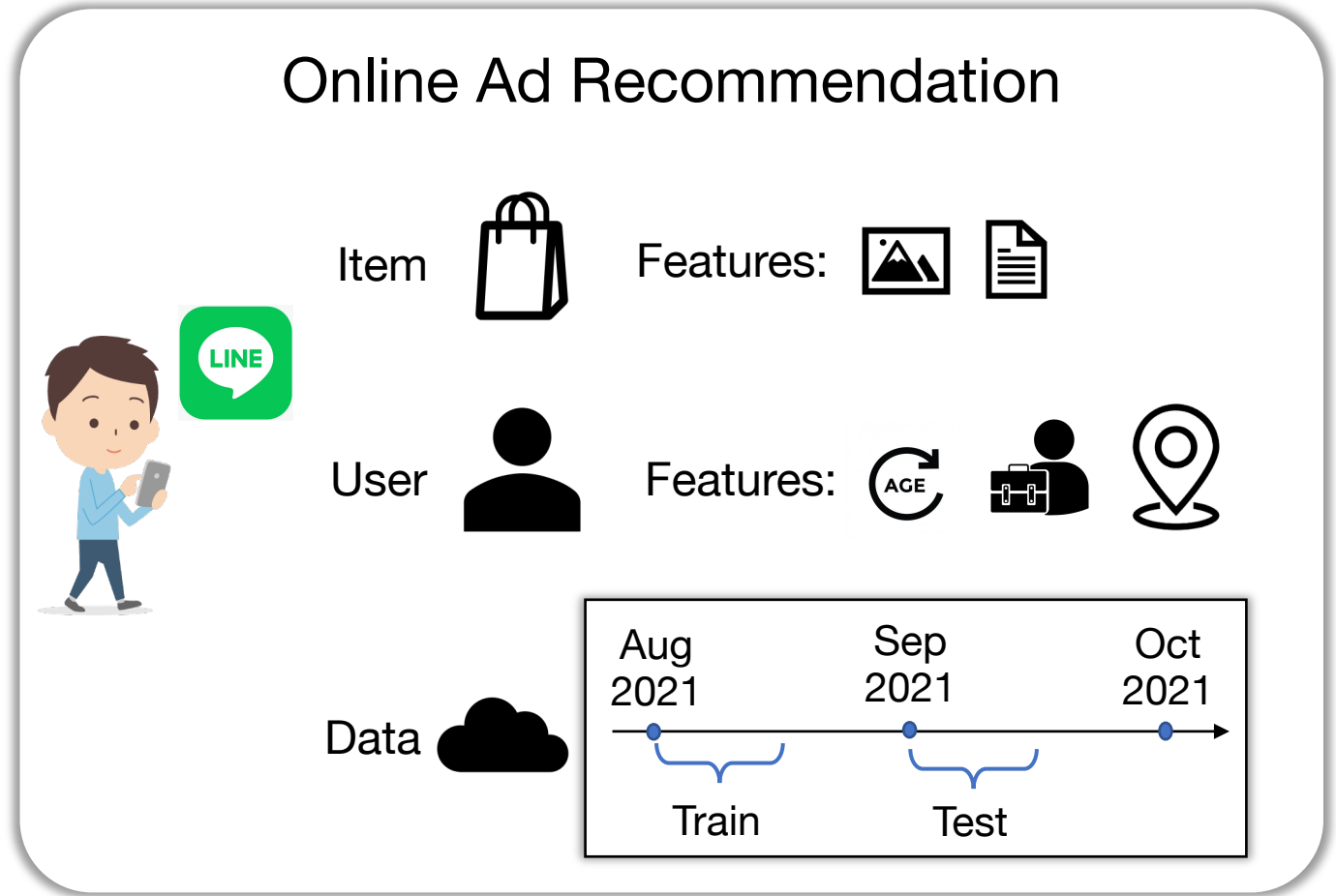
Place **Trampoline**



RecSys: Simulated & Real



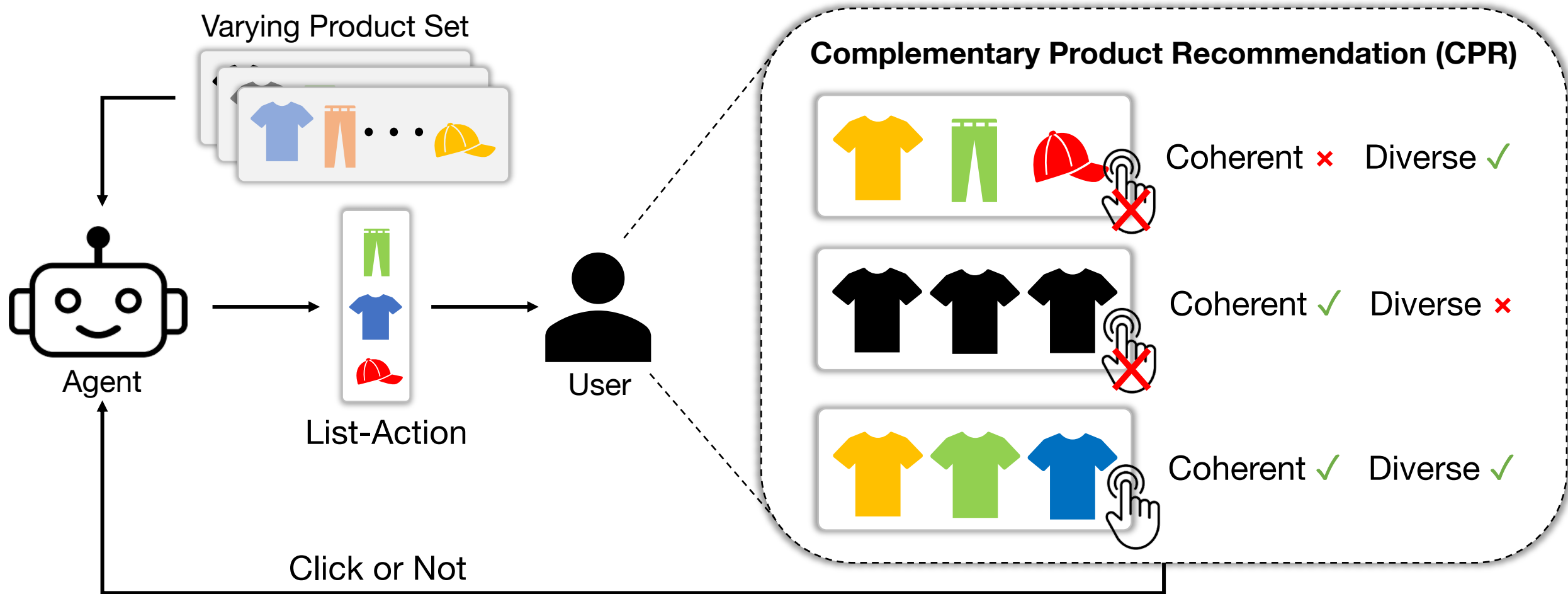
Simulated RecSys
(RecSim [le et al., 2019](#))



Real-Data RecSys



RecSys: Listwise Actions with CPR

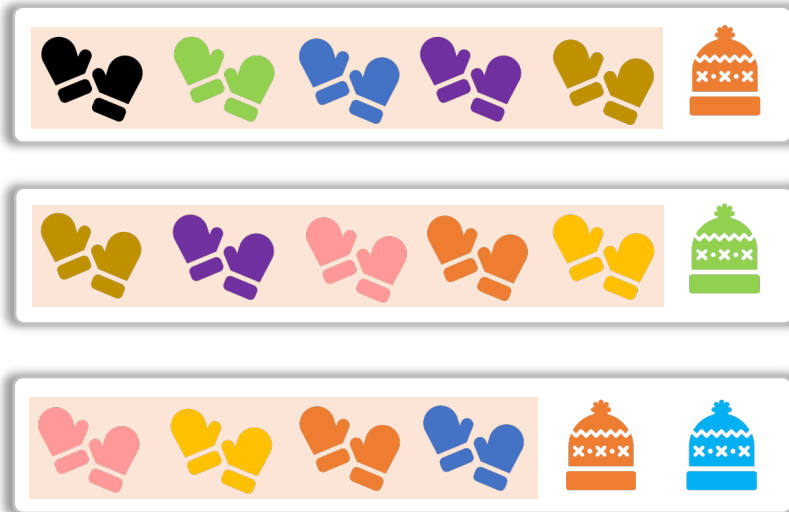


RecSys: Coherent List-Actions for CPR

Action Set (Categories)



AGILE (Ours)



Coherent ✓

$T = 1$

$T = 2$

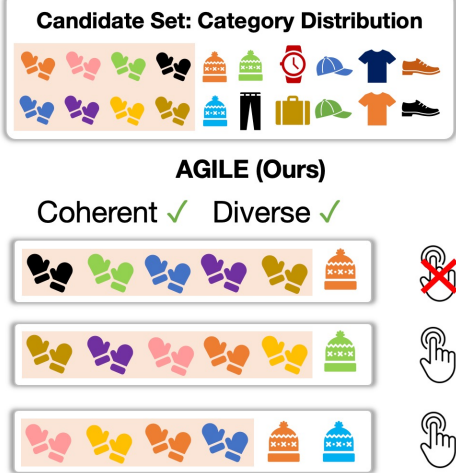
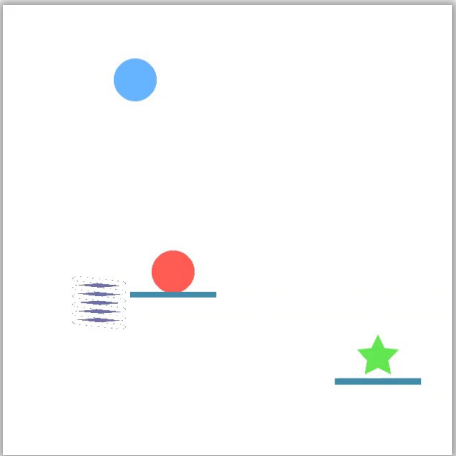
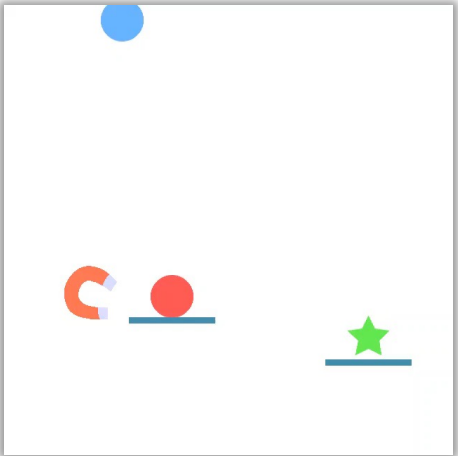
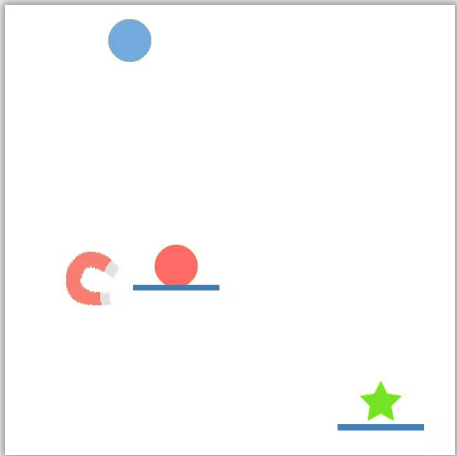
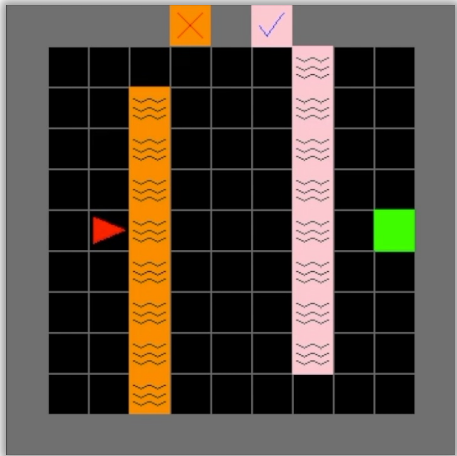
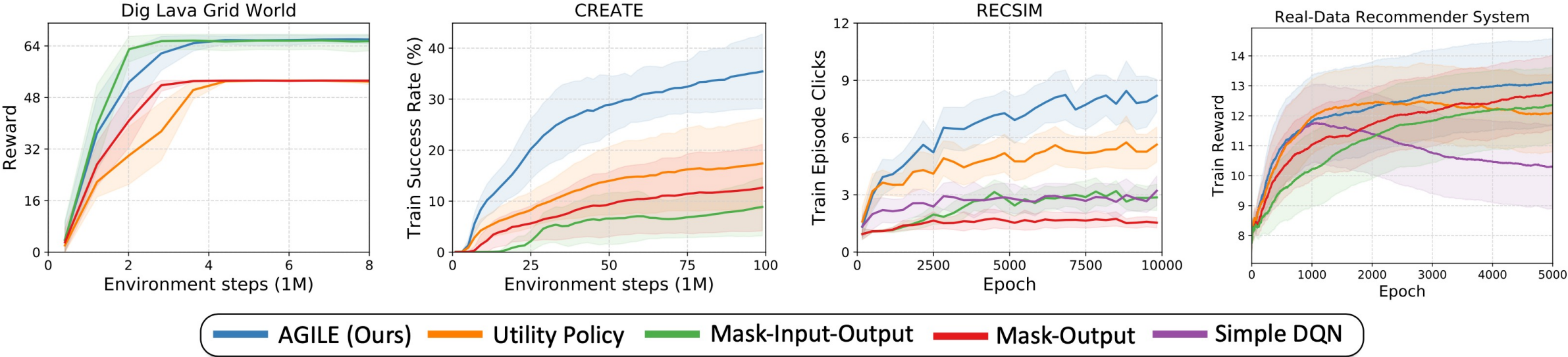
$T = 3$

Baseline

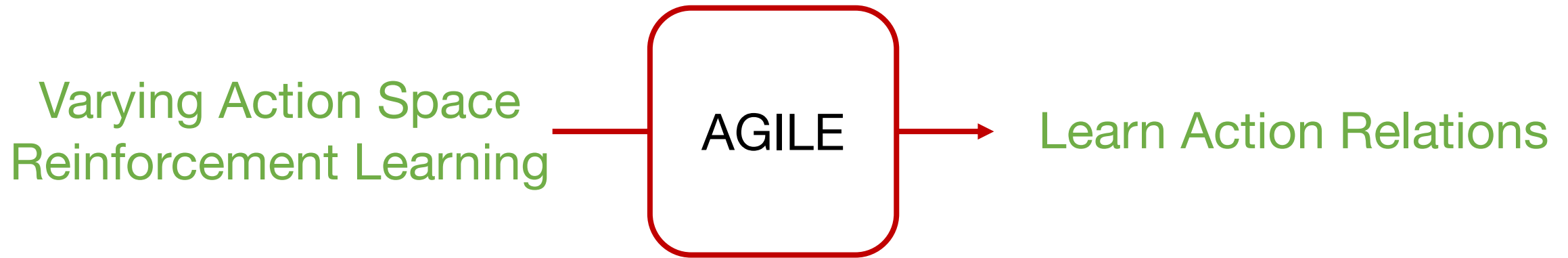


Coherent ✗

Result: Action Representations and Relations



Know Your Action Set



Website: sites.google.com/view/varyingaction



NAVER AI LAB

